HOME SWEET APARTMENT: A TEXT ANALYSIS OF SATISFACTION AND DISSATISFACTION WITH APARTMENT HOMES

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Abstract

Achieving renter satisfaction is critical for residential property managers who desire to reduce the costs of high turnover. While previous research on renter satisfaction has focused on the use of multiple-choice surveys, this study analyzed the text of 464,280 open-ended comments posted from January 1, 2000, to January 1, 2007, on ApartmentRatings.com©, the nation's largest apartment ratings Web site. Cross-tabulation and ordered logistic analysis of a word frequency coding scheme indicated that several of the most important issues related to residential satisfaction fell into the categories of safety and sanitation. While safety has long been recognized as a critical component of residential satisfaction, issues of sanitation appear uniquely salient for residents of rented apartment housing. The implication for property managers is that a focus on the core issues revealed in this analysis of resident comments may help to achieve greater resident satisfaction and, thereby, reduce resident turnover.

Introduction

What residential issues are most commonly noted by apartment residents? Do important issues for dissatisfied residents differ from issues that are important to satisfied residents? This article attempts to uncover answers to these questions by examining written remarks from a consumer comment Web site. Understanding which issues are the most common focus points for apartment residents can help property managers to target their limited resources.

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The results and views expressed are those of the authors and do not reflect the views of Apartment Ratings, Inc., or ApartmentRatings.com, a division of Internet Brands, Inc. Only publicly available data were made available to the researchers.

This article approaches the topic in the following sections. The literature review examines previous research related to the determinants and importance of resident satisfaction in rented multifamily housing. The method section reviews the characteristics of the current dataset, the previous uses of similar open-ended comments from consumer Web sites, and the procedures used in the analysis. The results section presents results and implications of the study. Finally, the conclusion summarizes the importance of the findings for residential property management.

Literature Review

Determinants of Renter Satisfaction

Common issues in residential satisfaction include such basic factors as crime, noise, and green space. Several studies have found that fear of crime or feelings of safety are the dominant predictors of residential satisfaction (Cook, 1988; Fransson, Rosenqvist, & Turner, 2001; Lee, 1981; Taylor, 1995). Noise intrusion has also been found to generate residential dissatisfaction (Savasdisara, 1988). In one study of the physical construction-related characteristics affecting residential satisfaction in rented multifamily housing, hearing noise through the walls, floor, or ceiling had the strongest negative impact on resident satisfaction of any characteristic (James, 2007). In a study of low-rise apartment community residents, Kaplan (2001) found that natural elements visible from the window have positive effects on residential satisfaction. Ellis et al. (2006) uncovered the positive effects of tree and shrub cover on residential satisfaction, especially in areas of nearby retail land use. Fransson, Rosenqvist, and Turner (2001) found the most important residential qualities according to residents were safety, nearby services, and green space.

While renters' residential satisfaction is subject to many of the same influences as homeowners' residential satisfaction, some considerations are unique to renters. In particular, homeowners have no individual comparable to the renters' property manager. Managers can exert a significant amount of influence over renters' lives, limiting renters' control over their residential environment. LeBrassuer, Blackford, and Whissell (1988) applied Rotter's (1966) "locus of control" approach as a categorizing framework for understanding renter satisfaction. A person's locus of control reflects the degree to which he expects to control his environment (internalized locus of control) or be controlled by his environment (externalized locus of control). Most commonly, satisfaction results from internalized locus of control, dissatisfaction from externalized locus of control. The locus of control approach has proven to be a successful conceptual model in a variety of satisfaction-related domains including general subjective well-being and job satisfaction (LeBrassuer et al., 1988). To the extent that renters feel an externalized

(manager-centered) locus of control instead of an internalized (resident-centered) locus of control, residential satisfaction will suffer (LeBrassuer et al., 1988). Similarly, managers who successfully project empathy with residents, rather than taking an authoritarian approach, should be more successful in increasing renter satisfaction (Ahlbrandt & Brophy, 1976). Paris and Kangari (2005) identified several major management-related variables affecting renter satisfaction in affordable housing, including staff communication with residents, cooperativeness of property management staff, and friendliness of management.

The locus of control concept may also be particularly important for renters in other areas of residential satisfaction. For example, renters may be more likely to react negatively to issues of cleanliness or maintenance when these issues are outside of their control. Where homeowners have the ultimate responsibility and authority to correct such matters, a renter faced with unresponsive management may feel quite powerless. LeBrassuer et al. (1988, p. 302) explained, "Physical housing deficiencies are more tolerable if they are the tenants' own responsibility." Accordingly, although homeowners rarely cite cleanliness of a building as an important factor in residential satisfaction, Delgadillo and Erickson (2006) found that cleanliness of the apartment community was one of the most important factors in the residential satisfaction of college-age renters.

Impact of Renter Satisfaction

The residential satisfaction of renters has wide-reaching impacts for managers, residents, and society as a whole. One third of households in the U.S. live in rental housing, and much of that is apartment housing. Thus, the satisfaction of residents in rented apartment housing is an issue that directly affects much of the nation (Joint Center for Housing Studies, 2006). Aside from its direct impact on resident well-being, dissatisfaction can also frequently motivate residential mobility.

