

Predictors of Pro-Environmental Behavior in Rural American Communities

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Abstract

Place and community attachment, community satisfaction, and environmental attitudes have all been independently linked to environmental behaviors. However, few efforts have attempted to determine the relationship between these factors, and together, how they relate to pro-environmental behaviors. Moreover, few studies have analyzed these concepts and relationships in the context of rural and low amenity settings. This study integrates these factors in a conceptual framework and examines them in the context of rural, low amenity communities. Based on the analysis of data from a survey of residents in six small, rural communities in Kansas and Iowa ($N = 1,088$), we find that environmental attitudes and place attachment are the strongest predictors of self-reported pro-environmental behaviors, while community satisfaction—including satisfaction with services and satisfaction with community leadership—is not a significant predictor. Recommendations for future research following the theoretical approach used in the study are presented.

Keywords

community attachment, community satisfaction, environmental attitudes, environmental behaviors, place attachment

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Most of the world's current environmental problems are directly related to human behaviors, ranging from disposal of pollutants in waterways to overconsumption of natural resources. One of the most critical contemporary environmental problems is climate change, though recent research shows that the percentage of the U.S. population who are skeptical about human culpability for climate change is growing, and that the Midwestern U.S. region has the highest percentage of climate change skeptics (McCright & Dunlap, 2011; Pew, 2009). This suggests that understanding how particular physical and social environments might influence environmental attitudes and behaviors may be important for addressing critical environmental problems.

Despite extensive research, consensus about the factors influencing the adoption of pro-environmental behaviors—such as energy conservation and recycling—is still limited. Many scholars have focused on examining the multitude of variables that explain and predict environmental behavior, such as environmental attitudes (Dunlap, Van Liere, Mertig, & Jones, 2000), values (Dietz, Fitzgerald, & Shwom, 2005), social context (Olli, Grendstad, & Wollebaek, 2001), situational variables (Corraliza & Berenguer, 2000), environmental knowledge (Malka, Krosnick, & Langer, 2009; Pfeffer & Stycos, 2002), and social norms (Nordlund & Garvill, 2002), among others.

One of the most prominent areas of research deals with the nexus between environmental attitudes and behaviors, where specific attitudes have been found to be the strongest predictors of specific environmental behaviors, a relationship thoroughly tested with the Theory of Planned Behavior (TPB; Ajzen & Fishbein, 2005). In TPB, behavioral intentions are determined by an individual's attitudes toward that behavior and perception of social norms. Other recent studies utilizing TPB have added new dimensions to this research, finding, for example, that self-identity as an environmentalist is a stronger predictor of pro-environmental behavior than are other variables, such as attitudes or social norms (Whitmarsh & O'Neill, 2010). This points to a need to further explore and understand other factors that might account for the engagement in environmental behaviors.

Other recent research examines the role that place attachment and community satisfaction play on environmental intentions and also on environmental and civic behaviors (Brehm, 2007; Matarrita-Cascante, Stedman, & Luloff, 2010; Trentelman, 2009). Scholarship analyzing this relationship has proliferated, although diverse approaches are used to measure the concept of place attachment within the literature: Sociologists have typically measured social attachments when studying place attachment (e.g., Beckley, 2003; Brehm, 2007; Brehm, Eisenhauer, & Krannich, 2006); environmental psychologists focus on the individual's experience with the environment (e.g., Hidalgo & Hernández, 2001; Lewicka, 2011); geographers, planners, and

recreation researchers examine human–physical place interactions when studying place attachment (e.g., Wakefield, Elliott, Eyles, & Cole, 2006).

Despite these growing scholarly literatures, no study has incorporated extant research on the relationship between environmental attitudes and behaviors with the more recent research on the role of place and community attachment and satisfaction. We therefore contribute to this literature by exploring whether place (measured as community attachment and community satisfaction), environmental attitudes, and socio-demographic variables influence the engagement in pro-environmental behaviors. We also add to the literature by exploring these relationships in a new physical context. Most studies have focused on the environmental attitudes and behaviors of urban populations, and on place attachment and identity in high amenity contexts facing high rates of population growth and in-migration (Brehm, Eisenhauer, & Stedman, 2013; Devine-Wright & Clayton, 2010). In a recent contribution, Raymond, Brown, and Weber (2010) theorized that place attachment may actually be more relevant to rural than urban populations when a measure of nature bonding is included. Our focus on rural communities presents an opportunity to expand the aforementioned factors in understanding environmental behaviors (Hamilton, Hartter, Safford, & Stevens, 2013).

