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Effects of Relandscaping on the Perceived Market Value of Single Family Residential Property

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ABSTRACT

Professional nurserymen selected four single-family residences in the greater Orlando area that were judged to be in need of relandscaping. Local landscape architects worked with resident owners of the four properties to develop designs that were adapted to each micro environment and each homeowners' needs and preferences. Each homesite was photographed from the front (street) exposure prior to relandscaping and again after plant material had been allowed to "grow in", a period of approximately 60 days. The "before" and "after" photographs were shown to a random sample of 104 licensed real estate professionals. The photos were shown in random order interspersed throughout a portfolio of 35 photos of other single family residences of varying ages in the central Florida area. The real estate professionals were asked to view each photo for 30 seconds and give an estimate of the current market value and number of days-to-sale. The average perceived market values of all four properties were greater after relandscaping, but the average increases in value were sufficient to cover the costs of relandscaping in only two of the four properties. Days-to-sale were significantly reduced for two properties.

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PREFACE

Over the past several years, results of this research have been formally presented to members of the Action Chapter of the Florida Nurserymens and Growers Association (FNGA), to hundreds of Central Florida residents at two annual Greater Orlando Home and Garden Shows, and to members of the Florida State Horticultural Society.

Findings have been disseminated through a video tape entitled "Your Florida Home: The Value of Relandscaping", through a paper published in the Proceedings of the Florida State Horticultural Society, and a press release which was published by 23 newspapers nationwide. This report provides methodological and analytical detail not previously published.

We are very indebted to the Action Chapter of the Florida Nurserymens and Growers Association their financial support of this pioneering effort to evaluate the economic benefits of relandscaping single family residences. We also appreciate the Chapter's collective patience with a project that had more than its share of setbacks and delays. We especially thank Action Chapter members Bob Wiederhold, Pat Dehlinger, Charlie Brown, Mark Byrd and Mike Rinck for their help throughout the project. Charlie Brown deserves special thanks for his efforts in obtaining and providing plant material and installation labor for the four subject properties. Thanks are also due Garth Schweitzer of Schweitzer Design Group (Sanford) and Stephen Pategas, ASLA (Winter Park) for their design expertise in planning the relandscaping of the subject properties.

Thanks are also extended to Dr. Robert Black, Consumer Horticulturist, University of Florida, and to Al Williamson and Bill Abrams, of the Educational Media and Services Department at the University of Florida for producing a video documentary of the relandscaping process. The documentary is entitled "Your Florida Home: The Value of Relandscaping" and is available through the Florida Agricultural Market Research Center.

The authors express gratitude to the four homeowners for their cooperation throughout the entire relandscaping project. They are Mr. and Mrs. Keith Thomas, Mr. and Mrs. Walter Cutler, Mr. and Mrs. Earl Latham, and Dr. Isaac Angel. Without their cooperation, the project would not have been possible. We are also thankful for the cooperation of Belton Jennings and Mike Roth of the Greater Orlando Association of Realtors for their assistance in obtaining the cooperation of area realtors.

EXECUTIVE SUMMARY

- This study evaluates the affect of relandscaping on the perceived market value of single-family residences.

- An "Ugly Yard" contest sponsored by the Action Chapter of the Florida Nurserymen and Growers Association was advertised in the Orlando Sentinel. Participants submitted color photographs of their properties. Out of 300 entries, 10 finalists were selected by a committee from the Action Chapter. The committee then conducted on-site inspections to choose the final four properties to be used in the study.

- Local landscape architects worked with homeowners to develop designs adapted to each micro-environment and each homeowners' needs and preferences.

- Each homesite was then photographed from the front (street) exposure prior to relandscaping and again after plant material had been established for two months.

- The "before" and "after" photographs were shown to a sample of 104 licensed real estate professionals which had been randomly selected from the membership list of the Greater Orlando Association of Realtors. Trained interviewers conducted face-to-face interviews in respondents' offices.

- The eight photos of subject properties ("before" and "after" photos of the four properties) were strategically placed within a portfolio of 35 color photos of single family residences of varying ages in the central Florida area. The order in which the portfolio was shown to respondents was rotated to reduce order bias. The real estate professionals viewed each photo for 30 seconds and were then asked to estimate the current market value and estimated days-to-sale for each property shown in the portfolio.

- Analyses were conducted for each property to determine if the "before" and "after" relandscaping values were statistically different. Days-to-sale were similarly evaluated.

- This study indicates relandscaping can have a positive effect on real estate professionals' perceived values and marketability of single family residences.

- While relandscaping increased the perceived value of all four properties and reduced the "time-to-sale" for three properties, the increased value covered relandscaping costs for only two of the four properties. However, this finding is significant for homeowners contemplating reselling since real estate professionals can influence listing prices and potential home buyers' perception of value.

INTRODUCTION

This study was sponsored by the Action Chapter (Orlando area) of the Florida Nurserymen and Growers Association (FNGA) to determine if relandscaping could be a viable market development option for the Central Florida woody ornamental plant industry. Many industry leaders are of the opinion that relandscaping, if aggressively promoted, could serve to beautify many residential areas of central Florida as well as improve financial returns to producers of outdoor landscaping plant materials. Observation of residential landscapes in Florida reveals that in a few short years many residential landscapes are overgrown and in need of rejuvenation or relandscaping. Many also show the results of poor initial design and plant selection.

Nurseries in other areas of the U.S. have successfully used visual presentations of proposed relandscaping to increase revenues (Fenn, 1994). However, the effects of relandscaping on market values and marketability of residential real estate have received little attention.

OBJECTIVES

The primary objective of this study was to measure the impact of relandscaping on the perceived market value and marketability of single-family residences. It was hypothesized that professionally designed and installed landscaping would have a positive effect on the perceived market values of single-family residential real estate. It was also hypothesized that relandscaping would reduce the period of time required to sell such property.

The ultimate goal of this study was to provide Florida nurserymen and landscapers with research findings that could be used to promote relandscaping to homeowners. Confirmation of the study's hypotheses could serve as a powerful sales tool: relandscaping could not only serve to enhance properties' aesthetics and homeowners' satisfaction while residing on the property, but in the event of resale, relandscaping could have financial benefits as well.

METHODOLOGY

Professional landscapers selected four single family residences in the greater Orlando area that were judged to be in need of relandscaping. Properties ranged in age from under 5 years to approximately 45 years. The property selection process involved participants in an "Ugly Yard" contest sponsored by the Action Chapter of the Florida Nurserymen and Growers Association (FNGA) and publicized in the Orlando Sentinel. Participants in the contest were required to submit a minimum of two color photographs of their properties. Out of 300 submitted entries, a group of 10 finalists was selected by a committee from the Action Chapter. The committee visited each finalist property for closer inspection and interviewed the homeowners. The committee was specifically looking for middle or upper middle income properties with relandscaping potential. Examination of tax assessment records revealed estimated market values of subject properties ranging from approximately $80,000 to $125,000. Homeowner cooperation with contractual conditions was also a consideration in the final selection process. Homeowners were not permitted to make any changes in the structure of their home for the duration of the project. They also agreed to

remove vehicles, garbage cans, and other unsightly items from front-street view to facilitate photography, and they agreed to allow several photography sessions at different times of the day if necessary. In return for their cooperation, homeowners received free design services. They also received plant material, automatic irrigation systems and installation at cost.

