TRENDS IN PARTICIPATION RATES FOR WILDLIFE-ASSOCIATED OUTDOOR RECREATION ACTIVITIES BY AGE AND RACE/ETHNICITY: IMPLICATIONS FOR COHORT-COMPONENT PROJECTION MODELS

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Abstract: Cohort-component projection models have been used to explore the implications of increased aging and growth of racial/ethnic minority groups on number of participants in outdoor recreation activities in the years ahead. Projections usually assume that participation rates by age and race/ethnicity remain constant over time. This study looks at trends in activity participation rates by age and race/ethnicity and explores their implications for projections made by cohort-component projection models.

Introduction

Outdoor recreation resource planners, managers, and policy makers often ask what levels of participation in outdoor recreation activities can be expected in the years ahead. They find these projections useful for planning facilities, staffing, and programs; as well as for predicting revenues from licenses, permits, and user fees. Their questions are increasingly about the implications of changing population demographics, particularly increased aging of the population and growth of racial/ethnic groups, for participation in outdoor recreation activities in the years ahead.

The U.S. Bureau of the Census (1989, 1992) provides projections of future populations by age and racial ethnic background which indicate that older Americans and individuals from particular racial/ethnic backgrounds will make up an increasing proportion of the population. There is ample evidence of significant differences in participation in outdoor recreation activities among individuals of different ages and racial/ethnic backgrounds (Dwyer 1995a, 1994a, 1994b, 1993; Nadkarni and O'Leary 1992). This has prompted recreation resource planners, managers, and policy makers to seek information about implications of these demographic changes for recreation participation in the years ahead.

Use of the Cohort-Component Projection Model

In an effort to answer these questions, cohort-component projection models have been developed to predict the number of participants in selected recreation activities in the years ahead based on projected changes in the size, age, and racial/ethnic structure of the population (Dwyer 1996, 1995b; Murdock 1990, 1991, 1996). The cohort-component projection model is based on estimates of the population in the years ahead by age and race/ethnicity (i.e., number of African Americans age 20 to 24) and the probability of an individual in an age and racial/ethnic category participating in an activity (i.e., the participation rate). The number of individuals projected to be in an age and racial/ethnic category is multiplied by the probability of an individual in that group participating in the activity to get an estimate of the number of participants from that group. The total number of participants in the activity is the sum of the participants across all groups in the population.

While projections of the population by age and race/ethnicity are available from the U.S. Bureau of the Census and individual States, projections of participation rates in outdoor recreation activities by age and race/ethnicity (i.e., proportion of the group that participates in the activity one or more times per year) are seldom made. Consequently, most applications of the cohort-component projection model have used activity participation rates by age and race/ethnicity from a single year to project number of participants in future years. This assumes that individuals in an age and racial/ethnic group (i.e., whites age 20-24 years) have the same likelihood of participating in an activity in each of the years ahead. This means that the projected number of white participants age 20-24 will change over time only with the projected number of individuals in that population group. Under these circumstances the cohort-component projection model predicts changes in the number of participants in a given activity based on changes in the size of the population and its distribution by age and race/ethnicity. All else is assumed to remain constant.

Extending the Model

In reviewing the results of cohort-component projection models; planners, managers, policy makers, and researchers often suggest that participation rates by age and racial/ethnic group might change over time, and ask about the implications of such changes for the projected number of participants. Some speculate that the participation rates of particular racial/ethnic groups might converge in the years ahead as groups become assimilated in a dominant culture (i.e., "the melting pot"). An alternative view is that recreation and leisure are among the means by which cultures maintain their identity, consequently we would not expect participation patterns of various groups to converge over time. The likelihood of either of these expectations materializing may vary with activity, racial/ethnic group, and age class. Others suggest that with improved health and changing attitudes towards recreation and leisure, older

Americans might tend to increase their participation in many activities -- acting more like their younger counterparts. The likelihood of this happening may also vary by activity and racial/ethnic group.

An absence of data on trends over time in activity participation rates by age and race/ethnicity makes it difficult to investigate these questions. However, data from the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation presents a unique opportunity to investigate these trends. Participation data have been gathered at 5-year intervals since 1955. Information on race/ethnicity has been included in the survey since 1990, using the same definitions as the U.S. Bureau of the Census.

In order to maintain consistent definitions of activities and ethnic groups over time, we limited the present analysis to three activities and three years 1980, 1985, and 1990. The activities included in our analysis are hunting, fishing, and observing wildlife around the home. Following the U.S. Bureau of the Census protocol, the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation breaks down the population into four racial groups: White; African American; American Indian, Eskimo, and Aleut; Asian and Pacific Islander; as well as by Hispanic and non-Hispanic. An individual in any of the four racial groups can be Hispanic or non-Hispanic. In this study we categorized all individuals who reported that they were Hispanic into a single group, regardless of race. Consequently all other groups included only individuals who reported that they were non-Hispanic. In order to match with the Census classifications we dropped the racial category "other" from the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation data. The implications were minimal since nearly all of those who selected "other" as their race also selected "Hispanic."

