

A Cross-Regional Comparison of Recreation Patterns of Older Hunters

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We studied outdoor recreation patterns among older hunting license holders in Pennsylvania and Colorado to better understand aspects of five trends that promise to impact outdoor recreation preferences, behavior, and management priorities: Sunbelt population growth, declining residential stability, urbanization, aging, and increasing levels of formal education. Results of our mail survey showed that the samples were similar in age, gender, and ethnicity, but Pennsylvania respondents were more likely to have lived their entire lives in the state and had spent more of their adult lives in rural areas. On the other hand, Pennsylvania respondents were less likely to have attended school beyond high school. Pennsylvania respondents hunted more frequently and were more likely to gather wild foods. Colorado respondents were more likely to fish, and they participated in more nonconsumptive activities. Education, rural/urban differences, and residential stability had a limited ability to predict differences in consumptive activities. Age, education, and residential stability predicted differences in nonconsumptive activities. Results suggest that cultural differences between regions may be more important than socio-demographic characteristics for understanding of outdoor recreation patterns in the past, present, and future.

Keywords consumptive recreation, non-consumptive recreation, recreation trends, regional differences, socio-demographic trends

U.S. society is undergoing socio-demographic changes that promise to impact outdoor recreation preferences and behavior, as well as management priorities for recreation resources. These changes include rapid population growth in the Sunbelt states (U.S. Bureau of the Census [USBC], 2000), declining residential stability (USBC, 2000), urbanization (USBC,

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2000), the aging of the population (Siegel, 1993; USBC, 2000), and increasing levels of education (Cordell & Super, 2000; Siegel, 1993). To better understand some aspects of these trends, we studied patterns of outdoor recreation among older hunting license holders in Pennsylvania and Colorado, two states whose differences embody, in many ways, the past and future of the trends we addressed. We focused on older individuals because, across the country, they are a growing segment of the population. Finally, we focused on hunting license holders because they participate in a traditional, consumptive form of outdoor recreation that appears to be in an extended period of decline (Brown, Decker, Siemer, & Enck, 2000; Kelly & Warnick, 1999), at the same time that many nonconsumptive activities are undergoing rapid growth (Cordell et al., 1999; Kelly & Warnick, 1999).

Study Background

Other research has demonstrated that geographic region, residential stability, rural versus urban residence, age, and education are related to outdoor recreation participation (e.g., Sessoms, 1963). Below, we review what is known about these relationships.

Growth of Sunbelt States, Declining Residential Stability, and Urbanization

The relocation of people within the United States includes movement into the Sunbelt states of the South and West, as well as shifts from rural into urban/suburban areas. Evidence suggests several ways that moving from one location to another can influence outdoor recreation behavior and preferences, particularly when the move is from one region of the country to another or from a rural area to an urban one.

Growth of Sunbelt states and outdoor activity participation. In addition to growing, the U.S. population is being redistributed among regions. States in the Northeast and Midwest are experiencing little or no growth, while the Sunbelt states of the South and West are experiencing rapid growth. For example, between 1990 and 1999, Pennsylvania's population grew only 1%, but Colorado's population grew 23% (USBC, 2000). Older Americans made up a disproportionately large part of this shift, with a net migration of older adults from the Northeast and Midwest to the South and West (Siegel, 1993).

Studies suggest that residents of the Mountain states participate in certain outdoor recreation activities at higher rates than residents of the Northeast and other regions. For example, a 1994-95 national survey (Cordell et al., 1999) showed that, compared to residents of the Northeast (including Pennsylvania), residents of the Mountain and Plains states (including Colorado) were more likely to participate in all forms of camping (38% versus 24%), nonmotorized and motorized trail use (48% versus 35%), hunting (13% versus 9%), and fishing (31% versus 28%). These participation differences may be related to a variety of causes, including physical, ecological, and cultural differences between regions as well as the impact of declining residential stability and urbanization.

Residential stability and outdoor activity participation. Moving from one location to another can influence outdoor recreation activity patterns by altering the make-up of social groups, impeding access to some recreation areas and opportunities, and facilitating access to others. The impact of social groups on recreation behavior and preferences is widely recognized (Burch, 1969; Stokowski, 1990). Relocation can disrupt social groups involved in recreation. These groups may not be replaced, or they may be replaced by groups with different recreation preferences and behavior. As a result of these changes, participation in some activities may be reduced, while participation in other activities may increase.

Outdoor recreation activities (e.g., hunting, fishing, wildlife watching) sometimes depend on detailed knowledge about a specific environment. When relocation separates an

individual from known environments, developing a similar level of knowledge about a new area can be difficult and time-consuming, particularly if relationships with social groups that can facilitate the process must be re-established in the new location. Thus, although empirical evidence is limited, researchers have hypothesized that relocation is likely to constrain participation in some outdoor activities, especially hunting (Enck, Decker, & Brown, 2000).