Several local landscape architects worked with resident owners of the four properties to develop designs that were adapted to each micro environment and each homeowners' needs and preferences. Each homesite was photographed from the front (street) exposure prior to relandscaping and again after plant material had been allowed to "grow in", a period of approximately 60 days. The "before" and "after" photographs of each property were carefully controlled for uniformity of exposure and viewpoint (Figures 1 and 2).

The "before" and "after" photographs were shown to a random sample of 104 licensed real estate professionals which were selected from the membership list of the Greater Orlando Association of Realtors. Respondents were sent an official University of Florida letter to legitimize the study, but they were not told the exact purpose. Trained interviewers made appointments by telephone with the selected realtors, and conducted face-to-face interviews in respondents', offices using the questionnaire found in Appendix A.

The eight photos of subject properties ("before" and "after" photos of the four properties) were included in a portfolio of thirty-five 5"x7" color photos of single family residences of varying ages in the central Florida area. Thus, there were eight subject photos and 27 photos of other properties. Each photograph was accompanied by a brief, generic description of the property which included the year built, the number of bedrooms, baths, and covered parking spaces, heated and cooled square footage, lot size, and the general

Figure 1. Properties “A” and “B” before and after relandscaping.

3 - 2 - 2
CH & A
Square footage:
1,400 + 400 garage

Built: 1952
Lot Size: 80’x110’=8,800 sq ft
Neighborhood:
Upper middle income, stable

3 - 2 - 2
CH & A
Square footage:
2,100 + 460 garage

Built: 1982
Lot Size: 130’x120’=15,600 sq ft
Neighborhood:
Upper middle income, stable

Figure 2. Properties “C” and “D” before and after relandscaping.

3 - 2 - 2
CH & A
Square footage:
1,800 + 420 garage

Built: 1985
Lot Size: 75’x125’=9375 sq ft
Neighborhood:
Upper middle income, stable

3 - 2 - 2
CH & A
Square footage:
1,700 + 420 garage

Built: 1991
Lot Size: 80’x120’=9,600 sq ft
Neighborhood:
Upper middle income, stable

income level of the neighborhood (Figures 1 and 2). These descriptions, which were brief and to the point, were provided to add a touch of realism and to preclude realtors' questions about such variables. The eight photos of subject properties were placed within the portfolio so that none attracted attention due to primacy. Further, the subject properties were strategically interspersed throughout the portfolio so that "before" and "after" photos of a given property were separated by 15 photos of other properties. The order in which the portfolio was shown to respondents was rotated to reduce order bias; thus half of the respondents were initially exposed to "after" photos of each subject property and half saw "before" photos first. The real estate professionals were allowed to view each photo for 30 seconds and then asked to estimate the current market value and days-to-sale.

A paired t-test was conducted for each property using the difference between the "before" and "after" relandscaping value estimates to determine if the difference in value was statistically significant. This was defined as the "gross" change in values. A brief review of hedonic price literature and a justification of the paired t-test is provided in Appendix B. The same statistical procedure was used to evaluate the difference after the costs were deducted from the "after" value estimate; this was defined as the "net" change in value. Changes in days-to-sale estimates were also evaluated with a paired t-test.

In addition to examining the differences in overall property values, paired t-tests were used to evaluate responses for each subject property by various demographic categories of respondents.

Finally, realtors' age and years experience, education and gender were all examined for possible associations with value and days-to-sale responses for each property using two multiple linear regression models.

The general form of these two models was:

$D\text{-value}_{ij}$ or $D\text{-days}_{ij}$ = f (age_i or $experience_i$, $education_i$, $gender_i$)

Where:

$D\text{-value}_{ij}$	=	differences in gross property values, i.e., post-relandscaping value minus pre-relandscaping value for individual i and property j, where j = properties A through D
$D\text{-days}_{ij}$	=	difference in days-to-sale estimates, i.e., post-relandscaping estimate minus pre-relandscaping estimate for individual i and property j
age_i	=	age of individual i in years
$experience_i$	=	years experience in real estate profession for individual i
$education_i$	=	years of formal education for individual i
$gender_i$	=	1 if male, 0 if female for individual i

Finally, each respondent was asked to name three characteristics, in order of importance, that contribute most to a property's curbside appeal. These open-ended responses were then categorized and ranked.

RESULTS AND DISCUSSION

The following sections address changes in the value of each of the four subject properties, hypothesized to be the result of relandscaping. The "gross" differences in "before" and "after" values ignore relandscaping costs, while the "net" differences reflect the net change in values after relandscaping costs were deducted from the "after" values. Relandscaping's effect on marketability was also examined. "Marketability" was defined as the change in realtors' estimated days-to-sale, calculated as days-to-sale post relandscaping minus days-to-sale prior to relandscaping. Thus, negative values indicate a reduction in days-to-sale, hypothesized to be attributable to relandscaping.

Results of t-tests for differences in pre- and post- relandscaping property values and days-to-sale estimates over all observations (n=104) are shown in Table 1. Results of t-tests for various demographic categories are found in Appendix C, Appendix Tables 1 through 8.

Differences in perceived pre- and post-relandscaping values and days-to-sale estimates associated with respondents' demographic characteristics were examined using the ordinary least squares (OLS) models described in the methodology section above. Realtors' ages and years experience in real estate were both obtained during the interviews. As expected, these variables were highly correlated. After examining various models containing either age or experience, it was found that it made little difference as to which was used.
However, results for the models including "years experience" are reported because of slightly greater R^2 values.

Table 1. Gross and net changes in perceived market value, and differences in days-to-sale for the four residential properties.

	Property			
	A	**B**	**C**	**D**
Difference in gross value(dollars)[a]	8,351	1,058	2,481	7,549
t-value	4.622 †	0.499	0.125	3.386 †
Cost of relandscaping (dollars)	4,722	4,999	3,876	5,870
Difference in net value(dollars)[b]	3,629	-3,941	-1,394	1,679
t-value	2.008*	-1.859	-0.869	0.753
Difference in days to sale (days)	-15	-10	+3	-2
t-value	3.217 †	2.140*	-0.952	0.556

[a] Difference in gross value ignores relandscaping costs.

[b] Relandscaping costs are deducted from "after" values, resulting in a net change in value.

Note: * denotes statistical significance at the 0.05 level and † denotes significance at the 0.10 level.