Differences in Activity Participation by Racial/Ethnic Group

Depending on the activity, we found different patterns of change in participation rates over time by racial/ethnic group (Tables 1, 2, and 3). Hunting had the smallest changes in participation rates over time and the most diverse pattern of changes by racial/ethnic group. No group showed consistent trends in hunting participation rates between 1980-1985 and 1985-1990. The overall trend 1980-1990 was for a slight increase in hunting participation rates for Whites, American Indians, and Asian Americans; but a slight decrease for African Americans and Hispanic Americans. With fishing there were consistent increases in participation rates from 1980-1985 and 1985-1990 for all racial/ethnic groups except Asian Americans where there was a slight decrease 1980-1985, and then an increase 1985-1990, resulting in an overall increase 1980-1990. With wildlife observation around the home there were substantial and consistent increases in participation rates for all racial/ethnic groups over the periods 1980-1985 and 1985-1990.

Table 1. Percent of Individuals Participating in Hunting by Racial/Ethnic Background and Year

Racial/Ethnic Group	1980	1985	1990
White	9.7	9.1	9.9
African American	2.6	2.2	2.4
American Indian	11.4	11.4	12.0
Asian American	0.9	1.2	1.2
Hispanic American	2.9	2.7	2.7

Table 2. Percent of Individuals Participating in Fishing by Racial/Ethnic Background and Year

Racial/Ethnic Group	1980	1985	1990
White	26.7	27.6	32.1
African American	12.4	13.1	15.9
American Indian	25.0	27.8	35.5
Asian American	16.3	15.4	16.9
Hispanic American	13.9	15.2	16.7

Table 3. Percent of Individuals Participating in Wildlife Observation Around the Home by Racial/Ethnic Background and Year

Racial/Ethnic Group	1980	1985	1990
White	17.0	22.9	32.7
African American	6.0	7.7	11.2
American Indian	11.3	16.6	30.6
Asian American	6.0	7.3	10.9
Hispanic American	7.1	9.8	13.5

Differences in Activity Participation Rates by Age Class

There was not a clear pattern of differential change over time in activity participation rates across the age classes. With some racial/ethnic groups the changes in participation rates stayed quite uniform across age classes over time, while in others there seemed to be no pattern of change across age classes. The similar changes across age classes tended to be for groups with fairly large sample sizes, suggesting that perhaps small sample sizes were contributing to the widely-varying patterns observed with smaller groups. With relatively small sample sizes for minority groups in some age classes and substantial weighting of individual cases, it is possible to get a wide variation in results across age classes within a racial/ethnic group.

Results from the Cohort-Component Projection Model

To test the implications of changes in activity participation rates by age and race/ethnicity for cohort-component projection models, we developed a model based on the distribution of the U.S. population by age and race/ethnicity for 1992. Projections of the number of participants in each of three activities were made for that year based on the participation rates by age and race/ethnicity in 1980, 1985, and 1990. This resulted in three sets of predictions for 1992, using 1980, 1985, and 1990 as the base years (Tables 4, 5, and 6). The prediction

using 1980 participation rates, for example, assumed that participation rates for 1980 by age and race/ethnicity remained constant through 1992, and calculated projected number of participants based on the population mix in 1992. These three sets of estimates represent the estimates that would be made using participation rates by age and race/ethnicity for that particular year (1980, 1985, or 1990) and population projections for 1992; and assuming that participation rates by age and race/ethnicity from that base year would be the same for 1992, a common practice with previous applications of the model.

Differences in Predictions by Activity

Estimating the number of hunting participants in 1992 based on 1980 participation rates by age and race/ethnicity produced a higher estimate (+5-6 percent) of the total number of hunters than were derived using the rates from 1985 or 1990 (which produced similar estimates). The 1980 participation rates produced the highest estimated number of White, African American, and Hispanic American hunters, while the 1985 participation rates predicted the highest estimates of American Indian and Asian American hunters. For no group did the 1990 participation rates produce the highest estimate of the number of hunters for 1992. The three sets of predictions reflect only slightly different proportions of hunters by racial/ethnic group. Over the periods 1980-1985 and 1985-1990 there are successively lower proportions of African American and Hispanic American hunters and a larger proportion of White hunters.

Table 4. Projected Number of 1992 Participants in Hunting by Racial/Ethnic Group, Based on 1992 Population and 1980, 1985, and 1990 Activity Participation Rates by Age and Race/Ethnicity

Racial/Ethnic Group	Base Year 1980	Base Year 1985	Base Year 1990
	Numbers are in thousands of participants projected for 1992		
White	(90.7)	(91.4)	(92.1)
	17,965	16,989	17,291
African American	(4.2)	(3.6)	(3.4)
	835	662	638
American Indian	(1.1)	(1.2)	(1.0)
	210	214	198
Asian American	(0.4)	(0.5)	(0.4)
	72	96	86
Hispanic American	(3.6)	(3.4)	(3.0)
	715	636	560
Total	(100)	(100)	(100)
	19,797	18,597	18,773

(X.X) = Percent of projected participants by racial/ethnic group. Numbers do not add up to 100 percent due to rounding.