The effect of relocation on outdoor recreation is not always negative. Sometimes relocators discover new opportunities and/or new activities. At other times, relocators deliberately move to areas where preferred opportunities are more readily available. Americans are migrating to the Sunbelt states, in part because the climate is favorable year-round for many outdoor activities. In some cases (e.g., boating, snow skiing), individuals or families relocate to a particular area specifically because outstanding recreation opportunities are available.

Urbanization and outdoor activity participation. As Americans relocate, the population is gradually becoming more urban. Between 1960 and 1990 the proportion of the population living in urban areas increased from 70% to 75% (USBC, 2000). Urbanization may influence outdoor recreation patterns in a variety of ways. On the positive side, relocating from a rural area to an urban area can result in exposure to new opportunities. On the negative side, relocating from a rural area to an urban area may necessitate traveling greater distances to preferred recreation sites, traveling via more heavily-used routes, and/or visiting sites that are more heavily used and/or less extensive than sites used previously. Furthermore, as urban and suburban areas grow and expand into rural areas, recreation sites that were once rural may be used more heavily, be used differently, become fragmented, or be lost altogether. These trends are particularly relevant for hunting, which depends on the availability of extensive areas with low population densities. Not surprisingly, there is a negative correlation between the extent of urbanization in a state and the proportion of residents who hunt (Brown et al., 2000), and urban hunters have higher attrition rates than their rural counterparts (Klessing, 1970).

The impacts of urbanization induce additional long-term changes in recreation patterns. Children who grow up in rural and urban areas are often socialized into recreation differently, and youthful leisure patterns are related to adult leisure choices (Burch, 1969; Buse & Enosh, 1977; Christensen & Yoesting, 1973; Scott & Willits, 1989; Sofranko & Nolan, 1972; Yoesting & Burkhead, 1973). For example, a rural upbringing has been shown to correlate with adult participation in higher numbers of outdoor activities (Yoesting & Christensen, 1978), as well as more frequent participation overall (Sofranko & Nolan, 1972).

Age and Outdoor Activity Participation

It has been projected that the proportion of the U.S. population that is 55 years old or older will increase from 21% in 2000 to 30% in 2010 and continue to increase after that time (USBC, 2000). Thus, it will be increasingly important to understand the role of leisure in the lives of older adults (Kelly, 1993). Theorists in the 1960s emphasized the disengagement of the elderly from society (Cumming & Henry, 1961). Later research, however, has shown that the relationship is more complex (e.g., Iso-Ahola, Jackson, & Dunn, 1994). As people age, they are less likely to participate in some forms of recreation but more likely to participate in others (e.g., Chick & Hood, 1996). This is consistent with evidence that older adults tend to believe participation in many physical activities is more appropriate for younger rather than older individuals (Ostrow & Dzewaltowski, 1986). Activity participation later in life has been related to life satisfaction (Dorfman & Moffett, 1987; Kelly, Steinkamp, & Kelly, 1986; Russell, 1987), mental health and well-being (George, 1978; Markides & Lee, 1990), morale (Lawton, 1985; Teaff, 1992), and self-confidence (Freysinger & Nevius, 1992). In other words, leisure involvement may help people cope with changes that occur

as a result of aging (Raymore & Scott, 1998; West, Delisle, Simard, & Drouin, 1996) and is indicative of the quality of life experienced by older individuals (Allison & Smith, 1990).

Education and Outdoor Activity Participation

The proportion of outdoor recreation participants who are college educated is increasing (Cordell & Super, 2000). Education is also related to participation rates in some specific outdoor activities, including sailing, cross-country skiing, and the use of backcountry and wilderness areas (Kelly, 1980; O'Leary, Napier, & Dottavio, 1982; Roggenbuck & Lucas, 1987; Zuzanek, 1978). These relationships may reflect the link between education and income. They may also reflect the role of education in stimulating interest in outdoor activities, providing necessary skills, and developing appreciation (Godbey, 1994). The educational level of older Americans, like that of the overall population, has been rising rapidly, as more recent, better-educated cohorts age. The proportion of persons aged 65 and over who had completed high school rose from 17% to 48% between 1950 and 1985 and is expected to reach 75% in 2010 (Siegel, 1993).