In general, the OLS models explained little of the variation observed in the dependent variables, i.e. differences in pre- and post landscaping values and days-to-sale estimates. R^2 values were very low; the explanatory variables age (alternatively years experience) gender and education usually explained only one to five percent of the total variation in the variation in value differences or days-to-sale. Further, most t-tests on the parameter estimates were not statistically significant. Thus, there appears to be little or no evidence that the perceived effects of relandscaping were associated with realtors' age, experience, educational attainment or gender.

The following subsections present detailed findings for each of the subject properties which were evaluated in this study.

Property A

Built in the 1950's, Property A was the oldest subject property included in this study. It was also on the smallest lot and underwent a comparatively drastic change in landscaping. Changes in the plant material included new turf, woody ornamentals of varying sizes and species, as well as colorful flowering annuals. In addition to changes in the plant materials used for property A, a retention wall was added along the front of the property, and a straight brick walkway was replaced by a curving concrete walkway running from the sidewalk paralleling the street to the front door. A privacy wall was also added on one side of the house which impacted the front-street view (Figure 1, property A).

On average, the realtors estimated that property A would sell for $88,887 before relandscaping and $97,237 after relandscaping (Table 1, Figure 3). The perceived change in market value after relandscaping property A averaged $8,351. This was the largest difference in market value of the four subject properties. The cost of relandscaping property A was $4,722, which yielded a net increase in perceived market value of $3,629 (Figure 4). Property A was the only subject property to show a statistically significant change in perceived gross and net market values (Table 1).

Property A also showed the largest reduction in days-to-sale estimates. Before relandscaping, the realtors' estimates of number of days-to-sale averaged 122 days. After relandscaping, the average days-to-sale estimate was 107 days, for a net reduction of 15 days (Table 1, Figure 5).

Because of the relatively large differences in pre- and post- relandscaping values for property A, many of the demographic categories reflected statistically significant

Figure 3. Average perceived values of subject properties before and after relandscaping.

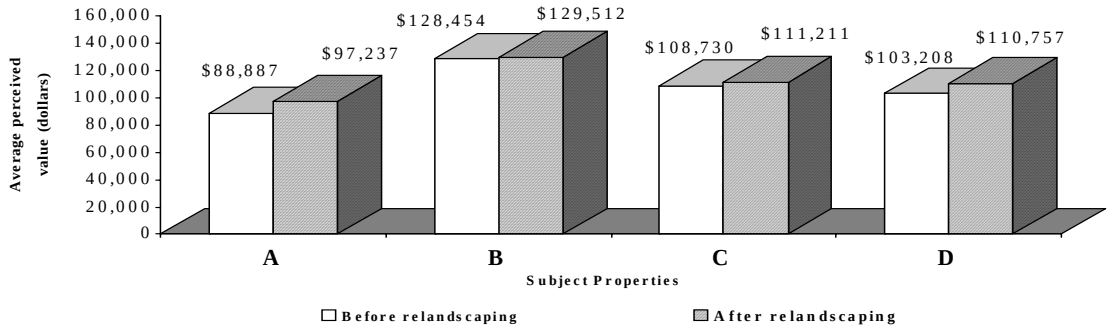


Figure 4. Average perceived changes in home values compared with relandscaping costs.

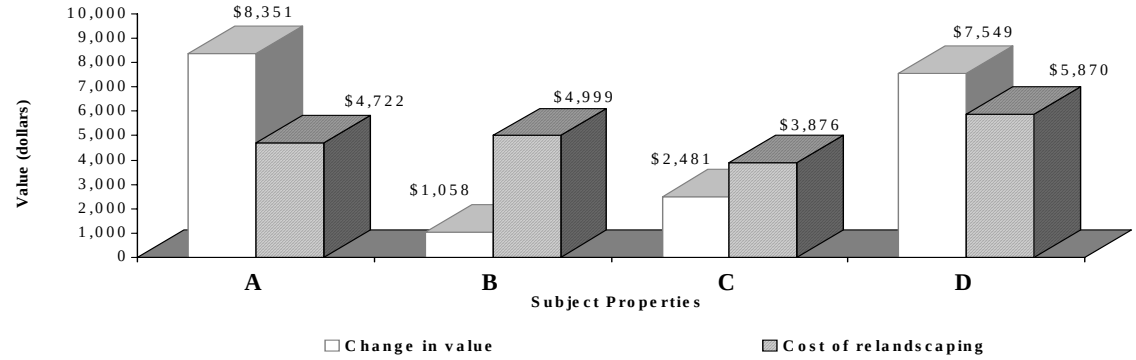
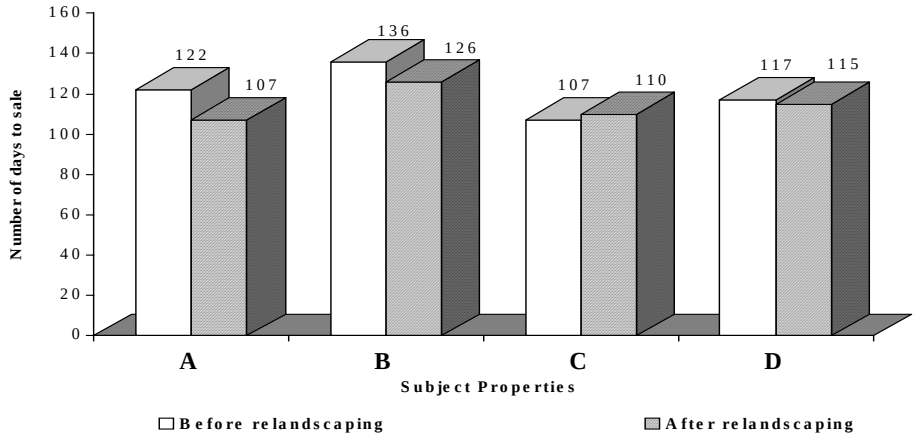


Figure 5. Average estimated number of days-to-sale for subject properties before and after relandscaping.



associations between pre- and post-relandscaping values or days-to-sale estimates and realtors' experience, gender, or educational attainment (Table 2).

However, care must be used in interpreting the statistical significance of the t-tests associated with the individual demographic categories. For example, a statistically significant t-value on one age category and a non-significant t-value on another age category does not mean that the variables for the two categories are significantly different from each other. Rather, it signifies that the variable for the category with the statistically significant t-value is significantly different from zero.

Table 2. Estimated effects of realtors' experience, gender and education on perceived differences in pre- and post- relandscaping and days-to-sale.