Table 5. Projected Number of 1992 Participants in Fishing by Racial/Ethnic Group, Based on 1992 Population and 1980, 1985, and 1990 Activity Participation Rates by Age and Race/Ethnicity

Racial/Ethnic Group	Base Year 1980	Base Year 1985	Base Year 1990
	Numbers are in thousands of participants projected for 1992		
White	(84.6)	(84.8)	(85.4)
	49,569	51,788	57,014
African American	(6.6)	(6.5)	(6.4)
	3,864	3,979	4,300
American Indian	(0.8)	(0.8)	(0.9)
	460	519	610
Asian American	(2.2)	(2.0)	(1.8)
	1,283	1,199	1,234
Hispanic American	(5.8)	(5.9)	(5.4)
	3,382	3,612	3,573
Total	(100)	(100)	(100)
	58,558	61,097	66,731

(X.X) = Percent of projected participants by racial/ethnic group. Numbers do not add up to 100 percent due to rounding.

Table 6. Projected Number of 1992 Participants in Wildlife Observation Around the Home, by Racial/Ethnic Group, Based on 1992 Population and 1980, 1985, and 1990 Activity Participation Rates by Age and Race/Ethnicity

Racial/Ethnic Group	Base Year 1980	Base Year 1985	Base Year 1990
	Numbers are in thousands of participants projected for 1992		
White	(88.8)	(88.7)	(88.8)
	32,238	42,231	57,826
African American	(5.0)	(4.7)	(4.7)
	1,800	2,249	3,046
American Indian	(0.2)	(0.6)	(0.8)
	79	300	523
Asian American	(1.3)	(1.2)	(1.2)
	461	551	804
Hispanic American	(4.7)	(4.7)	(4.5)
	1,721	2,257	2,908
Total	(100)	(100)	(100)
	36,299	47,579	65,107

(X.X) = Percent of projected participants by racial/ethnic group. Numbers do not add up to 100 percent due to rounding.

Estimating the number of fishers in 1992 based on participation rates by age and race/ethnicity for 1980, 1985, and 1990 produced successively higher projections overall. Projections of the number of fishers in 1992 based on 1990 participation rates yielded estimated numbers of participants that were 14 percent higher than those based on 1980 rates and 4 percent higher than those based on 1985 rates. The 1990 rates produced the highest estimated 1992 number of White, African American, and American Indian fishers compared to numbers from these groups based on the 1980 and 1985 rates. Estimates of 1992 Hispanic fishers were highest when 1985 rates were used in the projections. The projections of Asian American fishers were similar across all three years, and the projections of Hispanic American fishers were similar for 1985 and 1990. Over the periods 1980-1985 and 1985-1990 there were successively higher proportions of fishers who were white and successively lower proportions who were African American.

The 1990 participation rates by age and race/ethnicity produced higher estimates of the number of individuals engaged in wildlife observation around the home than did the 1985 or 1980 rates. The 1990 estimates were 31 percent higher than those for 1985 and 79 percent higher than those for 1980. The 1990 rates generated the highest estimated number of participants for each group, with the 1980 rates producing the lowest estimates for each group. The 1990 rates generated a higher proportion of American Indian participants and a lower proportion of Hispanic American participants than did the 1985 or 1980 rates.

Conclusions

With the analysis limited to three points of data, our efforts to identify trends were limited. However, we feel that the results are useful, and expect to extend the analysis to other years as the data become available.

The results show that participation rates by age and racial/ethnic background for hunting, fishing, and wildlife observation around the home do change over time, and the changes can have implications for the projections made by cohort-component projection models. Depending on which year's participation rates were used in the projections of number of participants in 1992, the estimates varied. In some instances the activity participation rates by age and race/ethnicity dropped or stayed the same over time, while in others they increased. Using 1980 participation rates by age and race/ethnicity for predicting number of participants in hunting, fishing, and wildlife observation around the home in 1992 would, in comparison to using 1990 rates, have overestimated the number of hunters by 5 percent, underestimated the number of fishers by 14 percent, and underestimated the number engaged in wildlife observation around the home by 79 percent. These results are based on an assumption that participation rates by age and race/ethnicity would remain constant for up to 10 years. The changes in predictions implied by the changes in rates reported here could have significant implications for management, planning, and policy. Those implications could be even greater in those instances where projections are made for periods longer than 10 years, which is often the case.

The participation rates by age and racial/ethnic groups in an activity tended to follow the same general pattern over time. Consequently use of the rates from different years (i.e., 1980, 1985, 1990) and applying then to the same population (i.e., 1992) did not have major implications for the racial/ethnic or age mix of projected participants. These results suggest that forces for change in participation rates in an activity appear to be operating similarly across age and race/ethnicity. Examining trends in activity participation rates by age and race/ethnicity over the 10 year time span, we did not see evidence of participation rates becoming more similar across racial/ethnic groups or that older individuals are beginning to behave more like their younger counterparts. Further testing for changes in the relative patterns across racial/ethnic groups will require data for additional years and the inclusion of additional explanatory variables in the models for predicting the number of participants. In the meantime it may be useful to monitor changes in participation rates over time and explore their implications for future participation.

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