Consumptive and Nonconsumptive Recreation and Socio-Demographic Trends

Hunting, a major consumptive activity, is one of the few outdoor activities that exhibits declining participation rates in this country (Brown et al., 2000; Kelly & Warnick, 1999). In comparison, fishing, another consumptive activity, exhibits relatively stable participation rates (U.S. Department of the Interior [USDI], 1999). While participation in hunting is decreasing and participation in fishing is stable, participation in many nonconsumptive outdoor activities has been increasing rapidly. For example, Cordell et al. (1999) identified ten nonconsumptive activities that exhibited growth rates in excess of 35% between 1982/83 and 1994/95. These included: bird watching (+155%), hiking (+94%), backpacking (+73%), primitive camping (+58%), off-road vehicle driving (+44%), walking (+42%), motorboating (+40%), sightseeing (+40%), developed camping (+38%), and nonpool swimming (+38%). Researchers have collected some empirical evidence about the relationship between these recreation trends and the socio-demographic trends described above (Brown et al., 2000; Enck et al., 2000; Heberlein & Thomson, 1996; Kelly & Warnick, 1999), but relationships between these broad trends and specific subgroups of the population (e.g., older hunters) are not fully understood.

Study Purpose and Setting

Our purpose was to better understand the ways in which participation in outdoor recreation activities is being influenced by societal trends, including rapid growth of the Sunbelt states, declining residential stability, urbanization, aging of the population, and increasing levels of education. We designed the study to examine hunting frequency among older hunters, as well as their overall participation rates in 2 other consumptive activities (fishing and gathering wild foods) and 17 nonconsumptive activities. We tested for participation differences between states and then assessed the extent to which age, education, residential stability, and rural versus urban residence could further explain participation differences.

We focused on Pennsylvania and Colorado, states that are well-suited as test cases for examining the recreation patterns of older hunters because of their unique combination of similarities and differences. Both states have strong hunting traditions and high participation rates (USDI and U.S. Department of Commerce [USDC], 1997). At the same time, many of the differences between the Northeast and the Sunbelt are evident in Pennsylvania and Colorado.

Although older hunters from Pennsylvania and Colorado represent a very limited part of the U.S. population, examining their outdoor recreation participation patterns provides an opportunity to better understand the influence of several important trends on outdoor recreation behavior. Results will help resource managers and planners better prepare for the impact of these socio-demographic trends on the markets they serve.

Method

Study Population and Sampling

Our study population was Pennsylvania and Colorado hunting license holders who were 50 years old or older. Like other researchers (e.g., Freysinger, Alessio, & Mehdizadeh, 1993; Kington, Reuben, Rogowski, & Lillard, 1994; Liddell, Locker, & Burman, 1991; Raymore & Scott, 1998), we used age 50 as a cut-off point because we wanted to capture those who had entered the period of later maturity in their life span development (Kelly & Godbey, 1992).

We sent up to three mailings (Baker, Absher, Knopf, & Virden, 2000; Dillman, 1978) to a random sample of hunting license holders obtained from wildlife management agencies in the two states. Potential participants first were mailed a questionnaire, a postage-paid return envelope, and a personalized cover letter explaining the study and requesting their participation. Ten days later, a reminder/thank you postcard was sent to each participant. Twenty days after the first mailing, a new cover letter and replacement questionnaire were sent to each participant whose original questionnaire still had not been returned.

Variables and Measurement

Outdoor recreation variables. We focused on 3 consumptive outdoor activities: hunting, fishing, and the gathering of wild foods, and 17 nonconsumptive outdoor activities: picnicking, day hiking, backpacking, bicycling, driving off-road vehicles (ORVs), horseback riding, developed camping, primitive camping, nature study/photography, nonpool swimming, sailing, canoeing/kayaking, motorboating, waterskiing, downhill skiing, cross-country skiing, and snowmobiling. For all activities except hunting, we measured participation as a dichotomous variable. Respondents either had participated or had not participated in each activity during the 12-month period prior to being surveyed. Because all participants were hunting license holders, we did not measure hunting participation in the same way. Instead we used a six-level categorical variable (0 days, 1–2 days, 3–5 days, 6–10 days, 11–25 days, 26 days or more) to measure hunting frequency during the 12 months prior to being surveyed.

Socio-demographic variables. We measured age and years of education as continuous variables. We measured residential stability at the state level as a normalized variable created by dividing the total number of years each respondent had lived in Pennsylvania or Colorado by his or her age. This variable ranged from 0.0 (for a respondent who had lived in Pennsylvania or Colorado less than one year) to 1.0 (for a respondent who had lived in Pennsylvania or Colorado his or her entire life). To measure rural/urban differences, we used a similar approach. “Rural upbringing” was limited to place of residence from birth until age 17. To calculate the rural upbringing variable, the number of years (through age 17) the respondent reporting living on a “farm, ranch, or rural area outside of a town” was divided by 17. Thus, the variable ranged from 0.0 (for a respondent who, through age 17, never had lived on a farm, ranch, or rural area outside of a town) to 1.0 (for a respondent who, through age 17, always had lived on a farm, ranch, or rural area outside of a town). “Rural residence as an adult” was defined as place of residence beginning at age 18. The number of years (beginning at age 18) that the respondent reporting living on a “farm, ranch,

or rural area outside of a town” was divided by his or her age minus 17. This variable also ranged from 0.0 to 1.0.