The empirical context for this analysis is a survey of residents in six small rural and agriculturally dominated communities in Iowa and Kansas, in the Midwestern United States. These communities were chosen as case study communities in a larger research project examining residents' perceptions of the community impacts of the biofuels industry in relation to the siting of a local ethanol plant in each community. In addition to exploring residents' perceptions of impacts of the biofuels industry, the study also examined residents' environmental attitudes and behaviors, and their social attachments to their community; the relationship between attitudes, attachments, and behaviors is the focus of our analysis in this article. Several survey questions measured whether residents' environmental attitudes and their attachment to their communities were related to their opinions about environmental issues such as climate change, human responsibility for environmental problems, and to their willingness to change their individual behavior to address environmental problems.

Although most research on place and community attachment focuses on "high amenity" recreational landscape locations (Beckley, 2003; Brehm, 2007; Brehm et al., 2006; Cross, 2001; Matarrita-Cascante et al., 2010), the physical landscape in which these rural communities are located is characterized as monoculture agricultural landscapes, and these differences in physical context provide an interesting comparison to other scholarship. In contrast to current literature that examines place attachment in high amenity regions

with high rates of population growth and in-migration and compares place attachment of new migrants with that of long-term residents in such locations (Cross, 2001; Matarrita-Cascante et al., 2010), our study communities were characterized by low amenities and by several decades of population decline and out-migration. As a result, our study's focus on the role of community attachment of long-term residents in the context of overall population decline provides an interesting and novel context for examining environmental attitudes and behaviors. While considerable research in rural demography has investigated the determinants of out-migration in rural agricultural communities over the past 50 years (Johnson & Rathge, 2006; McGranahan & Beale, 2002), there has been little attention to understanding non-migration, or what accounts for "attraction to place" (von Reichert, 2006), and how this may affect other behaviors of residents in rural communities (Hallin, 1995; Theodori, 2001). Therefore, our research on rural communities with low amenities and with a significant loss of residents expands the understanding of previously measured relationships in the study of environmental behaviors. In the next section, we provide a review of past studies that informed our theoretical framework, before describing the methods, data, and results.

Place and Community Attachment and Environmental Behaviors: A Review of Past Literature

Most of the scholarship on environmental behaviors has focused on social-psychological factors such as attitudes, values, and cognitions (Aoyagi-Usui, Vinken, & Kuribayashi, 2003; Barr, 2003; Nordlund & Garvill, 2002; Schultz et al., 2005; Stern & Dietz, 1994; Stern, Dietz, Abel, Guagnano, & Kalof, 1999), to the neglect of situational (i.e., situation, and physical-environment traits) factors (Corraliza & Berenguer, 2000). Several social scientists have also noted the omission of situational factors in the study of place (Brody, Highfield, & Alston, 2004; Vorkinn & Riese, 2001; Wakefield et al., 2006).

Reviewing the literature on place attachment, Trentelman (2009) and Hidalgo and Hernández (2001) highlighted the problematic conflation of concepts such as community attachment, sense of community, place attachment, place identity, place dependence, and sense of place. Recent environmental psychology research has also attempted to integrate attachments to both physical place and to community networks into the literature on place attachment. Scannell and Gifford (2010a, 2010b) discussed place attachment as a multidimensional concept (person, place, and process) that includes attachment to the physical environment as well as the social relationships that developed within a place. Hidalgo and Hernández (2001) also discussed two

levels of attachment (social and physical) and three scales (house, neighborhood, and city). Analyzing interviews with residents at these different spatial scales, they found that individuals had less attachment to the neighborhood and more attachment to social connections, suggesting that type and size of the community has an effect on the level of place attachment. They found this to be particularly important in settings with high loss of residents but with a majority of long-term residents, which is the context of this present study. On one hand, length of residence predicts stronger place attachment, but on the other, the loss of residents weakens social networks and attachment.