Speare (1974) demonstrated that self-reported residential satisfaction is not only the key determinant of residential mobility, but is also the mechanism through which many individual demographic and residence characteristics indirectly influence residential mobility. As Morris and Winter (1978) explained, "...the key determinant of the propensity to move and, in turn, actual mobility, is dissatisfaction with the dwelling" (p. 187). More recent studies continue to demonstrate the importance of residential satisfaction as a key factor in predicting residential mobility (McHugh, Gober, & Reid, 1990; Oh, 2003).

Of course, many factors can generate residential mobility such as a change in employment, change in financial circumstances, or change in family composition. According to data from the 2000 census, 16% of residential moves are motivated by employment-related reasons, 26% by family-related reasons, and 52% are motivated by a desire to move to housing with more satisfactory characteristics (price, unit quality, neighborhood quality, or tenure) (Schachter, 2001). Thus,

satisfaction with one's housing characteristics is an important determinant of mobility. Other factors are often beyond the control of a residential property manager. Correspondingly, residential property managers concerned about renter retention will generally be limited to focusing on issues of residential satisfaction.

Multifamily property managers working in government or nonprofit housing often use residential satisfaction as a primary indicator of success (Varady & Carrozza, 2000). In the for-profit context, the ability of successful property managers to influence residential satisfaction can generate significant financial benefits. Losing current residents is expensive due to increased marketing costs, lost rent while the unit is on the market, cleaning and repair of the unit, and the need to keep rent low in order to attract replacement residents. In a *Journal of Property Management* article entitled, "The hidden costs of resident dissatisfaction," Harmon and McKenna-Harmon (1994) proposed a "churn index" to calculate the full cost of reduced retention for a property manager. They estimated that even for a well-run apartment community, a lost resident costs almost as much in indirect costs from increased advertising and maintenance as in lost revenue due to vacancy. In a practical primer for property managers, Kelley (2003) compared apartment communities with low resident satisfaction to a leaky bucket where new residents must constantly be recruited to fill the spaces left by dissatisfied former renters.

Current resident satisfaction can also be important in attracting new residents. Not only do satisfied residents generate referrals, but dissatisfied residents are now able to reach far more prospective renters through consumer comment Web sites such as the one analyzed here. Consumers are increasingly turning to such Web sites to inform their choices. The current dataset from ApartmentRatings.com© reveals a more than tenfold increase in postings from 2001 to 2006. How important are such comments to consumer decisions? In a controlled experimental study, Chiou and Cheng (2003) found that messages on an Internet discussion forum significantly altered consumers' brand evaluations. They especially noted the impact of negative evaluations on low-image brands. In another controlled experimental setting, Bickart and Schindler (2001) found that Internet discussion forums were far more effective in influencing consumer behavior than marketer-generated advertising. This is not surprising given previous research showing that other consumers were a more influential source of information than even subject-area experts were (Kelley, 1967).

Improving residential satisfaction is not only an important goal for property managers, but it also has significant social impacts. Residential dissatisfaction tends to increase transience. Transience can negatively affect families and society. In general, transience diminishes the investment in and accumulation of social capital (Glaeser, Laibson, & Sacerdote, 2002). Simply put, investing heavily in

building neighborhood or community resources and social ties does not make sense for a person who is planning to leave. DiPasquale and Glaeser (1999) traced much of the social capital benefits of homeownership to its impact on reducing transience. The 2005 Current Population Survey indicated that 7% of homeowners and 30% of renters had moved in the previous year. Transience may also be linked to parents' lack of personal investment with the local schools, which can cause negative educational outcomes for children (Nakagawa, Stafford, Fisher, & Mathews, 2002). Several studies have linked residential mobility with negative educational outcomes, especially in children of underprivileged or single-parent households (Adam & Chase-Lansdale, 2002; Tucker, Marx, & Long, 1998). Other researchers have linked frequent mobility to additional negative outcomes for families. Excessive mobility can generate psychological difficulties for women (Magdol, 2002) and children (Adam & Chase-Lansdale, 2002). Boyle, Kulu, Cooke, Gayle, and Mulder (2006) found that frequent moving increases couple stress and the potential for union dissolution, further diminishing the stability of the family unit.

Method

Open-Ended Comments

This article represents the first analysis of apartment resident satisfaction conducted by examining written remarks from a consumer comment Web site. It adds significantly to previous research on the residential satisfaction of renters, which has been based largely on closed-ended, multiple-choice survey questions. Open-ended survey questions have long been used as an effective approach in consumer research and social science studies (Krosnick, 1999). An open-ended approach has many advantages, especially in understanding complex issues (Carey, Morgan, & Oxtoby, 1996). The complexity of residential satisfaction particularly lends itself to such an open-ended approach. As Romano, Donovan, Chen, and Nunamaker (2003) explained, "Free-form answers to nondirective questions reveal points of view and feelings normally inaccessible through direct questions and provide better insights into attitudes and intentions than predefined questions, which are often leading or biased" (p. 215). Some concerns about the open-ended approach, such as lack of response from less articulate individuals, have not turned out to be problematic in practice (Geer, 1988).

Although closed-form multiple-choice questions are far more common in research, the success of this closed-form approach is entirely dependent upon the list of predefined choices (Smith, 1987). Respondents inevitably limit their answers to the predefined choices provided, even if other opportunities are made available (Presser, 1990). This becomes problematic because it is often difficult or impossible to anticipate all issues in advance and enumerate them in multiple-choice format.