			Explanatory variables			
			Experience	Gender	Education	
		Mean =	14.7	0.48	15.1	
Dependent variable, property[a]	Dependent variable mean	Intercept	Range= 1-50	0,1	12-20	R^2
			----------Parameter estimates ----------			
D-value, A	8,351	-6,140	-59	3,481	907	0.0226
D-days, A	-14.69	-68.23	0.53	8.85	2.75	0.0447
D-value, B	1,058	31,591	-419	5,065	-1,775	0.0500
D-days, B	-10.38	101.96	-0.06	8.12	-7.64**	0.0773
D-value, C	2,481	-6,268	182	-852	429	0.0125
D-days, C	3.39	-8.67	0.25	-2.06	0.62	0.0047
D-value, D	7,549	503	559*	-10,296*	249	0.0793
D-days, D	-2.21	16.09	-0.02	-6.45	-0.99	0.0109

[a] "D-value" refers to the difference between post- relandscaping values and pre- landscaping values. Thus, a positive value reflects an increase in property value hypothesized to be a result of relandscaping. "D-days" refer to the difference in days-to-sale. A negative value indicates a reduction in days-to-sale. A negative value indicates a reduction in days-to-sale, hypothesized to be a result of relandscaping.

Note: ** denotes statistical significance at the 0.01 level, * significance at the 0.05 level, and † significance at the 0.10 level.

Property B

Property B was built in the early 1980's. It was situated on a corner lot that was approximately one-third of an acre in size, considerably larger than the other subject properties. Changes in the plant material included new turf and woody ornamentals of varying sizes and species. Because of the larger lot size and two street exposures, the changes were not as striking in the photographs as with property A (Figure 1, property B).

On average, the realtors estimated that property B would sell for $128,454 before relandscaping and $129,512 after relandscaping (Figure 3). Thus, the perceived change in market value after relandscaping property B averaged $1,058. This was the smallest change in market value of the four subject properties. The cost of relandscaping property B was $4,999 which yielded a net loss in perceived market value of $3,941. Property B did not show statistically significant changes in estimated gross or net market values (Table 1). However, property B did show a statistically significant reduction in days-to-sale estimates. Before relandscaping, the realtors' estimates of number of days-to-sale averaged 136 days. After relandscaping, the average days-to-sale estimate was 126 days for a net reduction of 10 days. Compared to the other three subject properties, only property A showed a greater reduction in days-to-sale (Table 1, Figure 5).

Few statistically significant differences in pre- and post-relandscaping values were found for the various demographic categories (Appendix Table 4). Also, no statistically significant associations were found between value estimates and realtors' demographic variables. However, there was a statistically significant negative association between days-to-sale estimates and realtors' educational attainment (Table 2). This could mean that

respondents with more formal education took greater note of the effects of relandscaping and reduced their days-to-sale estimates accordingly.

Property C

Property C was built in the mid 1980's on a modest sized lot. Changes in plant material for property C were modest; two small trees were removed and a larger tree added near the road. The turf, already in good condition, was not replaced. Existing foundation plantings of woody ornamentals were replaced by newer, low-growing varieties and colorful annuals in a more aesthetically pleasing design (Figure 2, property C).

Realtors estimated on average that property C would sell for $108,730 before relandscaping and $111,211 after relandscaping, resulting in a change in the perceived gross market value after relandscaping of $2,481 (Table 1, Figure 3). The cost of relandscaping property C was $3,876 which yielded a net loss of $1,394. These changes in gross or net estimated market values were not statistically significant (Table 1).

Pre- relandscaping, realtors' estimates of days-to-sale averaged 107. Post-relandscaping, the average estimated days-to-sale was 110, for a net increase of three days. However, this unexpected increase was not statistically significant (Table 1, Figure 5).

There were no statistically significant gross or net pre- and post-relandscaping values for property C or for days-to-sale estimates for any of the demographic categories of respondents (Appendix Tables 5 and 6). Further, the OLS models revealed no statistically significant associations between changes in perceived property values or days-to-sale estimates and realtors' experience, gender or educational attainment (Table 2).

Property D

Property D was the newest subject property included in this study. Built in the early 1990's, it was also situated on a modest sized lot, 80'x120'. Like property A, the relandscaping effort was comparatively dramatic. Before relandscaping, the only plant material in front of the home was healthy turf and small foundation plantings along the street side perimeter of the house and garage. The most noticeable relandscaping effort included the addition of pine trees, palm trees and some low-growing perennial plant material situated in a large island in the center of the front yard and near the street. The monotonous foundation plantings were replaced with a greater variety of woody ornamentals as well (Figure 2, property D).

The realtors estimated that property D would sell for $103,208 before relandscaping and $110,757 after relandscaping (Table 1, Figure 3). The perceived change in market value after relandscaping property D averaged $7,549, the second highest difference in market value of the four subject properties. The cost of relandscaping property D was $5,870 which yielded net increase in perceived market value of $1,679. Property D showed a statistically significant change in perceived gross market value, but not after the cost of relandscaping was subtracted (Table 1).

Before relandscaping, the realtors' estimates of number of days-to-sale averaged 117 days for property D. After relandscaping, the average days-to-sale estimate was 115 days for a net reduction in time-to-sale of two days. However, this difference was not statistically significant (Table 1, Figure 5).

Because of the large variability for value and relatively small numbers of observations for days-to-sale estimates, within the various demographic categories, few of the t-tests were statistically significant (Appendix Tables 7 and 8). However, the OLS model indicated that the change in property

D's pre- and post-relandscaping value was positively associated with realtors' professional experience. On average, a one year increase in realtors' experience was associated with an increase of nearly $660 in the gross value of property D. Another statistically significant finding was that males tended to evaluate property D rather harshly. On average, male realtors' perceived change in value for property D was about $10,000 lower than that of females' (Table 2). One possible explanation for this large gender difference is thought to lie in the new relandscaped design; several casual observers (not respondents) have commented that the new design is "cutesy" and possibly high maintenance. Male respondents may have held similar views, and since males are frequently responsible for landscape maintenance, they may have consciously or subconsciously reduced their estimates of the relandscaped property D. There were no statistically significant relationships between days-to-sale estimates and any of the realtors' demographic variables (Table 2).

After viewing photos of all the properties in the study portfolio, respondents were asked to list the three most important characteristics, in order of importance, which contribute to the "curbside appeal" of any given property (Table 3). The question was posed as strictly open-ended. By far, landscaping ranked as the number one response, even though respondents had not been told the specific purpose of the study in an effort to reduce response bias. Out of 104 responses, 100 (96 percent) mentioned landscaping as the first, second, or third most important characteristic affecting curbside appeal. Fifty-four (52 percent) ranked landscaping as the one most important home characteristic affecting curbside appeal. Other commonly mentioned attributes included the condition of the paint, the roof condition, general condition, and neatness and cleanliness of the exterior, each mentioned by about 30 percent of all respondents. Other less commonly mentioned characteristics were architectural aspects, paint color, neighborhood condition, location, lot size, construction quality, age and the front door (Table 3).

Table 3. Realtors' rankings of "curbside appeal" characteristics.