In the sociological literature, place attachment and community satisfaction are also defined as multidimensional concepts that refer to the perceived quality of a place. This ranges from the “sociability” of a place, to the level and adequacy of its services, to its physical qualities (Stedman, 2002). Raymond et al. (2010) developed a model that indicates that nature bonding, social strong attachment, and physical and social characteristics of place all have important roles to play in place identity and dependence. Brehm et al. (2006) also explored distinctions between social attachment and natural environment attachment. In their study, the influence of these measures on environmental concern was dependent on the type of environmental issue being considered. That is, they found that when *social attachments* were a predictor of attitudes toward environmental issues, the issues tended to be related to the local environment or health, whereas *natural attachments* predicted attitudes toward environmental issues related to resource protection. In a follow-up study about community attachment in a high amenity location, Brehm (2007) found that the physical environment was a very important component in defining attachment. In a recent study, Matarrita-Cascante et al. (2010) examined the differences in place attachments between seasonal and permanent residents in a high amenity location in Utah. They found that while permanent residents had greater social bonds and attachments, attachment to natural landscape was very important in shaping community attachments for both permanent and seasonal residents, albeit to different degrees and in different ways.

Research comparing environmentalism and environmental behaviors between urban and rural settings has traditionally found higher concern among those living in urban setting (Bogner & Wiseman, 1997; Freudenburg, 1991). However, some evidence suggests that this might be changing (Berenguer, Corraliza, & Martín, 2005), due to the increase in the access of individuals in rural areas to natural parks and outdoor recreation sites or higher amenity locations (Jones, Fly, & Cordell, 1999).

In addition to the multidimensional definitions of place attachment, most studies concerning place attachment have operationalized the concept as a

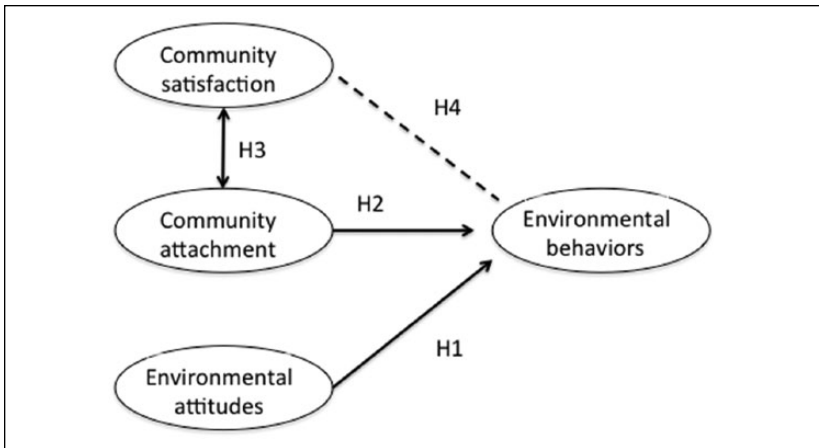


Figure 1. Hypothesized model.

dependent variable, although in a notable exception, Stedman (2002) used attachment as an independent variable to help explain behaviors. Commonly, length of residence, along with factors such as local ties, and neighborhood cohesion, among others, are some of the key predictors of the levels of place attachment (Theodori, 2004b), as well as of community attachment (Brown, Perkins, & Brown, 2003; Mesch, & Manor, 1998). Stedman (2002) argued that attachment fosters place-protective behaviors, while place satisfaction inhibits them. More specifically, Stedman (2002) argued, “We are willing to fight for places that are more central to our identities and that we perceive as being in less-than-optimal condition” (p. 577). Other scholars conclude that community attachment is positively related to community action (Payton, Fulton, & Anderson, 2005; Theodori, 2004a), while community satisfaction does not affect community action or place-protective behaviors. (Theodori, 2004a). Halpenny (2010) also found a positive effect of place attachment on general behavioral intentions (e.g., recycling) and specific behavioral intentions (related to the protection of a park) of visitors in a national park in Canada. Focusing on communities in British Columbia, Canada, Scannell and Gifford (2010b) found that attachment to the natural environment predicted environmental behaviors, while civic attachment had a more limited effect.

Building on the varied approaches to conceptualize and operationalize the relationship between place attachment and environmental behaviors discussed above, we develop a model that expands on current understandings about the predictors of environmental behaviors (Figure 1). Due to the rather

exploratory nature of the study, we only tested the basic relationships between the main variables, following this specific research question: What is the relationship between community satisfaction, community attachment (i.e., social attachments in a place), and environmental attitudes, and how do they influence environmental behaviors? The hypothesized relationships between these concepts are shown in Figure 1.