To measure ruralness of current residence, we used a proportion variable calculated by the USBC by overlaying 1990 census-defined urbanized areas and urban clusters on postal ZIP codes (USBC, 2001). This variable, like the rural/urban variables above, ranged from 0.0 (a ZIP code in which all 1990 residents lived inside a densely-settled area containing at least 2,500 people) to 1.0 (a ZIP code in which no 1990 residents lived inside a densely-settled area containing at least 2,500 people).

Statistical Analysis

We used four types of statistical tests, based on the nature of the variables being considered. For example, to test the relationship between two categorical variables (e.g., gender \times state, hunting frequency category \times state, fishing participation \times state), we used the χ^2 test of independence. To compare differences in subgroup means (e.g., age \times state, years living in state \times state, rural upbringing \times state), we used one-way analysis of variance (ANOVA).

After identifying participation differences between Pennsylvania and Colorado, we assessed the extent to which socio-demographic variables (e.g., age, education, residential stability, rural versus urban residence) could further explain differences between states. To test the relationship between a dichotomous dependent variable (e.g., fishing participation, gathering participation) and multiple independent variables (e.g., age, education, rural upbringing), we used logistic regression. To test the relationship between a continuous dependent variable (e.g., total number of nonconsumptive activities) and multiple independent variables (e.g., age, education, rural upbringing), we used multiple regression. In our use of logistic regression and multiple regression, we controlled for the variance explained by state (Pennsylvania versus Colorado) by first entering the dichotomous state variable into each model. We then entered the socio-demographic variables (e.g., age, education, rural upbringing) into each model to determine whether adding these variables explained significantly more variance than the state variable alone. Because we conducted a large number of statistical tests, we used an alpha level of .01 to evaluate the significance of all tests.

Results

Response Rate and Profile of Respondents

We mailed 1,200 questionnaires, 600 in each state. In Pennsylvania, 27 questionnaires were undeliverable and 315 were returned, resulting in a net response rate of 55%. In Colorado, 55 questionnaires were undeliverable and 283 were returned, for a net response rate of 52%. Overall, 598 questionnaires were returned and the response rate was 54%.

Respondents were 94% male in each state (Table 1). The two samples were nearly equal in average age (Pennsylvania $M = 63$, Colorado $M = 61$) and predominantly Caucasian (98% in Pennsylvania versus 93% in Colorado), although these differences were statistically significant. On average, respondents had spent 50% of their youth (through age 17) in rural areas. Other socio-demographic characteristics of the two samples differed substantially. On average, Pennsylvanians had lived more of their lives in state (93% versus 65%), and had spent more of their adult lives (beginning at age 18) in rural areas (44% versus 26%). Furthermore, compared to the current ZIP codes of Coloradans, those of Pennsylvanians contained, on average, a higher percentage of rural residents (61% versus 36%). On the other hand, Coloradans were more likely to have attended some school beyond high school (65% versus 36%).

TABLE 1 Profile of Respondents, by State

Characteristic	Overall	Pennsylvania	Colorado	Test for difference between states
Gender (% male) ^a	93.7	93.9	93.5	$\chi^2 = 0.03, p = .872$
Age (mean years) ^b	62.1	63.0	61.1	$F = 8.75, p = .003$
Ethnicity (% Caucasian or white) ^a	95.4	97.7	92.7	$\chi^2 = 15.48, p = .008$
Education (% attended beyond high school) ^a	50.6	36.5	66.2	$\chi^2 = 52.67, p < .001$
Percent of life in state (mean %) ^b	79.9	93.2	65.0	$F = 178.99, p < .001$
Percent of youth in rural area (mean %) ^{bc}	49.6	51.1	48.0	$F = 0.57, p = .451$
Percent of adult life in rural area (mean %) ^{bd}	34.8	44.1	25.5	$F = 24.99, p < .001$
Percent of current ZIP code's population living in rural areas (mean %) ^{be}	49.1	60.7	35.8	$F = 56.85, p < .001$

^aDifference between states tested with χ^2 test of independence.

^bDifference between states tested with one-way ANOVA.

^cCalculated by dividing years lived on a farm, ranch, or rural area outside of a town (through age 17) by 17.

^dCalculated by dividing years lived on a farm, ranch, or rural area outside of a town (beginning at age 18) by age minus 17.

^eU.S. Bureau of the Census data calculated by overlaying 1990 census-defined urbanized areas and urban clusters on postal ZIP codes (USBC, 2001).