As Kelley (1983) discussed, "any list of questions about particular considerations, even a long list, is almost certain to omit important ones" (p. 10).

In recent years, the use of open-ended response data for analyzing customer satisfaction has increased, driven in part by the growth of Internet-based consumer comment sites (Finch & Luebbe, 1997; Romano et al., 2003; Wang, Chiu, & Tang, 2005). This article extends that approach to the issue of satisfaction with apartment homes by examining data from ApartmentRatings.com©, the nation's largest Web site for renter comments and ratings.

Dataset Characteristics

The data for this study come from ApartmentRatings.com©, the nation's largest apartment ratings WebSite. Individuals wishing to comment on their experience with an apartment community can select their apartment location and give ratings as well as provide written comments in the opinion section. All comments posted from January 1, 2000 to January 1, 2007 are included in this analysis. The resulting dataset contains 464,280 comments posted during this period. Although registration is required in order to post a comment or rating, the verification process does not prevent false postings by those who were not residents. The most likely impact is the presence of positive posts placed by managers. (While managers can write responses to resident comments, this requires a registration fee. Falsely claiming to be a resident allows posting a new comment with no such fee.) The false positive posting issue is common to open-forum consumer comment sites (Dellarocas, 2006; Morin, 2003), but does not prevent such sites from being an influential source of information for consumers (Bickart & Schindler, 2001; Chiou & Cheng, 2003). The incentives for false positive posting typically cause consumers to pay more attention to negative postings (Mayzlin, 2006). However, it is also possible that negative ratings could be posted by those falsely claiming to be residents. Further, those who are residents may post negative comments that are not truly reflective of their feelings. Residents who are angry over some hidden issue may instead choose to make negative comments about other issues that are not actually the drivers of their dissatisfaction. Also, it is quite likely that highly dissatisfied residents will be more likely to post comments while satisfied residents may not be similarly motivated.

Despite its limitations, information from consumer comment sites such as ApartmentRatings.com© has been used in a wide range of academic studies (Bickart & Schindler, 2001; Chevalier & Mayzlin, 2006; Chiou & Cheng, 2003; Dellarocas, 2006; Finch & Luebbe, 1997; Romano et al., 2003; Wang, Chiu, & Tang, 2005), further legitimizing them as important sources of data.

Procedures

Traditional text analysis, whether it is classical content analysis, grounded theory, or schema analysis, involves developing classification categories and

coding the text (Bernard & Ryan, 1998). Several researchers have approached text analysis of open-ended survey questions from a quantitative, word frequency approach. Godes and Mayzlin (2004) and Chevalier and Mayzlin (2006) used word frequency as a method to estimate the impact of Internet-based comments on product sales. Ryan and Weisner (1996) used comparative word frequencies to differentiate mothers' and fathers' descriptions of adolescent children. Jehn and Doucet (1996) used word frequencies to analyze open-ended comments in situations of cross-cultural conflict.

We follow a mixed approach using both word frequencies and subjective coding. Given the large volume of comments (nearly one half million), individually reading and coding each comment was impracticable. We instead analyzed the text through the matrix of the 1,000 most frequently used words. This cut off point included all words that were used in at least one half of one percent of comments posted. Words excluded from the analysis were not typical or common, being used in less than one out of 200 resident comments. We identified the 1,000 most frequently used words by analyzing the total pool of open-ended comments for word frequency using the software, Hermetic Word Frequency Advanced Version 6.47. Capitalization of words was ignored throughout the analysis. Four coders, working separately, then classified each of the 1,000 most frequently used words as either meaningful in the context of the residential environment, or as unclassified. So, for example, words such as "the," "and," or "my" would remain unclassified. Conversely, words such as "laundry," "maintenance," or "bathroom" were classified as meaningful. Only words classified in a meaningful, issue-related category by each of the four coders were retained in the final classification category. (Consequently, only those words selected as meaningful by all four coders appear in Table 1.) This process resulted in 135 of the 1,000 most frequently used words being selected as meaningful. These words were then grouped into the 12 categories listed in Table 1 for convenience of analysis. The following analyses then considered the association of overall ratings either with the presence of one of the 135 classified words or with the presence of any word within one of the 12 classification categories. Using SAS 9.1, each of these 135 words was associated with a dummy variable. For each comment, if the text of the comment included the word, the variable value was one, and otherwise was zero. Similarly, a separate analysis was run using dummy variables reflecting the presence of any words within each of the 12 classification categories.