Based on the literature reviewed, we first predict that (H1) those individuals who are strongly socially attached to their community should be more involved in actions to improve their communities and their surrounding environment (i.e., pro-environmental behaviors). Second, (H2) stronger pro-environmental attitudes positively predict environmental behaviors (based on TPB). Furthermore, we hypothesize that (H3) community satisfaction and community attachment will be positively correlated but that (H4) community satisfaction will have a limited effect on environmental behaviors. Finally, we also explored the role of length of residence on community attachment and satisfaction. We also controlled for socio-demographic variables, which are explained below.

Method

As discussed above, the survey was part of a larger study examining perceptions of social, economic, and environmental impacts of biofuels development on six rural, agriculturally dominated communities in Kansas and Iowa. Case study communities were selected from nonmetropolitan counties based on a combination of criteria, including community size, presence of ethanol plant, variation in plant ownership structure (local vs. absentee owner), and variation in the biophysical endowments, from dry irrigated western Kansas landscapes to rain-fed eastern Kansas and Iowa locations, to reflect the diversity in these states (for a detailed demographic information, see Table 1 in the online appendix).

The project “Examining the Community Impacts of Ethanol Production” utilized a mixed-methods approach that included a community survey, in-depth interviews, focus groups, and media content analysis in six communities in Kansas and Iowa. Analysis of interview data, media content analysis, and of other aspects of the project is reported on in additional articles (Bain, Prokos, & Liu, 2012; Bain & Selfa, 2013; Selfa, 2010; Selfa, Kulcsár, Bain, Goe, & Middendorf, 2011). A random sample of households from each case study community was selected for the community survey. Each sample was limited to households located within the city boundaries of the community in which the ethanol plant was located. The survey was targeted toward the head of household and was self-administered by the respondent.

Each community survey was conducted by mail using a modified Dillman's Tailored Design method (Dillman, Smyth, & Christian, 2009). The surveys for Russell and Phillipsburg, Kansas, and Nevada, Iowa, were conducted between April and October 2008, while those for Liberal/Hayne and Garnett, Kansas, and Greene County, Iowa, were conducted between June and July 2010. Prior to sending out the surveys, public notification of the survey was provided in the local newspaper. Sampled households in each case study community were notified via a postcard that their residence had been selected through a random sample. An initial survey packet was then mailed to each sampled household that included a cover letter, survey questionnaire, and business reply envelope. A postcard reminding non-respondents to complete and return the survey was sent 2 weeks after the initial mailing. Finally, a second survey packet was mailed to non-respondents 1 month after the initial mailing. We did not offer any incentives for participation in the survey; the survey was formatted as an eight-page booklet and took about 15 min to complete.

After excluding the surveys that were returned due to bad addresses, and those from households who asked to be removed from the list of participants, a total of 1,088 surveys in six communities were completed. We included only city (i.e., not county) residents in the sample for each community, and the sample size was determined to be a statistically significant representation for each community. The overall response rate for all six communities was 38.9%, with a high of 46% in Nevada, Iowa, to a low of 22% in the community of Liberal/Hayne, Kansas. Missing values for all variables were completed using the imputation procedure described in Myers (2011) and Reilly (1993). This method uses actual data to replace missing values based on similar responses to other related variables among respondents.

When comparing the demographic characteristics of the sample population to that of the characteristics of the communities in the 2000 U.S. Census of Population and Housing, we found some differences between the samples and the populations as characterized in 2000. In all communities, the respondents were slightly older on average, included a higher proportion of men, and had higher incomes and levels of education than community residents overall. These differences may suggest that residents with a greater interest in the issues addressed in the survey responded at a higher rate. Therefore, our findings can only be generalizable to those residents who do have a greater interest and not necessarily to all residents in the communities.

Dependent Variable

Environmental behaviors. For the variable *environmental behaviors*, an eight-item scale with a 3-point response scale (1 = *never*, 2 = *sometimes*, 3 =

Table 1. Factor Analyses for Summated Scales.