Characteristics	Ranking of curbside appeal characteristics				
	First	Second	Third	All responses	Percent of Total[a]
	(- - - - - - - - - - Number of respondents - - - - - - - - - - - -)				
Landscaping	54	25	21	100	96.2
General Maintenance:					
Paint condition	8	17	8	33	31.7
Roof condition	4	15	13	32	30.8
General condition	6	15	10	31	29.8
Neatness, cleanliness	12	5	8	25	24.0
Front door	1	2	2	5	4.8
Design, Quality & Age:					
Architectural aspects	9	4	11	24	23.1
Paint color	3	9	4	16	15.4
Construction quality	1	2	1	4	3.8
Age	1	2	1	4	3.8
Neighborhood condition	2	3	11	16	15.4
Location	3	1	2	6	5.8
Lot characteristics	0	1	5	6	5.8
Size of lot	0	1	0	1	1.0

[a] Percentages are based upon 104 respondents.

CONCLUSIONS

In conclusion, this study indicates that relandscaping can have positive effects on real estate professionals' perceived values and marketability of single family residences. Relandscaping increased the perceived value of all four and reduced the estimated "time-to-sale" for three of the four properties. However, the increases in perceived values were sufficient to cover relandscaping costs for only two of the four properties. This finding is significant for homeowners contemplating selling their property, because real estate professionals can influence listing prices and potential home buyers' perception of value as well. Further, the "Ugly Yard" contest used to select the subject properties for this study revealed considerable interest in relandscaping among central Florida residents. This interest may indicate an unmet need among homeowners for professional assistance with relandscaping. Experience among nursery operators in other areas has shown that homeowners are more likely to purchase relandscaping when dramatic "before" and "after" results can be demonstrated. Although it was not available for this study, the advent of digital photography has made customized "before" and "after" demonstrations practical and feasible for homeowners' specific properties. This technique has been used as a very effective sales tool (Fenn, 1995). Further, there was a strong consensus among realtors that landscaping was the most significant factor affecting curbside appeal. Thus, the landscape probably warrants greater attention from homeowners preparing their property for resale.

The results of this study, coupled with appropriate relandscaping planning and digital photography, could be used as effective market development tools for the Florida nursery industry.

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APPENDIX A: Survey Instrument

UNIVERSITY OF
FLORIDA

Institute of Food and Agricultural Sciences
Food and Resource Economics Department
Florida Agricultural Marketing Research Center
Email: DEGNER@FRED.IFAS.UFL.EDU

1083 McCarty Hall
PO Box 110240
Gainesville FL 32611-0240
Telephone (352) 392-1871
Fax (352) 392-1886

August 1, 1996

Dear Realtor:

The Market Research Center at the University of Florida in Gainesville is conducting a research project which will identify key factors affecting values of residential real estate in the greater Orlando area.

You were randomly selected to participate in this study. *(Interviewer)*, one of my research assistants from Barbara Nolan Market Research, Inc., will be calling you in the next several weeks to set up an appointment to interview you. She will ask you to view a portfolio of photographs of single family residences and give "curbside appraisals." The interview typically takes about 20 minutes and can be arranged to fit your schedule. Your responses will remain strictly confidential and will be used only for research purposes.

Your participation in this study is extremely important. As a token of our appreciation, you will receive a copy of our final report.

When *(Interviewer)* calls, please set up an appointment as soon as possible. I am sure you will find the interview interesting. If you have any questions, please call me at 1-800-4UF-POLL (1-800-483-7655). We are looking forward to your participation.

Sincerely,

Robert L. Degner
Professor and Director

Name:_____

Firm:_____

Street Address:_____

Mailing Address:_____

Phone:_____

Contacted:_____

Interview Date:_____

RELANDSCAPING PROJECT
REAL ESTATE AGENT/APPRAISER SURVEY
INTRODUCTION

The Florida Agricultural Market Research Center at the University of Florida in Gainesville is conducting a survey of licensed real estate professionals in the greater Orlando area. **The purpose of the study is to estimate the relationship between "curbside appeal" and actual sales prices of selected residential properties shown in a series of photographs.**

You are one of only 100 people randomly chosen to participate in this study, so your responses are especially important to us. You and your company will receive an acknowledgment in our final report, if you like, and you will receive a copy of the findings for your use as well.

I will show you a series of 35 photographs of residential properties that have been especially selected for this study. All subject properties are single family residences in middle to upper-middle income areas. Square footage and amenities are "average" for neighborhoods on subdivisions where they are located.

You will be given 30 seconds to view each property, at the end of which time you are to tell me your best specific estimate (not a range) of its current value. After you have studied a photo, you will not have a chance to go back for a second look. Immediately after you have given me you estimate of the value of the property, give me an estimate of the number of days the property would have to be on the market to obtain the price you gave. DO NOT GET "BOGGED DOWN" with data on specific properties. All properties are in stable, desirable neighborhoods. Again, we are trying to determine the correlation between curbside appeal and market value.

Your price estimates and any other information will remain strictly confidential.

Version 1

Relandscaping Project

Real Estate Agent Questionnaire

Photo Order	Estimated Value Dollars	Days to Sale	Photo Order	Estimated Value Dollars	Days to Sale
01			31		
02			32		
03			33		
04			34		
05			35		
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

Note: A second version of this questionnaire reversed the order in which the 35 photos were shown.

Additional Questions

1. With respect to "curbside appeal", what three things do you feel are most important (in order) **[Probe].**

(1) _____
(2) _____
(3) _____

2. How many years, in total, do you have in the real estate business? How many years as a licensed real estate agent or broker? How many additional years in real estate experience (specify)?

Total years _____
Years as licensed agent/broker _____
Years other experience _____

What professional certification(s) do you hold? _____
_____

[Make certain total years experience is the sum of all others!]

3. In what type of housing do you currently reside (primary residence)? (Circle one)

(a) single family
(b) duplex
(c) multi-family apartments
(d) multi-family condo
(e) Other (Hotel, etc.)

4. What is the highest grade of school you completed? (Circle number)

High School	9	10	11	12	
College/Vocational	13	14	15	16	Degree?_____
Grad/Professional	17	18	19	20	Degree?_____

[By Observation]

5. Gender: Male ____ Female _____

6. In what year were you born? _____

APPENDIX B: Hedonic Pricing

Hedonic Pricing Literature

To estimate the value of relandscaping, the effect of the amenity of landscaping on the purchase price of the house must be determined. This type of analysis is typically done in the framework of a hedonic pricing model. In hedonic pricing models, the effect of changes in the attributes of a commodity on its market price is estimated. Research efforts aimed at determining such effects on market price have included evaluation of characteristics such as the fiber length of cotton, the color of asparagus, the length of the cucumber, etc. This appendix describes the overall hedonic pricing framework and reviews the specific literature on housing.