Table 1. Word-Level and Category-Level Analysis of Renter Comments

Word or Category	(1)	(2)	(3)	(4)
Managing Personnel	**53.3%**	**43.5%**	**(1.16-1.19)**	**(1.14-1.17)**
Staff	27.7%	55.3%	(1.69-1.74)	(1.66-1.71)
Management	24.4%	32.1%	(0.71-0.73)	(0.69-0.71)
Manager	9.8%	33.2%	(0.73-0.76)	(0.73-0.76)
Managment	5.1%	24.6%	(0.92-0.97)	(0.93-0.99)
Managers	2.0%	32.2%	(0.79-0.85)	(0.78-0.86)
Safety & Security	**19.3%**	**30.1%**	**(0.55-0.57)**	**(0.55-0.57)**
Security	6.3%	27.1%	(0.80-0.84)	(0.78-0.82)
Safe	4.4%	53.3%	(1.46-1.54)	(1.48-1.58)
Police	3.9%	20.4%	(0.57-0.60)	(0.55-0.59)
Stolen	2.0%	14.7%	(0.59-0.64)	(0.58-0.64)
Crime	2.0%	34.4%	(0.83-0.90)	(0.84-0.93)
Drug	2.0%	11.9%	(0.33-0.36)	(0.33-0.36)
Safety	1.4%	30.5%	(0.75-0.82)	(0.73-0.81)
Cops	1.1%	14.9%	(0.50-0.55)	(0.49-0.56)
Unsafe	0.8%	21.9%	(0.47-0.53)	(0.49-0.57)
Drugs	0.7%	11.8%	(0.35-0.41)	(0.35-0.42)
Steal	0.5%	16.5%	(0.56-0.65)	(0.54-0.65)
Bugs & Vermin	**4.5%**	**22.7%**	**(0.50-0.53)**	**(0.50-0.54)**
Bugs	1.9%	28.0%	(0.68-0.74)	(0.69-0.75)
Roaches	1.9%	16.1%	(0.41-0.45)	(0.40-0.45)
Ants	1.1%	23.9%	(0.70-0.78)	(0.69-0.78)
Neighbors/ Neighborhood	**29.9%**	**42.5%**	**(1.11-1.14)**	**(1.09-1.13)**
Neighbors	11.2%	44.2%	(1.21-1.26)	(1.17-1.22)
Residents	6.6%	41.0%	(1.05-1.09)	(1.02-1.07)
Kids	5.3%	32.8%	(0.84-0.88)	(0.83-0.88)
Location	4.6%	65.2%	(1.81-1.90)	(1.75-1.86)
Neighbor	3.3%	31.6%	(0.92-0.98)	(0.90-0.97)
Children	2.6%	31.8%	(0.79-0.84)	(0.77-0.83)
Neighborhood	2.1%	51.3%	(1.28-1.37)	(1.29-1.41)
Ghetto	1.3%	17.1%	(0.43-0.48)	(0.43-0.49)
Roommate	1.1%	36.8%	(0.98-1.08)	(0.93-1.05)
Unit Structure	**35.5%**	**35.2%**	**(0.76-0.78)**	**(0.72-0.74)**
Building	8.1%	38.5%	(1.01-1.06)	(1.00-1.05)
Property	7.8%	43.4%	(1.15-1.19)	(1.10-1.16)
Walls	5.9%	25.1%	(0.68-0.71)	(0.68-0.72)

Word or Category	(1)	(2)	(3)	(4)
Unit Structure (cont.)	**35.5%**	**35.2%**	**(0.76-0.78)**	**(0.72-0.74)**
Carpet	4.1%	21.7%	(0.72-0.76)	(0.70-0.75)
Kitchen	3.7%	34.7%	(1.06-1.12)	(1.06-1.13)
Buildings	3.4%	39.7%	(0.94-1.00)	(0.94-1.01)
Bathroom	3.2%	24.6%	(0.85-0.91)	(0.84-0.91)
Doors	2.8%	23.0%	(0.76-0.81)	(0.75-0.81)
Paint	2.3%	22.0%	(0.79-0.85)	(0.78-0.86)
Window	2.2%	23.0%	(0.82-0.88)	(0.81-0.89)
Ceiling	2.1%	19.5%	(0.72-0.78)	(0.71-0.78)
Wall	1.9%	22.4%	(0.81-0.89)	(0.81-0.89)
Closet	1.7%	45.4%	(1.34-1.46)	(1.35-1.48)
Floors	1.7%	32.9%	(0.92-1.00)	(0.91-1.00)
Rooms	1.4%	46.0%	(1.15-1.26)	(1.16-1.29)
Patio	1.2%	33.5%	(1.01-1.12)	(1.02-1.14)
Balcony	1.1%	37.0%	(1.05-1.16)	(1.04-1.17)
Bed	1.0%	31.5%	(0.87-0.97)	(0.90-1.02)
Carpets	1.0%	21.0%	(0.72-0.81)	(0.71-0.82)
Roof	1.0%	21.4%	(0.69-0.78)	(0.67-0.76)
Ceilings	0.7%	41.8%	(1.21-1.38)	(1.20-1.39)
Bathrooms	0.7%	37.9%	(1.05-1.20)	(1.01-1.17)
Common Area Facilities	**32.2%**	**42.3%**	**(1.18-1.21)**	**(1.16-1.19)**
Parking	18.4%	38.2%	(0.93-0.96)	(0.92-0.96)
Pool	7.3%	49.0%	(1.33-1.38)	(1.30-1.37)
Park	6.2%	41.0%	(1.10-1.15)	(1.10-1.16)
Fitness	1.9%	63.0%	(1.72-1.87)	(1.68-1.84)
Amenities	1.4%	60.2%	(1.57-1.71)	(1.48-1.64)
Landscaping	1.4%	57.2%	(1.54-1.68)	(1.51-1.67)
Parked	1.3%	22.5%	(0.74-0.82)	(0.72-0.80)
Hallways	1.2%	27.1%	(0.73-0.80)	(0.72-0.81)
Stairs	1.0%	23.5%	(0.74-0.82)	(0.71-0.81)
Grass	1.0%	31.8%	(0.81-0.90)	(0.81-0.91)
Facilities	1.0%	48.5%	(1.12-1.25)	(1.09-1.23)
Swimming	0.9%	47.7%	(1.01-1.14)	(1.03-1.18)
Trees	0.9%	59.7%	(1.57-1.75)	(1.55-1.76)
Elevators	0.8%	28.0%	(0.75-0.85)	(0.72-0.83)
Elevator	0.7%	29.0%	(0.84-0.95)	(0.83-0.96)
Hallway	0.7%	25.2%	(0.82-0.94)	(0.82-0.95)