Variable	M ^a	Factor loadings ^b	SD
Environmental behaviors ($\alpha = .7$) ^c	11.96		2.41
1. Buy biodegradable or recycle products		0.76	
2. Reduce household trash by buying products that come with less packaging		0.76	
3. Avoid chemical use in your yard or garden		0.58	
4. Donate money to environmental organizations		0.50	
5. Recycle		0.68	
6. Compost household kitchen waste		0.40	
Environmental attitudes ($\alpha = .81$)	18.57		3.21
1. I think environmental issues are extremely important		0.74	
2. When I see or hear a story about an environmental issue, I pay particular attention to that story		0.62	
3. It bothers me that the world's natural environment is changing so quickly		0.74	
4. The public should not worry about climate change ^d		0.81	
5. The public has responsibility to conserve resources for future generations		0.41	
6. My individual actions will not make a difference regarding global climate change ^d		0.71	
Satisfaction with services and recreation ($\alpha = .78$)	18.08		2.67
1. Public education		0.53	
2. Housing		0.64	
3. Cultural opportunities		0.75	
4. Recreation/leisure		0.74	
5. Health and welfare		0.60	
6. Churches/religious institutions		0.60	
Satisfaction with community leadership ($\alpha = .82$)	11.11		2.32
1. Local government		0.85	
2. Economic development		0.65	
3. Local municipal services (water, sewer, etc.) ^e		0.62	
4. Community leadership		0.88	
Community attachment ($\alpha = .66$)	7.38		1.34
1. In considering your life as a local resident, would you say you belong to or feel at home in your community?		0.67	
2. How much interest do you have in knowing what goes on in your community?		0.83	
3. How important is it to you that you participate in local community activities?		0.82	

^aMeans are for the sum of the scales.

^bExtraction method: principal component analysis; rotation method: Varimax with Kaiser normalization.

^cAlpha scores are based on non-standardized items

^dReversed coding

^eAlthough this item refers also to services, it explicitly refers to the function of local governments.

frequently) was used. The scale, shown in Table 1, included statements about specific environmental behaviors, following the recommendation by Vaske

and Kobrin (2001). Respondents were asked "In your day-to-day life, do you . . . ?" to which they were presented with the statements in Table 1. The statements included are considered curtailment behaviors, which need to be constantly repeated (as opposed to one-time efficiency behaviors, such as changing house insulation). An exploratory factor analysis was conducted to determine the appropriateness of the scale for measurement of environmental behaviors. A single component was extracted with coefficient values above .4. "Driving a hybrid vehicle" and "using fluorescent lightbulbs" were dropped from the final analysis because they scored lower than the aforementioned threshold. Therefore, six out of the eight items are included in the summated scale. Cronbach's alpha value of .70 was calculated and deemed acceptable for analysis (see Table 1).

Independent Variables

Environmental attitudes. Respondents were asked "To what extent do you agree with the following statements?" A list of seven statements measuring their environmental attitudes was then presented (Table 1) and measured with a 4-point Likert-type scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, and 4 = *strongly agree*). An exploratory factor analysis revealed two principal components. Component 1 included six of the seven items, which together were considered a measure of environmental attitudes. Cronbach's alpha of .81 was calculated, which suggests a good reliability measure. Component 2 included only three items and did not reveal any apparent underlying concept; therefore, it was not considered in the analysis.

Community satisfaction. Community satisfaction was measured by asking the question "How would you rate the quality of the following aspects of the local community?" A series of 10 community features (Table 1) were listed and measured with a 4-point Likert-type response scale (1 = *very poor*, 2 = *poor*, 3 = *good*, 4 = *very good*). This approach follows the work by Theodori (2004a), who measured community satisfaction using seven items, including satisfaction with medical services, youth programs, and recreational programs, among others. An exploratory factor analysis revealed two distinct components. The first component includes measures that were later labeled as "satisfaction with services and recreation" ($\alpha = .78$). The second component includes measures that were labeled as "satisfaction with community leadership" ($\alpha = .82$). Both scale variables were included in the analysis based on the high reliability scores.

Community attachment. As discussed above, our measures of attachment referred to the social connections to the community, and hereafter will be

called community attachment. Community attachment was measured via three items, building on previous research (Theodori, 2001). The first item asked "In considering your life as a local resident, would you say you belong to or feel at home in your community?" Respondents answered one of the following: definitely not = 1, probably not = 2, probably = 3, or definitely = 4. The first two responses were recoded into a single category due to their low frequencies. Second, the survey asked "How much interest do you have in knowing what goes on in your community (no interest = 1, some interest = 2, and much interest = 3). Finally, respondents were asked "How important is it to you that you participate in local community activities?" Possible responses included "of no importance" = 1, "somewhat important" = 2, and "very important" = 3. Responses to the three items were then added to develop a scale ranging from three to nine. The reliability score was not as high as expected ($\alpha = .66$); however, it was deemed acceptable and was included in the multivariate analysis.