Hunting Frequency

Using a χ^2 test of independence, we found that Pennsylvania respondents (36%) were more likely than Colorado respondents (14%) to report that, during the 12-month period prior to being surveyed, they had hunted more than 25 days (Table 2). In contrast, Colorado respondents were more likely than Pennsylvania respondents to report that they had hunted three to five days (18% versus 13%) or six to ten days (32% versus 21%). Although a large majority of these hunting license holders reported hunting during the 12 months prior to being surveyed, it should be noted that 3% of the Pennsylvania respondents and 6% of the Colorado respondents reported they had not hunted during the preceding 12 months.

To test the relationship of hunting frequency to socio-demographic variables, we used a two-step multiple regression procedure. We treated the hunting frequency categories (Table 2) as a continuous dependent variable ranging from one through six. In the first

TABLE 2 Days Hunted During 12-Month Period Prior to Being Surveyed, by State

State	Number of days hunted (% reporting)						χ^2	p
	None	1-2	3-5	6-10	11-25	>25		
Pennsylvania	2.9	2.9	12.7	20.6	24.8	35.9	41.67	<.001
Colorado	5.8	4.0	18.1	32.2	26.1	13.8		

step, we entered state (a zero-one dummy variable) into the model. As expected, state was a significant predictor of hunting frequency ($B = -.635$, $\beta = -.234$, $p = <.001$, $R^2 = .055$). In the second step, we entered the six socio-demographic predictor variables, including age, years of education, rural upbringing, rural residence as an adult, ruralness of current residence, and residential stability. This step did not significantly improve the overall regression model, indicating that the socio-demographic variables did not explain any additional variance in hunting frequency.

Participation in Other Outdoor Activities

In addition to examining hunting frequency, we examined the percentage of respondents who, during the 12 months prior to being surveyed, participated in fishing, gathering, and 17 nonconsumptive activities. For fishing and gathering, we compared participation rates between states and tested the relationship of participation to socio-demographic variables. For the 17 nonconsumptive activities, we compared participation rates between states and tested the relationship of socio-demographic variables to the total number of activities in which respondents participated.

Participation in fishing and gathering. Among the sample as a whole, 83% reported participating in fishing and 46% reported participating in gathering during the 12-month period prior to being surveyed (Table 3). Participation rates for both activities differed

TABLE 3 Overall Participation Rates for Outdoor Activities, by State

Consumptive/nonconsumptive activities	Participation rate (%) ^a			χ^2	<i>p</i>
	Activity	Overall	Pennsylvania		
Consumptive activities other than hunting					
Fishing	82.8	76.8	89.3	15.27	<.001
Gathering	45.7	57.8	32.4	37.76	<.001
Non-consumptive activities					
Picnicking	78.9	76.7	81.4	1.59	.207
Day hiking	61.3	55.1	68.2	9.52	.002
Driving ORVs	53.0	37.3	70.7	61.59	<.001
Nature study/photography	51.0	48.1	54.2	1.80	.180
Motorboating	43.6	43.4	43.9	<0.01	.997
Primitive camping	42.2	20.2	65.8	118.21	<.001
Developed camping	41.8	26.4	58.9	58.97	<.001
Non-pool swimming	39.9	48.8	30.1	19.63	<.001
Bicycling	29.7	25.1	34.9	5.89	.015
Horseback riding	18.6	7.2	31.4	51.78	<.001
Backpacking	17.7	8.9	27.5	31.26	<.001
Canoeing/kayaking	16.2	14.2	18.4	1.55	.213
Snowmobiling	11.1	8.7	13.8	3.13	.077
Downhill skiing	10.9	5.4	16.9	18.02	<.001
Waterskiing	10.0	8.0	12.2	2.27	.132
Cross-country skiing	8.4	3.0	14.3	21.92	<.001
Sailing	5.6	4.1	7.2	1.90	.168

Note. Results which differed significantly (alpha level = .01) between states are shown in boldface.

^aPercent who participated during 12-month period prior to being surveyed.

between states. Hunting license holders from Colorado were more likely than those from Pennsylvania to have fished (89% versus 77%) but less likely to have gathered wild foods (32% versus 58%).

Treating fishing participation as the dependent variable, we used a two-step logistic regression procedure to test relationships between participation and age, years of education, rural upbringing, rural residence as an adult, ruralness of current residence, and residential stability. First, we entered state into the model, resulting in a significant improvement over a null model ($\chi^2 = 10.52$, $df = 1$, $p = .001$, pseudo $R^2 = .040$). The second step, entering the six socio-demographic variables, failed to significantly improve the model, indicating that the socio-demographic variables explained little additional variance in fishing participation.