Table 1. Continued

Word or Category	(1)	(2)	(3)	(4)
Maintenance (Other)	**41.0%**	**40.1%**	**(0.96-0.98)**	**(0.90-0.93)**
Maintenance	19.1%	51.0%	(1.44-1.48)	(1.39-1.43)
Broken	7.9%	15.6%	(0.49-0.51)	(0.47-0.50)
Fix	7.8%	24.2%	(0.62-0.65)	(0.61-0.64)
Fixed	5.8%	41.2%	(1.15-1.20)	(1.12-1.18)
Service	4.9%	41.3%	(0.99-1.04)	(0.97-1.03)
Broke	2.2%	17.1%	(0.59-0.64)	(0.58-0.64)
Repairs	1.7%	35.1%	(0.81-0.89)	(0.78-0.86)
Repair	1.6%	26.7%	(0.75-0.82)	(0.74-0.82)
Cost	1.5%	31.9%	(0.92-1.00)	(0.91-1.01)
Leak	1.4%	16.1%	(0.68-0.75)	(0.68-0.76)
Maintained	1.3%	62.9%	(1.63-1.79)	(1.57-1.76)
Maintence	1.2%	38.1%	(1.00-1.11)	(0.96-1.07)
Leaking	1.1%	13.1%	(0.57-0.64)	(0.56-0.64)
Maintenence	1.0%	43.5%	(1.13-1.26)	(1.10-1.24)
Maintance	1.0%	38.9%	(1.01-1.12)	(0.97-1.10)
Leaks	0.9%	11.4%	(0.51-0.58)	(0.50-0.58)
Repaired	0.6%	32.9%	(0.90-1.03)	(0.87-1.02)
Maintenance (Cleaning)	**18.2%**	**31.4%**	**(0.68-0.70)**	**(0.66-0.69)**
Clean	6.5%	48.5%	(1.48-1.55)	(1.45-1.52)
Trash	4.9%	25.9%	(0.64-0.68)	(0.62-0.66)
Mold	2.4%	9.5%	(0.37-0.40)	(0.36-0.40)
Garbage	2.4%	24.7%	(0.71-0.77)	(0.71-0.77)
Cleaned	2.1%	25.0%	(0.83-0.90)	(0.82-0.90)
Cleaning	2.0%	28.2%	(0.94-1.01)	(0.90-0.99)
Dirty	2.0%	12.7%	(0.42-0.45)	(0.41-0.45)
Mess	0.7%	20.8%	(0.62-0.71)	(0.61-0.72)
Noise Category	**19.7%**	**44.4%**	**(1.21-1.24)**	**(1.21-1.25)**
Noise	7.5%	41.9%	(1.02-1.06)	(1.01-1.07)
Loud	5.4%	27.3%	(0.74-0.78)	(0.74-0.79)
Quiet	4.8%	73.4%	(2.41-2.54)	(2.39-2.53)
Music	2.5%	23.3%	(0.74-0.79)	(0.73-0.79)
Parties	1.6%	41.8%	(1.13-1.23)	(1.12-1.23)
Sound	1.6%	35.5%	(0.93-1.01)	(0.92-1.02)
Party	1.4%	41.7%	(1.04-1.14)	(1.05-1.17)
Sounds	1.1%	32.7%	(0.91-1.00)	(0.87-0.99)
Household Equipment	**13.8%**	**33.93**	**(0.83-0.85)**	**(0.83-0.86)**
Laundry	3.7%	38.9%	(0.97-1.03)	(0.99-1.06)
Appliances	2.3%	40.6%	(0.94-1.01)	(0.94-1.02)
Washer	2.1%	49.8%	(1.39-1.53)	(1.39-1.54)
Dryer	1.6%	45.4%	(0.98-1.09)	(0.95-1.07)
Shower	1.4%	19.9%	(0.73-0.81)	(0.72-0.80)
Toilet	1.4%	18.8%	(0.70-0.77)	(0.70-0.78)
Dishwasher	1.3%	26.5%	(0.80-0.88)	(0.78-0.87)