Socio-demographic variables. Taking into consideration the previous studies on community attachment described above (e.g., Theodori, 2004b), length of residence, education, gender, age, and income were included as socio-demographic variables that served as controls for the other independent variables. It is expected that age will predict the levels of environmental attitudes and behaviors since young people are usually found in the literature to be more environmentally minded (Olli et al., 2001). Similarly, based on the extensive literature on the role of gender in environmental concern and behaviors (McCright, 2010; Stern, Dietz, & Kalof, 1993), we expect women to engage in more environmental behaviors and to express more environmental attitudes and attachment than men.

The sample population is composed of mostly older adults ($M = 56.68$, $SD = 16.56$), middle-income households ($M = 3.31$, $SD = 1.15$; over 50% reported an income between US\$30,000 and US\$90,000) with some college or technical school education ($M = 2.03$, $SD = 0.80$), two thirds male, and mostly long-term resident (80.3% have lived in their communities for 10 years or more). The sample oversampled males (62.3%), and 57.3% of respondents are residents from Kansas, while 42.6% live in Iowa. More detailed descriptive statistics for these variables are presented in Table 2 in the online appendix.

To better understand the relationships among the variables described above, a variety of descriptive and explanatory analyses were conducted. First, chi-square tests were used to determine significant differences among the responses to the categorical variables. Second, mean tests and a correlation matrix are presented to explain the relationships including the

Table 2. Correlations Between Continuous Independent Variables and Environmental Behaviors.

Variables	1	2	3	4	5
1. Environmental behaviors	1				
2. Environmental attitudes	.474**	1			
3. Satisfaction with services and recreation	.076*	.086**	1		
4. Satisfaction with community leadership	.024	.049	.604**	1	
5. Community attachment	.224**	.182**	.322**	.263**	1

* $p < .05$, two tailed. ** $p < .01$, two tailed.

continuous variables. Finally, regression analyses are presented to explain the relationship between the dependent and independent variables.

Results

The length of residence in a place has frequently been used to predict place and community attachment. The relationship between length of residence and community attachment was also analyzed in this study; we found that it explicates the relationships between community attachment, environmental attitudes, community satisfaction, and environmental behaviors. Chi-square tests (based on length of residence) were conducted to determine differences in the responses to the three categorical variables that make up the community attachment scale (see Table 3 of the online appendix for more details). The results show that those individuals who have lived for a longer time in the community tend to have stronger community attachment, $\chi^2(2, N = 1088) = 53.99, p < .001$. The strength of this relationship is moderate (Hedge's $g = .47$). However, as explained below, length of residence *alone* does not explain community attachment. Results also show that those individuals that have lived the longest in their communities tend to have more interest in knowing about issues in their community, $\chi^2(2, N = 1088) = 20.35, p < .001$. The strength of this relationship is also moderate ($g = .32$). On the other hand, no differences in terms of length of residence were found in regards to the importance of participating in local community activities.

The relationship between the dependent variable, environmental behaviors, and the four continuous variables (environmental attitudes, community attachment, community services satisfaction, and community leadership satisfaction) was analyzed using Pearson's correlation (see Table 2). The results show a moderate significant correlation among environmental attitudes and behaviors ($r = .47, p < .01$), which is consistent with previous studies on

Table 3. Regression of Environmental Behaviors.

	Model 1		Model 2		Model 3		Model 4	
	b	Std. β	b	Std. β	b	Std. β	b	Std. β
Constant	10.776***		8.99***		3.97***		4.65***	
1. Satisfaction with services and recreation	0.087**	.096	0.034	.038	0.016	.018	-0.005	-.005
2. Satisfaction with community leadership	-0.035	-.034	-0.061	-.059	-0.050	-.048	-0.052	-.050
3. Community attachment			0.410***	.228	0.270***	.150	0.271***	.151
4. Environmental attitudes					0.337***	.448	0.319***	.424
5. Age							0.015***	.103
6. Gender (male)							-0.522***	-.105
7. Length of residence (more than 10 years)							-0.129	-.021
8. State (Kansas)							-0.283*	-.058
9. Education								
High school or less							-0.269	-.051
Education (technical school or some college)							0.169	.034
10. Income								
US\$29,000 or less							0.071	.013
US\$30,000-US\$59,999							0.008	.002
US\$60,000-US\$89,999							0.154	.025
R ²	.006		.052		.246		.271	
Adjusted R ²	.005		.050		.243		.262	

* $p < .05$. ** $p < .01$. *** $p < .001$.

attitudes and behaviors (see Kaiser, Wölfing, & Fuhrer, 1999). Environmental behaviors also have a weak but significant correlation with satisfaction with services ($r = .08, p < .01$), which was not expected based on previous studies, but this could be a manifestation of sample size. However, this relationship does not prove to be relevant in the regression models discussed below. In addition, both measures of satisfaction are predictably highly correlated ($r = .604, p < .05$). Most of the services presented in the survey are delivered by either public or private institutions, which are rated in the satisfaction with leadership scale.