The literature on hedonic pricing is well established. Waugh (1927) wrote about valuing the characteristics of vegetables such as green asparagus, long cucumbers, and the condition of tomatoes. More recent examples include the hedonic pricing of milk components (Gilmeister, Yonkers, and Dunn), fresh tomatoes (Bierlen and Grunewald), apples (Tronstad, Huthoefer, and Monke), and cotton (Ethridge and Davis).

Formally, hedonic pricing literature can be traced back to Lancaster who speculated that a good does not give utility in and of itself. Instead, the consumable attributes of the good yields utility. Within this framework, the market price of the good can then be decomposed into a price for each attribute. Mathematically, following Ladd and Suvannunt,

$$p_i = E_0 + E_1 x_{1i} + E_2 x_{2i} + \ldots E_m x_{mi} + \varepsilon_i \qquad (1)$$

Where p_i is the price of good i, E_j is the price of attribute j, x_{ij} is the amount of attribute j contained in good i, and ε_i is the error term in equation 1. The typical approach is to collect prices for various goods. The price or value of each good can then be regressed on each good's attributes to yield an estimated price for each attribute.

This approach has also been applied in the housing literature to estimate prices of

housing attributes. For example, Witte, Sumka and Erekson estimated implicit prices for housing attributes such as dwelling quality, dwelling size and lot size. Palmquist broadened the scope from individual housing attributes to include socio-economic variables, as well as size, age, condition, etc. Coulson and Bond estimated how characteristics of housing units affected neighborhood turnover in six U.S. cities, and Kim used hedonic price models in his estimation of rental housing demand.

In this study, we look at the price difference between the same house before and after relandscaping. Letting x_1 be the quantity of landscaping, the price of the house could be expressed as

$$p_i = E_0 + E_1 x_1 + E_2 x_2^* + E_3 x_3^* + \ldots \tag{2}$$

If x_1 is the quantity of landscaping before treatment and $\tilde{x}_i$ is the quantity of landscaping after treatment, the change in the price of the house becomes

$$p_i - \tilde{p}_i = E_1(x_1 - \tilde{x}_1) \tag{3}$$

By repeated samples on the same house, the average price change can be derived as

$$\sum_{t=1}^{T} (p_i - \tilde{p}_i) = (x_1 - \tilde{x}_1) \sum_{t=1}^{T} E_{it} \tag{4}$$

Hence, a paired t-test of price changes yields an estimate of the price effect of landscaping.

Appendix C: Tables

Appendix Table 1. Realtors' estimates of "before" and "after" values by demographic categories, Property A.

Demographic categories	Number	Percent of total	Average value before relandscaping	Average value after relandscaping	Average difference in gross value (after-before)	Average difference in net value	Paired *t* test of difference in value		Paired *t* test of difference in net value	
			(dollars)	(dollars)	(dollars)	(dollars)	*t*	Prob>*t*	*t*	Prob>*t*
Gender										
female	54	51.9	91,302	97,628	6,326	1,604	2.3339*	0.0234	0.5917	0.5565
male	50	48.1	86,278	96,816,	10,538	5,816	4.4916**	0.0001	2.4789*	0.0167
Age										
28-39	21	20.2	86,381	99,476	13,095	8,373	5.4534**	0.0001	3.4869**	0.0023
40-49	28	26.9	88,286	95,429	7,143	2,421	1.7769†	0.0868	0.6022	0.5520
50-64	46	44.2	89,465	96,846	7,381	2,658	2.5435*	0.0145	0.9162	0.3645
65-80	9	8.7	93,644	99,644	6,000	1,278	1.0617	0.3193	0.2262	0.8268
Education										
high school	13	12.5	86,500	88,615	2,115	-2,607	0.3243	0.7513	-0.3996	0.6965
some college	37	35.6	91,184	98,189	7,005	2,283	2.1687*	0.0368	0.7069	0.4842
college graduate	41	39.4	85,534	96,651	11,117	6,395	4.0930**	0.0002	2.3545*	0.0235
post baccalaureate	13	12.5	95,308	105,000	9,692	4,970	3.2049**	0.0076	1.6435	0.0126
Years Experience										
1-5	15	14.4	87,333	93,867	6,534	1,811	1.7698†	0.0985	0.4907	0.6313
6-10	22	21.2	88,136	97,818	9,682	4,960	1.7977†	0.0866	0.9209	0.3676
11-15	27	26.0	94,500	100,778	6,278	1,556	2.4045*	0.0236	0.5959	0.5564
16-20	21	20.2	83,090	95,804	12,714	7,992	2.7324*	0.0128	1.7176	0.1013
21-25	7	6.7	75,571	89,143	13,572	8,849	3.0424*	0.0227	1.9800†	0.0945
26-30	5	4.8	103,980	107,600	3,620	-1,102	0.3664	0.7326	-0.1115	0.9166
>30	7	6.7	92,843	93,971	1,128	-3,593	0.2635	0.8010	-0.8389	0.4336
All respondents	104	100.0	88,887	97,238	8,351	3,629	4.6218**	0.0001	2.0084*	0.0472

Note: † denotes statistical significance at the 0.10 percent level, * denotes statistical significance at the 0.05 level and, ** denotes statistical significance at the 0.01level.

Appendix Table 2. Demographic categorization of realtors participating in the study and their average response regarding days-to-sale for Property A.

Demographic categories	Number	Percent of total	Average days-to-sale before	Average days-to-sale after	Average difference in days-to-sale (after-before)	Paired *t* test of difference in days-to-sale	
			(days)	(days)	(days)	*t*	Prob>*t*
Gender							
female	54	51.9	135	113	-22	-2.8330**	0.0065
male	50	48.1	108	101	-7	-1.5753	0.1216
Age							
28-39	21	20.2	128	111	-17	-1.2749	0.2170
40-49	28	26.9	117	103	-14	-2.4721*	0.0200
50-64	46	44.2	119	107	-12	-1.8368†	0.0728
65-80	9	8.7	134	111	-23	-2.4009*	0.0431
Education							
high school	13	12.5	142	116	-26	-1.4338	0.1772
some college	37	35.6	126	107	-19	-2.6838*	0.0109
college graduate	41	39.4	113	101	-12	-1.7225†	0.0927
post baccalaureate	13	12.5	116	116	0	0.0000	1.0000
Years							
1-5	15	14.4	132	102	-30	-2.7844*	0.0146
6-10	22	21.2	115	114	-1	0.1115	0.9123
11-15	27	26.0	125	99	-26	-2.6278*	0.0142
16-20	21	20.2	107	102	-5	-0.5881	0.5631
21-25	7	6.7	150	120	-30	-1.9406	0.1004
26-30	5	4.8	120	108	-12	-1.0000	0.3739
>30	7	6.7	121	128	7	0.3169	0.7621
All respondents	104	100.0	122	107	-15	-3.2167**	0.0017

Note: † denotes statistical significance at the 0.10 percent level, * denotes statistical significance at the 0.05 level and, ** denotes statistical significance at the 0.01 level.