We used the same method to predict participation in gathering. Entering the state variable into the model (step 1) resulted in a significant improvement over a null model ($\chi^2 = 35.40$, $df = 1$, $p < .001$, pseudo $R^2 = .105$). Entering the six socio-demographic variables (step 2) further improved the model ($\chi^2 = 20.76$, $df = 6$, $p = .002$, Nagelkerke pseudo $R^2 = .162$); two of the six socio-demographic predictors were significant. Participation in gathering had a positive relationship with years of education (Exp(B) = 1.180, Wald statistic = 10.25, $p = .001$) and rural residence as an adult (Exp(B) = 2.354, Wald statistic = 8.085, $p = .004$).

Participation in nonconsumptive activities. In testing participation rates for 17 nonconsumptive activities, we found that 79% of our sample of older hunting license holders participated in picnicking, more than any other nonconsumptive activity (Table 3). Other nonconsumptive activities with participation rates above 50% included day hiking, driving ORVs, and nature study/photography. From 30% to 50% of respondents participated in motorboating, primitive camping, developed camping, nonpool swimming, and bicycling. Participation rates were below 20% for backpacking, horseback riding, canoeing/kayaking, snowmobiling, downhill skiing, waterskiing, cross-country skiing, and sailing.

For 9 of the 17 nonconsumptive activities, participation rates differed significantly between states (Table 3). Colorado respondents in the study were more likely to participate in eight activities: day hiking, driving ORVs, both primitive and developed camping, backpacking, horseback riding, downhill skiing, and cross-country skiing. In contrast, respondents from Pennsylvania were more likely than those from Colorado to participate in swimming. For the remaining eight activities (picnicking, nature study/photography, motorboating, bicycling, canoeing/kayaking, snowmobiling, water-skiing, sailing), participation rates were not significantly different between states.

To better understand participation differences between states, we created a "number of activities" index that ranged from 0 to 17 (total number of nonconsumptive activities participated in). We then used this variable to compare state means and test the relationship between number of nonconsumptive activities participated in and socio-demographic variables. On average, Pennsylvania respondents participated in 4.2 nonconsumptive activities, while those from Colorado participated in 6.2 activities. ANOVA confirmed that this difference between states was significant ($F = 68.26$, $p < .001$).

We used a two-step multiple regression analysis to test the relationship between the number of activities index (dependent variable) and age, education, rural upbringing, rural residence as an adult, ruralness of current residence, and residential stability (independent variables). In the first step, we confirmed that the state variable was a significant predictor of number of activities ($B = 1.950$, $\beta = .312$, $p < .001$, $R^2 = .097$). In the second step, we entered the six socio-demographic variables into the model, resulting in significant improvement (change in $F = 11.15$, $p < .001$, overall $R^2 = .219$). Three of the six socio-demographic predictor variables were significant. First, compared to younger respondents, those who were older participated in fewer nonconsumptive activities ($B = .069$, $\beta = -.169$,

$p < .001$). Second, respondents with more education participated in more activities than those with less education ($B = .237, \beta = .174, p < .001$). Third, respondents who had lived fewer years in a state participated in more activities than those who had lived more years in a state ($B = 2.333, \beta = -.222, p < .001$). With the socio-demographic variables added to the model, the state variable remained significant but lost some explanatory power, as shown by a smaller β value ($B = .773, \beta = .124, p = .020$).

Discussion

In this study of societal trends and outdoor recreation, we compared hunting frequency, as well as participation rates for other consumptive and nonconsumptive outdoor activities, in two U.S. regions. We then tested relationships between activity participation and six socio-demographic variables associated with major socio-demographic trends (age, education, rural upbringing, rural residence as an adult, ruralness of current address, and residential stability).

Participation Differences Between States

We found several differences in outdoor recreation participation between our two samples. For the 12-month period prior to being surveyed, Pennsylvania respondents reported having hunted more days than their counterparts in Colorado. In addition to hunting more frequently, Pennsylvania respondents were more likely to have participated in gathering wild foods and swimming. In contrast, Pennsylvania respondents were less likely to have participated in fishing, and they had participated in fewer nonconsumptive outdoor activities.

We are not aware of other studies comparing hunting frequency or gathering participation between states or regions, but the participation differences we found for other activities mirror regional comparisons made in several general population studies. Higher participation rates among Colorado respondents for fishing, day hiking, driving ORVs, primitive and developed camping, backpacking, horseback riding, downhill skiing, and cross-country skiing are consistent with regional differences described by Cordell et al. (1999), Kelly & Warnick (1999), and the USDI & USDC (1997). The higher participation rate for swimming among Pennsylvania respondents is also consistent with regional differences reported by Cordell et al. (1999).