The relationship between community attachment and environmental attitudes was also explored, and based on previous studies, we expected to be positive. The correlation shown below is partially consistent with previous research, with satisfaction with services and community attachment positively correlating with environmental attitudes. Finally, community attachment is also positively correlated with all other variables. The significance of these relationships is explored later in more detail in the regression analyses.

Mean tests (*t* test and ANOVA) were conducted to determine differences in the responses that make the five continuous variables described above. The analyses were based on the following factors: gender, education, length of residence, and state of residence. State of residence was included as a variable because, despite the demographic similarities of the communities surveyed, political, economic, and other social factors could differ at the state level and moderate the types of responses to the questions presented, such as satisfaction with municipal and county services. Mean differences based on gender show that women have higher levels of pro-environmental behaviors than men, $F(1, 1086) = 34.54, p < .001$) and attitudes, $F(1, 1086) = 31.69, p < .001$. On the contrary, no mean differences based on level of education were found. We hypothesized that community attachment and length of residence would be related. When analyzing length of residence, both community attachment, $F(1, 1086) = 33.26, p < .001$, and satisfaction with services show significant differences, $F(1, 1086) = 7.04, p < .01$, with long-term residents (more than 10 years) being more attached and more satisfied than those who have lived in these communities for a shorter time. Finally, the analysis revealed significant differences in all continuous variables based on the place of residence (Kansas vs. Iowa). Respondents in Iowa scored higher than respondents in Kansas in all variables except on community attachment.

Table 3 presents four different regression models on environmental behaviors. Model 1 includes satisfaction with services and satisfaction with leadership as predictor variables. In this model, only the first variable (satisfaction with services) is significant, which was also reported in the correlation analysis. However, in the three other models, neither variable remains significant. Model 2 incorporates the measure of community attachment, which is significant across Models 2 to 4. This relationship was anticipated, but as discussed in the next section, it also raises questions about the different effects based on the notions of natural and civic attachment. A path analysis did not reveal a mediating role of community attachment in the relationship between community satisfaction and environmental behaviors. The variable, environmental attitudes, was added to Model 3, which is the strongest significant predictor in all models, explaining most of the variance of the environmental behaviors scale. The last model incorporates all the socio-demographic variables, which increases slightly the adjusted R^2 from .24 to .26. From these control variables, age ($\beta = .02, p < .001$), gender ($\beta = -.522, p < .001$), and state of residence ($\beta = -.283, p < .05$) are significant predictors. More specifically, people of older age, women, and Iowa residents tend to engage in more pro-environmental behaviors. In summary, most of the predicted variance in environmental behaviors is explained by environmental attitudes ($\beta = .319, p < .001$) and community attachment ($\beta = .271, p < .001$).

Discussion

This article had two central goals. First, it aimed at integrating two main perspectives in the study of pro-environmental behaviors—the role of socio-psychological variables and the role of community attachment variables. We examined the effects of environmental attitudes, community attachment, community satisfaction, along with demographic variables, in explaining pro-environmental behaviors. While these variables have been used separately in past literature to predict environmental behaviors, they have not been thoroughly tested in combination. Second, this article focused on understanding pro-environmental behaviors in rural agricultural communities, a context that has not been adequately explored in previous efforts but one which other researchers also argue provide an important contribution to the study of factors shaping environmental concerns (e.g., Hamilton et al., 2013).