Word or Category	(1)	(2)	(3)	(4)
Household Equipment (cont.)	**13.8%**	**33.93**	**(0.83-0.85)**	**(0.83-0.86)**
AC	1.3%	25.9%	(0.76-0.84)	(0.75-0.83)
Tub	1.2%	30.2%	(0.89-0.99)	(0.89-1.00)
Sink	1.0%	19.9%	(0.74-0.83)	(0.73-0.83)
Cabinets	0.9%	27.9%	(0.80-0.90)	(0.82-0.93)
Dryers	0.7%	33.5%	(0.82-0.93)	(0.81-0.94)
Utilities/Services	**9.1%**	**34.3%**	**(0.91-0.94)**	**(0.90-0.94)**
Heat	2.2%	30.4%	(0.83-0.90)	(0.83-0.91)
Electric	1.6%	31.0%	(1.04-1.14)	(1.03-1.15)
Cold	1.5%	24.0%	(0.75-0.82)	(0.73-0.81)
Cable	1.3%	42.8%	(1.11-1.23)	(1.10-1.23)
Heater	1.1%	24.1%	(0.79-0.88)	(0.77-0.86)
Gas	1.1%	40.1%	(1.11-1.23)	(1.11-1.25)
Utilities	1.0%	49.1%	(1.19-1.33)	(1.18-1.33)
Internet	1.0%	43.8%	(1.03-1.15)	(1.01-1.14)
Heating	0.9%	29.9%	(0.86-0.96)	(0.85-0.97)
Financial Concerns	**34.0%**	**32.5%**	**(0.64-0.66)**	**(0.63-0.65)**
Rent	17.3%	31.9%	(0.76-0.78)	(0.75-0.78)
Money	6.3%	19.3%	(0.54-0.56)	(0.53-0.56)
Price	4.6%	51.6%	(1.26-1.32)	(1.23-1.31)
Deposit	3.9%	20.6%	(0.63-0.67)	(0.64-0.68)
Paying	3.7%	25.2%	(0.77-0.82)	(0.75-0.80)
Bill	2.7%	21.3%	(0.68-0.73)	(0.67-0.73)
Expensive	1.8%	41.3%	(1.04-1.13)	(1.01-1.11)
Bills	1.4%	29.5%	(0.76-0.83)	(0.76-0.85)
Prices	1.3%	48.4%	(1.17-1.28)	(1.19-1.32)
Fee	1.2%	22.1%	(0.77-0.85)	(0.77-0.87)
Afford	1.2%	43.0%	(1.16-1.28)	(1.15-1.29)
Dollars	1.2%	17.6%	(0.62-0.69)	(0.61-0.68)
Rents	0.9%	37.2%	(0.90-1.01)	(0.92-1.06)
Charges	0.8%	15.3%	(0.58-0.65)	(0.54-0.63)
Overpriced	0.6%	13.8%	(0.45-0.51)	(0.44-0.52)

Notes:

(1) Percentage of all comments including word.

(2) Percentage of individuals using word who would recommend the apartment community to a friend.

(3) Wald 95% confidence interval of point estimate from logistic regression of overall rating of the apartment community. The category levels are not included as independent variables in the word-level regression. The individual words are not included as independent variables in the category-level regression. This analysis has a non-missing *n* of 464,280 observations of 466,388 original observations. Where the interval does not cross 1.0, the point estimate is significant at the $p<.05$ level.

(4) Same as (3) but adding controls for year dummy variables, stated rent, bedrooms, and bathrooms with coefficients unreported. This analysis has a non-missing *n* of 309,837 observations of 466,388 original observations where missing variables are due largely to non-report of rent.

We used as our primary outcome variable the resident's overall rating of the apartment community. The overall rating could range from one to five based upon the following question:

Overall (compared to other apartments) how does this community rate in general?

(1) Rates poorly on basically all levels.

(2) Below average. Not the greatest place, but not the worst.

(3) Average compared to others.

(4) Superior to most others.

(5) An excellent community in all regards.

Because the outcome variable—overall rating—is based upon a series of qualitative statements, we do not treat it as a cardinal, numerical value. Instead, we simply consider each higher rating level as greater than the previous level, without making assumptions about the relative distance between any two levels. As such, we employ an ordered logit model, rather than an ordinary least squares regression model. Such an approach is common in literature measuring residential satisfaction as an outcome (Barcus, 2004; Lu, 1999; Speare, 1974). Under this model the cumulative probability of respondent, i, choosing a particular rating, j, or greater is

$$F_{ij} = \sum_{m=j}^{J} p_{im}$$

where p_{im} is the probability that individual i chooses the overall rating m, and J is the highest category (in this case, a rating of five). Thus, each F_{ij} relates to a different division of the dependent variable (e.g., 3 and higher, 4 and higher, etc.). The model is then the J-1 set of equations

$$\log\left(\frac{F_{ij}}{1-F_j}\right) = \alpha_j + \boldsymbol{\beta}\mathbf{x}_i \qquad j = 1,\ldots,J-1$$

where $\boldsymbol{\beta}\mathbf{x}_i = \beta_1 x_{i1} + \ldots + B_k x_{ik}$ and k is the number of independent variables (Allison, 1999).