Appendix Table 3. Realtors' estimates of "before" and "after" values and differences in days-to-sale, by demographic categories, Property B.

Demographic categories	Number	Percent of total	Average value before relandscaping	Average value after relandscaping	Average difference in gross value (after-before)	Average difference in net value	Paired *t* test of difference in value		Paired *t* test of difference in net value	
			(dollars)	(dollars)	(dollars)	(dollars)	*t*	Prob>*t*	*t*	Prob>*t*
Gender										
female	54	51.9	130,619	131,182	563	-4,436	0.1168	0.8681	-1.3145	0.1943
male	50	48.1	126,116	127,708	1,592	-3,407	0.6321	0.5302	-1.3528	0.1823
Age										
28-39	21	20.2	125,381	127,095	1,714	-3,285	0.5370	0.5972	-1.0289	0.3158
40-49	28	26.9	124,496	130,429	5,933	933	1.3080†	0.2019	0.2058	0.8385
50-64	46	44.2	130,967	129,857	-1,110	-6,109	-0.3196	0.7508	-1.7578†	0.0856
65-80	9	8.7	135,089	130,533	-4,556	-9,555	-0.8348	0.4281	-1.7508	0.1181
Education										
high school	13	12.5	125,423	131,538	6,115	1,116	0.8789	0.3967	0.1604	0.8752
some college	37	35.6	127,403	131,724	4,321	-677	1.1402	0.2617	-0.1787	0.8592
college graduate	41	39.4	130,900	126,851	-4,04	-9,048	-1.4357	0.1589	3.2084**	0.0026
post baccalaureate	13	12.5	126,762	129,577	2,815	-2,184	0.4331	0.6726	-0.3359	0.7427
Years Experience										
1-5	15	14.4	122,667	126,133	3,466	-1,532	0.5428	0.5958	-0.2399	0.8139
6-10	22	21.2	133,000	136,364	3,364	-1,635	0.9667	0.3447	-0.4700	0.6432
11-15	27	26.0	128,944	132,000	3,056	-1,943	0.7559	0.4565	-0.4807	0.6347
16-20	21	20.2	121,757	122,138	381	-4,618	0.0606	0.9522	-0.7351	0.4708
21-25	7	6.7	125,429	123,429	-2,000	-6,999	-0.3714	0.7231	-1.2997	0.2414
26-30	5	4.8	140,580	132,280	-8,300	-13,299	-1.0816	0.3403	-1.7330	0.1581
>30	7	6.7	139,129	131,843	-7,286	-12,285	-0.9969	0.3573	-1.6809	0.1438
All respondents	104	100.0	128,454	129,512	1,058	-3,941	0.4988	0.6190	-1.8588	0.0659

Note: † denotes statistical significance at the 0.10 percent level, * denotes statistical significance at the 0.05 level, and ** denotes statistical significance at the 0.01 level.

Appendix Table 4. Demographic categorization of realtors participating in the study and their average response regarding days-to-sale for Property B.

Demographic categories	Num-ber	Percent of total	Average days-to-sale before	Average days-to-sale after	Average difference in days-to-sale	Paired *t* test of difference in days-to-sale	
			(days)	(days)	(days)	*t*	Prob>*t*
Gender							
female	54	51.9	151	141	-10	-1.2228	0.2268
male	50	48.1	120	109	-11	-2.1706*	0.0348
Age							
28-39	21	20.2	143	141	-2	-0.1259	0.9011
40-49	28	26.9	137	113	-24	-2.4721*	0.2000
50-64	46	44.2	128	122	-6	-1.0683	0.2911
65-80	9	8.7	155	143	-12	-0.7644	0.4666
Education							
high school	13	12.5	126	143	17	0.8327	0.4213
some college	37	35.6	144	137	-7	-0.9158	0.3659
college graduate	41	39.4	134	119	-15	-2.2699*	0.0287
post baccalaureate	13	12.5	126	96	-30	-3.4520**	0.0048
Years							
1-5	15	14.4	173	148	-25	-1.9508 †	0.0714
6-10	22	21.2	129	123	-6	-0.8019	0.4315
11-15	27	26.0	127	119	-8	-0.6200	0.5406
16-20	21	20.2	130	119	-11	-0.9840	0.3369
21-25	7	6.7	141	128	-13	-1.1619	0.2894
26-30	5	4.8	126	132	6	0.4082	0.7040
>30	7	6.7	129	118	-11	-0.6359	0.5483
All respondents	104	100.0	136	126	-10	-2.1397*	0.0347

Note: † denotes statistical significance at the 0.10 percent level, * denotes statistical significance at the 0.05 level and, **

Appendix Table 5. Realtors' estimates of "before" and "after" values and differences in days-to-sale, by demographic categories, Property C.

Demographic categories	Number	Percent of total	Average value before relandscaping	Average value after relandscaping	Average difference in gross value (after-before)	Average difference in net value	Paired *t* test of difference in value		Paired *t* test of difference in net value	
			(dollars)	(dollars)	(dollars)	(dollars)	*t*	Prob>*t*	*t*	Prob>*t*
Gender										
female	54	51.9	110,048	112,279	2,231	-1,643	0.8807	0.3825	-0.6486	0.5194
male	50	48.1	107,306	110,056	2,750	-1,125	1.4192	0.1622	-0.5806	0.5642
Age										
28-39	21	20.2	108,185	106,9431	-1,242	-5,118	-0.4460	0.6604	-1.8363	0.0812
40-49	28	26.9	104,461	108,604	4,143	268	1.4316	0.1637	0.0926	0.9269
50-64	46	44.2	110,637	113,069	2,432	-1,442	0.8856	0.3803	-0.5253	0.6019
65-80	9	8.7	113,533	119,778	6,245	2,369	1.2204	0.2571	0.4631	0.6556
Education										
high school	13	12.5	112,523	110,500	-2,023	-5,898	-0.7743	0.4537	-2.2574*	0.0434
some college	37	35.6	106,116	111,589	5,473	1,598	1.7100†	0.0959	0.4993	0.6206
college graduate	41	39.4	111,022	111,946	924	-2,951	0.3868	0.7009	-1.2350	0.2241
post baccalaureate	13	12.5	105,146	108,523	3,377	-498	0.7967	0.4411	0.1175	0.9084
Years Experience										
1-5	15	14.4	110,200	112,667	2,467	-1,408	0.4125	0.6862	-0.2355	0.8172
6-10	22	21.2	110,586	108,318	-2,268	-6,143	-0.7623	0.4543	-2.0647	0.0515
11-15	27	26.0	110,144	114,422	4,278	403	1.4848	0.1496	0.1398	0.8899
16-20	21	20.2	101,919	108,033	6,114	2,239	1.6191	0.1211	0.5929	0.5598
21-25	7	6.7	101,429	102,843	1,414	-2,461	0.4659	0.6577	-0.8106	0.4485
26-30	5	4.8	114,960	109,780	-5,180	-9,055	-0.9694	0.3872	-1.6946	0.1654
>30	7	6.7	117,571	123,714	6,143	2,268	0.9009	0.4024	0.3326	0.7508
All respondents	104	100.0	108,730	111,211	2,481	-1,394	1.5460†	0.1252	-0.8689	0.3869

Note: † denotes statistical significance at the 0.10 percent level, * denotes statistical significance at the 0.05 level, and ** denotes statistical significance at the 0.01 level.