Some of these participation differences appear to be consistent with popular images of Colorado as a haven for outdoor recreation, and participation rates may be related to opportunity differences between the two states. Compared to Pennsylvania, Colorado has more public land available for dispersed recreation, and Colorado's mountains are renowned for their skiing opportunities. But opportunity differences do not seem adequate to explain all the participation differences we found. For example, our Pennsylvania sample reported hunting more frequently, but both states have diverse hunting opportunities and Colorado has more public land open for hunting. Furthermore, Pennsylvania respondents were nearly twice as likely as those from Colorado to report participating in gathering wild foods, but opportunity differences that might exist between the two states are not clear. Similarly, it is difficult to relate participation rates for water-based activities to opportunity differences. Pennsylvanians were more likely than Coloradans to report swimming, but they were not more likely to report motorboating, canoeing/kayaking, waterskiing, or sailing.

Socio-Demographic Characteristics and Participation Differences

Our samples were similar in age, gender, and ethnicity, but Pennsylvania respondents were more likely than those from Colorado to have lived their entire lives in the state and to have

spent more of their adult lives in rural areas. On the other hand, Pennsylvania respondents were less likely to have attended school beyond high school. These differences in education, rural residence, and residential stability were consistent with those found by the USBC (2000), but they were not consistent predictors of recreation participation.

Age and outdoor activities. Age predicted only the number of nonconsumptive activities participated in by respondents. Older respondents participated in fewer activities. However, our results are cross-sectional. This and other limitations of the study make the meaning of this finding unclear. Older respondents may have disengaged from some activities, but it is possible that they increased participation in other activities and/or added new activities that were not addressed by our questionnaire. Furthermore, we do not have evidence that older respondents dropped activities involving high levels of physical exertion, as suggested by Godbey (1994), nor can we rule out other explanations for the relationship (e.g., generational differences).

We did not find a relationship between age and hunting frequency, fishing participation, or gathering participation. This may be because participation in consumptive activities is often characterized by powerful social meanings and motivations. For example, research suggests participants perceive fewer substitutes for deer hunting (Baumgartner & Heberlein, 1981) and some types of fishing (Shelby, 1985) than for other activities. As participants age, they may be especially determined to maintain participation in these consumptive activities.

Education and outdoor activities. Education had a positive relationship with participation in gathering, as well as total number of nonconsumptive activities. The meaning of the positive relationship between education and gathering is unclear. Education did not predict hunting frequency or participation in fishing, two other traditional, rural-based, consumptive activities. Two points may be important. First, education may be related to hunting participation without being related to hunting frequency. Second, hunting and fishing are often introduced to children or adolescents by family members (O'Leary, Behrens-Tepper, McGuire, & Dottavio, 1987). These activities often may become important to participants before formal education exposes some of them to additional activities and/or life skills. This type of recruitment process may no longer be common for gathering wild foods.

The positive relationship between education and total number of nonconsumptive activities is consistent with the correlation between education and socio-economic status, and it is consistent with Godbey's (1994) suggestion that education can stimulate and/or facilitate participation in many different types of activities. In partial support of Godbey's suggestion, researchers have found a positive link between education and a number of specific activities (Kelly, 1980; O'Leary, Napier, & Dottavio, 1982; Roggenbuck & Lucas, 1987; Zuzanek, 1978).

Rural upbringing, rural residence as an adult, ruralness of current residence, and outdoor activities. Although some studies have demonstrated links between outdoor recreation behavior and rural/urban differences, we found little support for this connection. In particular, rural upbringing was not associated with any outdoor activity we investigated. This finding runs counter to evidence that a rural upbringing is positively linked to frequency of participation in outdoor activities (Sofranko & Nolan, 1972) and participation in higher numbers of outdoor activities (Yoesting & Christensen, 1978). Because our sample was limited to hunting license holders (more than 90% of whom reported hunting during the 12 months prior to being surveyed), we were not able to test the relationship between hunting participation and rural upbringing.

Rural residence as an adult was positively associated with only one activity, gathering wild foods. This association may be linked to differences in gathering opportunities available to rural and urban residents. This explanation would parallel evidence from other studies

that rural residence as an adult is positively associated with hunting, another traditional, consumptive activity (Brown et al., 2000; Klessing, 1970).

Our failure to find a relationship between ruralness of current residence and participation in outdoor activities may help explain the limited predictive power of our other two rural/urban variables by indicating that these relationships are weak. On the other hand, the lack of a relationship may be indicative of the challenges of creating adequate quantitative measures of rural/urban differences. Our ZIP code-based measure of rural/urban differences may have been insufficiently sensitive to capture existing differences.

Residential stability and outdoor activities. Percent of life spent in a state was unrelated to hunting frequency, fishing participation, or gathering participation. This finding appears to be inconsistent with propositions that residential stability facilitates continued participation in some activities by keeping social groups intact (Burch, 1969) and/or by keeping an individual in contact with known environments (Enck et al., 2000). We might speculate that residential stability could be especially important in the case of activities such as hunting, gathering, and fishing because these consumptive activities require local knowledge for success and are often introduced to children or adolescents by family members (e.g., O'Leary et al., 1987). However, we found no residential stability effect for these activities. This may be evidence that traditional patterns of initiation and participation in hunting, fishing, and gathering are changing.