Results

Table 1 displays results for the 12 classification categories and the corresponding words. Column (1) indicates the frequency with which a word (or any word within a category) appears in the comments. So, for example, the most frequently used word classified as meaningful by the coders was "staff," used in 27.7% of all comments. Column (2) indicates the proportion of those using a word (or any word within a category) who indicated that they would recommend the apartment to a friend. Thus, only 9.5% of residents using the word "mold" would recommend the apartment to a friend, while 73.4% of those using the word "quiet" would do so. Columns (3) and (4) display the 95% confidence intervals for

the odds ratio point estimate impact of the word (or category) on the likelihood of being in a higher, rather than a lower, ordered outcome category. The point estimate intervals for the categories reflect a regression where the categories, and not the individual words, were included as independent variables. Conversely, the point estimate intervals for individual words reflect a regression where the individual words, and not the categories, were included as independent variables. The regression results in column (4) correspond to a model including controls for rent, number of bedrooms, number of bathrooms, and year of observation. As this specification results in over 150,000 observations being dropped—largely because of missing values in self-reported rent—we also include column (3) corresponding to a model where only the individual words (or categories) are used as independent variables.

Table 2 reports two sets of "top 10" lists taken from the results in columns (1) and (4) of Table 1. The first set reports the words with the 10 lowest and 10 highest point estimates in the ordered logistic regression including all control variables. This reflects the association of these words with the overall ratings when the word appears in the text of the comments. However, some words are important not only for their impact on overall ratings when they appear, but also for the frequency with which they appear. As a combined measure of both of these factors, we multiply the impact of a word (defined as the point estimate subtracted from one) by the frequency of the word.

In examining words most strongly associated with negative overall ratings, two consistent themes begin to emerge: safety and sanitation. Of the top 10 most negative words by point estimate, five arguably relate to safety concerns ("unsafe," "cops," and "ghetto," "drugs," and "drug"), while three relate to sanitation ("mold," "dirty," and "roaches,"). The final terms, "overpriced," relates to money and "broken" relates to maintenance. While these words have a great impact on the overall apartment rating, many of them occur relatively infrequently. When we multiply a measure of impact by the frequency of the word, the concepts of safety ("police") and sanitation ("trash," "mold") remain in the top 10, but are joined by an emphasis on management ("management," "manager"), maintenance ("broken," "fix") and money ("rent," "money").

While the terms associated with the most positive ratings are more likely to be subject to the false positive posting issue, we do see some parallels with the most negative words. Observing a parallel where the same issue is important in both lists suggests that the issue itself is universally important, rather than simply being the product of false positive postings. This parallel occurrence tends to confirm the validity of those positive ratings, even given the incentive for false positive postings. For example, while problems with safety and sanitation dominated the most negative terms, both "safe" and "clean" made it into the top 10 list for most positive words. "Location" was number 2 among

Table 2. Top 10 Issue-Related Words in Renter Comments (Data from Columns 1 and 4 of Table 1)

Most Positive Issues by Point Estimate			Most Negative Issues by Point Estimate		
Word	Point Estimate	*p*-value	Word	Point Estimate	*p*-value
1. quiet	2.458	<.0001	1. drug	0.342	<.0001
2. location	1.804	<.0001	2. mold	0.378	<.0001
3. fitness	1.756	<.0001	3. drugs	0.382	<.0001
4. staff	1.684	<.0001	4. roaches	0.424	<.0001
5. maintained	1.662	<.0001	5. dirty	0.432	<.0001
6. trees	1.649	<.0001	6. ghetto	0.459	<.0001
7. landscaping	1.587	<.0001	7. overpriced	0.476	<.0001
8. amenities	1.554	<.0001	8. broken	0.484	<.0001
9. safe	1.529	<.0001	9. cops	0.520	<.0001
10. clean	1.485	<.0001	10. unsafe	0.525	<.0001

Most Important Positive Issues by Frequency X Impact

Word	Frequency	Impact (point estimate-1)	Product
1. staff	27.7%	0.684	0.190
2. maintenance	19.1%	0.410	0.078
3. quiet	4.8%	1.458	0.070
4. location	4.6%	0.804	0.037
5. clean	6.5%	0.485	0.032
6. pool	7.3%	0.336	0.025
7. safe	4.4%	0.529	0.023
8. neighbors	11.2%	0.192	0.021
9. fitness	1.9%	0.756	0.014
10. price	4.6%	0.268	0.012

Most Important Negative Issues by Frequency X Impact

Word	Frequency	Impact (point estimate-1)	Product
1. management	24.4%	-0.298	-0.073
2. rent	17.3%	-0.235	-0.041
3. broken	7.9%	-0.516	-0.041
4. fix	7.8%	-0.379	-0.030
5. money	6.3%	-0.455	-0.029
6. manager	9.8%	-0.253	-0.025
7. walls	5.9%	-0.300	-0.018
8. trash	4.9%	-0.361	-0.018
9. police	3.9%	-0.434	-0.017
10. mold	2.4%	-0.622	-0.015

the most positive words paralleling the potentially location-related "ghetto" in the top 10 most negative words. The word with the strongest positive impact was "quiet," reflecting a common concern in dense multifamily housing. Initially, "quiet" would seem to have no parallel among the words with most negative impact. However, over 40% of the comments including the word "walls" (one of the most important negative words) and also referenced some term in the noise category, likely relating to hearing noise through the walls. The 10 most positive words also contained a strong element related to common area amenities ("amenities," "landscaping," "trees," and "fitness"). Note that 89.4% of the occurrences of "fitness" appeared in the phrases "fitness center," "fitness room," or "fitness area," qualifying it as a common area amenity term.