Appendix Table 6. Demographic categorization of realtors participating in the study and their average responses regarding days-to-sale for Property C.

Demographic categories	Num-ber	Percent of total	Average days-to-sale before	Average days-to-sale after	Average difference in days-to-sale (after-before)	Paired T test of difference in days-to-sale	
			(days)	(days)	(days)	*t*	Prob>*t*
Gender							
female	54	51.9	117	120	3	0.6248	0.5348
male	50	48.1	96	99	3	0.7472	0.4585
Age							
28-39	21	20.2	103	106	3	0.4452	0.6609
40-49	28	26.9	102	107	5	0.6810	0.5017
50-64	46	44.2	107	112	5	1.0399	0.3039
65-80	9	8.7	131	121	-10	-0.5547	0.5943
Education							
high school	13	12.5	121	117	-4	-0.3432	0.7374
some college	37	35.6	114	125	11	1.6277	0.1123
college graduate	41	39.4	100	97	-3	-0.6779	0.5017
post baccalaureate	13	12.5	92	100	8	1.2349	0.2405
Years							
1-5	15	14.4	118	119	1	0.1185	0.9073
6-10	22	21.2	107	115	8	1.3559	0.1895
11-15	27	26.0	103	102	-1	-0.2336	0.8171
16-20	21	20.2	107	105	-2	-0.2769	0.7846
21-25	7	6.7	97	115	18	1.4362	0.2010
26-30	5	4.8	120	114	-6	-0.2182	0.8379
>30	7	6.7	97	117	20	1.6178	0.1568
All respondents	104	100.0	107	110	3	0.9516	0.3435

Note: † denotes statistical significance at the 0.10 percent level, * denotes statistical significance at the 0.05 level, and ** denotes statistical significance at the 0.01 level.

Appendix Table 7. Realtors' estimates of "before" and "after" values and differences in days-to-sale, by demographic categories, Property D.

Demographic categories	Number	Percent of total	Average value before relandscaping	Average value after relandscaping	Average difference in gross value (after-before)	Average difference in net value	Paired *t* test of difference in value		Paired *t* test of difference in net value	
			(dollars)	(dollars)	(dollars)	(dollars)	*t*	Prob>*t*	*t*	Prob>*t*
Gender										
female	54	51.9	100,756	111,811	11,055	5,186	3.1976**	0.0023	1.4998	0.1396
male	50	48.1	105,856	109,618	3,762	-2,108	1.4019	0.1672	-0.7856	0.4359
Age										
28-39	21	20.2	107,571	105,971	-1,600	-7,470	-0.4016	0.6923	-1.8750	0.0755
40-49	28	26.9	96,889	104,353	7,464	1,594	2.4142*	0.0228	0.5156	0.6103
50-64	46	44.2	103,235	113,000	9,765	3,895	2.4055*	0.0203	0.9595	0.3424
65-80	9	8.7	112,544	130,377	17,833	,11,963	3.1614*	0.0134	2.1210†	0.0667
Education										
high school	13	12.5	109,467	103,269	9,307	3,437	1.6443	0.1260	0.6073	0.5550
some college	37	35.6	102,859	113,170	11,135	5,265	3.1616**	0.0032	1.4949	0.1437
college graduate	41	39.4	106,949	111,317	4,368	-1,501	1.0600	0.2955	-0.3644	0.7175
post baccalaureate	13	12.5	103,992	109,608	5,616	-255	1.3062	0.2160	-0.0592	0.9537
Years Experience										
1-5	15	14.4	109,467	111,600	2,133	-3,737	0.2893	0.7766	-0.5067	0.6202
6-10	22	21.2	102,859	108,159	5,300	-570	0.9305	0.3627	-0.1001	0.9212
11-15	27	26.0	104,481	110,666	6,185	315	3.1691**	0.0039	0.1615	0.8730
16-20	21	20.2	95,800	106,376	10,576	4,706	1.9277 †	0.0682	0.8578	0.4012
21-25	7	6.7	93,000	107,128	14,128	8,259	1.2486	0.2583	0.7299	0.4930
26-30	5	4.8	109,980	124,580	14,600	8,730	3.3442*	0.0287	1.9996	0.1162
>30	7	6.7	113,571	124,357	10,786	4,916	1.0618	0.3292	0.4839	0.6456
All respondents	104	100.0	103,208	110,757	7,549	1,679	3.3863**	0.0010	0.7532	0.4531

Note: † denotes statistical significance at the 0.10 percent level, * denotes statistical significance at the 0.05 level, and ** denotes statistical significance at the 0.01 level.

Appendix Table 8. Demographic categorization of realtors participating in the study and their average response regarding days-to-sale for Property D.

Demographic categories	Num-ber	Percent of total	Average days-to-sale before	Average days-to-sale after	Average difference in days-to-sale (after-before)	Paired *t* test of difference in days-to-sale	
			(days)	(days)	(days)	*t*	Prob>*t*
Gender							
female	54	51.9	127	128	1	0.2192	0.8273
male	50	48.1	107	101	-6	-1.517	0.1357
Age							
28-39	21	20.2	122	118	-4	-0.3508	0.7294
40-49	28	26.9	111	102	-9	-1.1996	0.2407
50-64	46	44.2	113	117	4	0.8861	0.3803
65-80	9	8.7	143	138	-5	-0.2980	0.7733
Education							
high school	13	12.5	118	123	5	0.5962	0.5621
some college	37	35.6	124	124	0	0.0000	1.0000
college graduate	41	39.4	115	107	-8	-1.0689	0.2750
post baccalaureate	13	12.5	103	105	2	0.3526	0.7305
Years							
1-5	15	14.4	123	137	14	0.8379	0.4161
6-10	22	21.2	125	119	-6	-1.2085	0.2403
11-15	27	26.0	119	110	-9	-1.0563	0.3005
16-20	21	20.2	103	103	0	0.000	1.0000
21-25	7	6.7	117	116	-1	-0.0822	0.9372
26-30	5	4.8	132	114	-18	-1.5000	0.2080
>30	7	6.7	100	105	5	0.5453	0.6052
All respondents	104	100.0	117	115	-2	-0.5559	0.5795

Note: † denotes statistical significance at the 0.10 percent level, * denotes statistical significance at the 0.05 level, and ** denotes statistical significance at the 0.01 level.