Our results support all the hypotheses we presented in the introductory sections of the article. The first and second hypotheses stated that community attachment and environmental attitudes would predict environmental behaviors, respectively. The complete regression model confirms this, with both variables explaining most of the predicted variance. The unexplained variance could be accounted by other factors such as social norms, specific measures of attitudes toward the measured behaviors, and the perceived self-efficacy to perform the behaviors, among others. It was also hypothesized (H3) that community attachment would be related to community satisfaction. The correlation analysis shows that community attachment is positively correlated to both measures of satisfaction. Although the correlations are moderate ($r = .322$ for satisfaction with services and $r = .263$ for satisfaction with leadership), they are significant at $p < .01$. H4 stated that community satisfaction would not predict behaviors. This was also confirmed because both measures of satisfaction (with services and with leadership) were not significant predictors of environmental behaviors in the final model. Satisfaction with services was significant in the first model but lost significance when the control variables were incorporated. The significance of community attachment and the non-significance of community satisfaction are consistent with the results presented by Theodori (2004a) in his study of community actions. However, these results are not consistent with Stedman's (2002) results, which found a significant negative relationship between satisfaction and behavioral intentions. This, we believe, is still an area for further research. The consistency of our results with those by Theodori (2004a) may suggest that both community actions and environmental behaviors are similar in their relationship to both attachment and satisfaction and that both are related to an individual's interest in improving their place of residence.

However, differences in measurement scales do not allow a valid comparison. Moreover, it might be possible that other confounding variables can help explain the relationships. For instance, neither this study nor Theodori's (2004a) used a measure of political affiliation. Engagement in environmental behaviors and support for environmental policies has been found to show significant differences among party lines (Dunlap, Xiao, & McCright, 2001; McCright & Dunlap, 2011).

Finally, we tested the relationship between length of residence and community attachment. Both the chi-square tests for the three items that compose the community attachment scale, and the *t* test using the composite scale, show significant differences, with those residents who have lived longer in the community being more attached to it. In summary, the results of this study support the findings reported in previous studies that looked at the independent variables separately, while also confirming their effect when used in conjunction.

However, this study also raises several questions in regards to the relationship of community attachment to environmental behaviors, as several differences were found between our study and previous literature. For example, Scannell and Gifford (2010b) did not find a significant predictive relationship between community civic attachment and behaviors, while Theodori (2004a) found a positive relationship between community attachment and community action. Despite the different operationalization of the concept, in this study, we found a positive relationship between community attachment and pro-environmental behaviors, which suggests the need to further explore the relationship under different contexts, with a more precise and reliable scale. We can hypothesize from these results that community attachment in rural areas has a stronger effect on environmental protective behaviors than in urban areas. However, from the results, it is not possible to hypothesize what role high out-migration plays in this relationship.

Like most studies, this study is not exempt of limitations. Length of residence was not significant in predicting environmental behaviors; however, the dichotomous nature of the variable (less than 10 years or more than 10 years) might have limited its explanatory power. The variable was recoded this way because the great majority of respondents (over 80%) had lived in their communities for more than 10 years. This variable would be worth exploring by using a continuous variable instead and by applying it to a more mobile and diverse population. Similarly, the environmental attitudes and behavior items in the summated scales included general statements not specific to the locality. Further studies should present more specific items as those used in the study of attitudes and behaviors (e.g., Ajzen & Fishbein, 2005). Finally, the three-item measure of community attachment had a

relatively low reliability score, which might be a function of the lack of precision of the items in measuring the latent variable.

Future Research and Recommendations

Future research could apply this theoretical framework to different physical and geographical locations. For example, it would be appropriate to determine if a stronger and significant relationship between satisfaction and behaviors is present in rural areas in different regions of the United States or in different cultural contexts (e.g., developing countries). In addition, the communities studied in this research are all rural agricultural communities and lack “high amenity” environmental locations, and therefore comparing whether access to pristine environments influences place attachment was not possible. In addition, this study did not include measures of the perceptions of the physical environment, as discussed by Stedman (2003), which should be incorporated in future research efforts. We also believe that the notion of loss of residents is worth exploring further, with other settings that experience different rates of migration. In other words, does the loss of social relationships through out-migration affect the level of place attachment, and therefore the overall engagement on place-protective behaviors?

In this study, we show that the engagement of communities in pro-environmental behaviors depends on both positive environmental attitudes and also on the level of community or place attachment of individuals. Our findings suggest policymakers in rural Midwestern and Plains states may need to appeal to community attachments to change regional entrenched environmental attitudes and behaviors (Pew, 2009). Planners, activists, and policymakers should consider both sets of factors in their educational and communication efforts to promote pro-environmental behaviors.

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Supplemental Material

The online appendix is available at <http://cab.sagepub.com/supplemental>

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