When adding the consideration of frequency to the impact of words, the themes remain somewhat similar. "Safe" and "clean" remain on the top 10 list and move up slightly. The neighborhood-related "neighbors" joins the previously mentioned "location." While some common area amenities drop off the list, "pool" joins the list. Paralleling the added emphasis on money issues in the accompanying negative impact list, "price" joins the positive impact list as well. The importance of management becomes obvious as management-related terms top both the most important positive and most important negative issues list.

Overall, eight areas arguably encompass all of the terms in the four top 10 lists. These are safety (8), sanitation (7), common area amenities (6), maintenance (5), managers (4), money (4), neighborhood (3), and noise (3). Each of these areas, except for common area amenities, appear on both the negative and positive lists, further supporting the validity of their importance.

Some elements of this resulting list support the findings of previous research related to residential satisfaction. Several previous studies had found safety to be the most important characteristic in residential satisfaction (Cook, 1988; Lee, 1981; Taylor, 1995). This may be especially true in a multifamily housing context where residents are less likely to be able to limit contact with neighbors (Baumgartner, 1988). The importance of neighborhood (Fransson et al., 2001) and quietness (Savasdisara, 1988) found in other studies appears to be confirmed by analysis of these open-ended commentaries as well. The connection of green space in common areas with residential satisfaction found in previous research (Ellis et al., 2006; Kaplan, 2001) was also confirmed in the importance of words like "trees" and "landscaping."

However, the dramatic importance of sanitation issues emerged as a major theme not frequently found in earlier residential satisfaction research efforts focused on homeowners. This may result from sanitation issues being differentially related to locus of control, depending upon the resident's tenure status. While sanitation issues would be relevant to homeowners, they are also largely under the control of homeowners. Homeowners, being responsible for their own residential

sanitation conditions, may be more likely to downplay or accept some problems. Consequently, the same sanitation issues may have very different results for homeowners and renters because of this element of control. Homeowners living with sanitation deficiencies may more frequently see this circumstance as the result of personal choice and may feel a personal ability to change the deficiency at some convenient future time. Conversely, apartment residents have much less control over sanitation issues. A renter living in an apartment community with moldy or dirty common areas cannot control these problems. Some sanitation problems, such as roaches, may originate in common areas or connected units, and thus may also be outside the control of the resident. Even those sanitation issues within the unit itself may result from management's choices regarding deferred maintenance. Unlike homeowners, renters cannot justify investing in repairs to the unit, and thus may be in the powerless position of living with sanitation problems without obvious recourse. Consequently, terms related to sanitation concerns may be especially important for renters because of the likelihood that they are outside of the renters' control. The same locus of control concern would also apply to maintenance concerns as these often interrelate with sanitation issues.

As mentioned previously, a focus point for locus of control issues uniquely related to renters centers around the property manager. Thus, the presence of manager-related terms among the most frequent and influential words is not surprising. This confirms previous research conducted in public housing suggesting that the property manager's relationship with residents directly influences renter satisfaction (Ahlbrandt & Brophy, 1976; Paris & Kangari, 2005). In this dataset, management-related terms were number one in both the most important positive issues and most important negative issues. This reflects the ubiquitous nature of management issues in these open-ended comments, with 27.7% of all comments using the word "management" and 24.4% using the word "staff."

Finally, money-related issues also emerged as a satisfaction theme not commonly identified with homeowners. For homeowners, housing is both a service and an investment. So long as housing prices in the area did not fall, the homeowner devoting a larger share of personal income to a self-amortizing mortgage could typically look forward to owning a more valuable asset. Renters, however, receive no similar investment benefit from devoting a larger share of personal income to rent.

Conclusion

How do these findings provide guidance to residential property managers? While none of the factors listed appear counterintuitive, some may have been more powerful than expected. The core issues of safety and sanitation appear to dominate the comments of dissatisfied residents in rented multifamily housing.

While safety has long been found to be a dominant factor in residential satisfaction, the emergence of sanitation issues (related to words such as "clean," "dirty," "trash," and "mold") appeared as a strong theme not commonly found in research on homeowners. One reason sanitation and maintenance issues can be so important for renter satisfaction is that problems in this area are often outside of the renter's control. This lack of control over the problem areas can shift the renter's self-perceived locus of control, causing dissatisfaction. Conversely, homeowners, being themselves responsible for such conditions, may downplay their significance, knowing that such circumstances are within their control to change.

While most issues had important parallels for both satisfied and dissatisfied residents (e.g., clean and dirty, or safe and unsafe), common area amenities (trees, landscaping, and amenities) appeared to be mentioned only by satisfied residents. Thus, while satisfied residents may notice success in these areas, such improvements may not simultaneously address issues of concern to dissatisfied residents, which tend to be focused on core issues such as safety and sanitation.

The text analysis presented here also helps to confirm previous results obtained through more traditional closed-ended surveys. The fact that none of the most important terms pointed to unexpected issues suggests that previous research approaches have generally captured the most important concepts of residential satisfaction. The results also help to confirm previous findings by replicating these results through a different methodological approach using an exceptionally large dataset. For example, suggestions that the management's relationship with residents plays a key role in renter satisfaction were supported by the frequency of residents' use of management-related terms. The manager who can focus on the core issues that dominate residents' discussions, rather than being distracted by a multitude of other management minutia, may have the most impact on residential satisfaction. While the concepts are not new, the focus on these core issues may still provide the best strategy for the effective residential property manager.

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