In general, we might anticipate that the longer one lived in a state, the more he or she would learn about resource-based recreation opportunities within the state. However, we found that the percent of life spent in a state was inversely related to the number of nonconsumptive activities in which respondents participated. Respondents who had spent less time in a state had participated in more nonconsumptive activities. In our review of the literature, we discovered no similar findings, but a number of possible explanations come to mind. Living in multiple states may tend to expose people to many different activities, some of which may be adopted. Moreover, low-investment, nonconsumptive activities (e.g., picnicking, day hiking) may be linked to sightseeing done by curious newcomers as they explore a new state. Finally, it may be that our findings cannot be generalized to all relocation between states. A self-selection process may lead people who want to participate in many outdoor activities to migrate to states where outdoor recreation figures prominently in daily life.

Management Implications and Need for Future Research

This study was focused on the outdoor recreation patterns of older hunting license holders from two states, a narrow segment of the population. The findings, however, have broader implications. First, our results were consistent with other research that suggests older adults tend to participate in fewer activities as they age. This may reflect a pattern of disengagement that is natural and healthy, or it may reflect a pattern of growing vulnerability to leisure constraints among aging individuals. It will be increasingly important for researchers to design studies that can illuminate relationships among aging, leisure constraints, and recreation disengagement, in subpopulations and in the population as a whole. As knowledge about these phenomena increases, recreation managers will be better able to facilitate leisure participation among an aging population.

Second, we failed to find a relationship between residential stability and consumptive activities, but we found an inverse relationship between residential stability and the number of nonconsumptive activities participated in, suggesting that those who have lived in more than one area may tend to have larger leisure repertoires than those who have lived in a single area. Our study does not provide adequate evidence to generalize this finding to a larger population, but it does suggest additional research will be needed. Others have suggested that an extensive leisure repertoire can improve quality of life, particularly for the elderly

(Iso-Ahola, 1980; Mobily, Lemke, & Gisin, 1991; Mobily et al., 1993). Understanding the factors that influence leisure repertoire will help recreation managers facilitate its optimal development.

Third, our results suggest that relationships between recreation participation and rural/urban differences are not fully understood. We found no evidence that rural upbringing is related to hunting frequency or participation in other resource-based activities, and we found only one activity, gathering wild foods, that was related to rural residence as an adult. However, other researchers have found these relationships (e.g., Klessing, 1970). It may be that rural/urban differences were masked in our study specifically because we sampled only older hunting license holders, a population in which rural upbringing and rural residence as an adult are overrepresented. Participation differences may be more evident, for example, in a general population study that stratifies by rural/urban upbringing or residence.

Finally, our results suggest the importance of continuing to assess regional differences in recreation participation and investigating causes underlying these differences. Although we found some significant relationships between participation patterns and socio-demographic characteristics, these relationships left much of the difference between regions unexplained. It may be that other variables (e.g., income or participation patterns established during youth) are more closely related to participation differences, but, more important, regional differences in recreation behavior may reflect both cultural and opportunity differences.

Culture, which can be described as shared information and the behaviors and artifacts that are manifestations of that information (e.g., Chick, 1997; Roberts, 1964), can be expected to influence recreation preferences and behaviors. For example, Pennsylvania and Colorado share strong deer-hunting traditions, but cultural differences between the states are likely to lead deer hunters to envision different "ideal" hunting experiences. Pennsylvanians are likely to share an image of extended family/friendship group driving to a deer camp (a cabin) in the state's big woods. In contrast, Coloradans are likely to share an image of a smaller group of hunters horse-packing into a spike camp (a tent) in the mountains. To the extent that people in different parts of the country share different sets of information about outdoor activities, socialization and enculturation are likely to lead to different recreation patterns (Chick & Hood, 1996). Research that leads to a better understanding of the relationship between culture and recreation has the ability to lead to enhanced appreciation of local and regional traditions and to improved knowledge about managing recreation opportunities.

Regional differences in recreation patterns may also reflect opportunity differences. Some opportunity differences, like those shaped by climate or basic landforms, may always exist. Yet, in the past, opportunity differences have been shaped to a surprising degree by human intervention. Fifty to sixty years ago, for example, opportunities for many water-based activities (e.g., sailing, motorboating, waterskiing, white-water boating) were extremely limited in semiarid Colorado. The construction of water management projects, although controversial, has changed these opportunities dramatically. Human activity is likely to continue to modify recreation opportunities. To the extent that recreation researchers and managers can anticipate these changes, they can be better prepared to respond to them.

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