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GENDER DIFFERENCES IN RESOURCE USE AND EVALUATION OF ATTRIBUTES OF PLACES OF RESOURCE USE BY NATIVE AMERICANS AND CAUCASIANS FROM WESTERN IDAHO: RELEVANCE TO RISK EVALUATIONS

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Abstract

A substantial body of literature deals with exposure differences between men and women, and how men and women perceive environmental risk, but far less attention has been devoted to how men and women use the environment and how they evaluate the features of natural environments. The objective of this study was to examine gender differences in the perceptions of environmental quality and resource use for Native Americans and Caucasians interviewed at an Indian festival in northwestern Idaho. More individuals engaged in fishing than any other consumptive activity, and more people engaged in camping and hiking than other nonconsumptive activities. For both ethnic groups, significantly more men hunted than women, although a higher percentage of Native Americans of both genders hunted than did Caucasians. Although significantly more Caucasian men fished than women (63 vs. 41%), there were no marked differences in fishing for Native Americans. Significantly more Native American women gathered herbs (57%) compared to men (37%). There were no significant gender differences in nonconsumptive activities (camping, hiking, biking, bird watching, or picnicking). For those who engaged in consumptive and nonconsumptive activities, however, there were few gender differences in the frequency of these activities, except for fishing, hunting, and crabbing by Caucasians (men had higher rates) and collecting berries and herbs for Native Americans (women had higher rates). When asked to evaluate environmental characteristics or attributes on a scale of 1 (less important) to 5 (very important), unpolluted water, clean air, no visible smog, unpolluted groundwater, and appears unspoiled were rated the highest. There were few significant gender differences in these evaluations for Native Americans, but there were significant gender differences for Caucasians:

Women rated most features higher than did men (except for natural tidal flow). These data indicate a need to evaluate not only consumption rate differences between men and women, but also nonconsumptive activities, as well as resource values and perceptions, when managing environments and determining potential risk from exposure.

Protecting human health and the environment are important values desired by public policymakers, managers, and the public (Burger, 2007). While it is clear that human values guide personal exposure, the management and protection of ecosystems is also partly guided by how the public and policymakers perceive ecosystem resources and services. Individuals who value natural resources and pristine ecosystems support habitat protection, and often engage in a range of outdoor activities that could place them at risk from environmental contamination. The assessment of resource use by subjects and the assessment of perceptions and concerns about the important features of the environment and multiple land use are critical to understanding risk to the public (Slocombe, 1993; Yin & Pierce, 1993). While the attitudes of the public are often solicited about chemical plants, nuclear facilities, or other hazardous waste sites (Greenberg & Anderson, 1984; Kunreuther et al., 1990; Slovic et al., 1991; Slovic, 1993; Mitchell et al., 1997), perceptions about uncontaminated lands or neighborhood parks and wood-lands are often ignored. Understanding attitudes about environmental features is essential for wise management, whether for contaminated or uncontaminated lands (Lowrie & Greenberg, 1997).

To manage recreational rates and the potential adverse human health risks from contaminants, managers need to understand how many of the local or regional population use particular lands, how often people who engage in particular activities use the lands, and their attitudes toward features of these lands. Ecologists and others have often catalogued ecological resources of importance to people (deGroot et al., 2002), but have not always determined how individuals evaluated, or the importance they attached to protecting the quality of, these resources and habitats. Evaluation of wildlife in terms of the cost of a given species (to replace) and how people value wildlife aesthetically is an important discipline (Costanza et al., 1997; Efroymson et al., 2008), other characteristics of the ecosystem itself are often ignored. Contingent valuation is used for the former (Mitchell & Carson, 1989; Diamond & Hausman, 1994; Chambers & Whitehead, 2003), while examining preferences for the latter is an approach often used (Martinez-Espineira, 2006). Knowing resource use, recreational rates, and how much people value particular characteristics of the environments and habitats they prefer is an important aspect of environmental management, risk assessment, and public policy development.

Several demographic factors affect all three of these aspects (percentage of individuals engaging in outdoor activities, frequency of engagement, perceptions of qualities of habitats and environments), including income, age, gender, and cultural traditions (Harper et al., 2008; Burger et al., 2008). Gender-related beliefs affect perceptions and behavior (Gustafson, 1998), which in turn affect several aspects of how society behaves, places itself at risk, and manages these ecosystems. Understanding both perceptions and evaluations and gender-related behaviors may thus provide useful information for understanding and support for ecosystem protection and management, habitats necessary for human activities, natural

resource consumption, and other nonconsumption activities (Figure 1). That is, if men and women engage in different frequencies of activities, then their exposure clearly can vary if sites (soil, water) or resources (fish, game, herbs, berries) are contaminated. Further, if their perceptions vary, then places used mainly by men (or women) could be managed for gender-related preferences. The activities bear directly on risk evaluations and risk assessments. While gender-based differences in consumption, and even recreational activities, have been examined, seldom are these studied in terms of percentage of people who engage in them, the frequencies of those who engage in them, and their attitudes toward the places they prefer to engage in these activities. Managing exposure, or at least providing individuals with the opportunity to reduce exposure, requires that managers be aware of the demographic and cultural factors that relate to that exposure. The presence of gender-related differences in perceptions of the places people prefer, the activities they prefer, and their frequency of participation all affect potential exposure (Figure 1).

This study examined gender-related differences in Caucasians and Native Americans interviewed at an Indian festival in north-western Idaho. We report the percentage of individuals who engage in a number of different outdoor activities, the frequency of such participation, and attitudes and perceptions about the qualities of their preferred locations for these activities. Consumptive and nonconsumptive activities were examined separately because men and women engage in both, and there may be gender-related differences.

METHODS

The overall design was to study gender-related differences in people who attended the 2009 Julyamsh Pow Wow (an Indian festival) at Post Falls, ID. This event was selected because both Native Americans and Caucasians would be present, and an equal number of men and women were expected. This venue is a site in the Northwest where individuals might be expected to engage in outdoor activities, but the attendees were not only individuals who engaged in outdoor recreation. The event attracted a general public and not just subjects interested in natural resources, and the event went for several days, providing the opportunity to interview 401 people of both genders. Further, it was a festival that would attract a cross-section of people interested in Native American culture (particularly music, dancing, and crafts), and at which hunting, fishing, or other outdoor activities were not featured. Although 401 individuals were interviewed, only 372 were engaged in either consumptive or nonconsumptive activities, although these subjects did have views on other aspects (e.g., natural resource damage assessment).

Structured interviews employing a questionnaire were used to assess resource uses, perceptions about the features of the environment that were important to people, and resource activity rates (by consumptive and nonconsumptive uses). Knowledge and perceptions about natural resource damage assessment and resource restoration and beliefs about who should restore impaired natural resources are discussed elsewhere (Burger, personal communication). People were interviewed while they watched or waited in lines for activities to begin, and few people declined to be interviewed. Interviewers first introduced themselves as from Rutgers University, and explained the overall purpose of the survey as to understand “how people perceive natural resources, how people use and value the

environments they prefer, and what factors affects their perceptions and activities.” A person was randomly selected for the interview, and after completing an interview, the interviewer moved at least 3 m in a transect to select the next prospective interviewee. In some cases interviewers moved along a waiting line in this manner, and in other cases they moved through the crowd. Subjects were not selected completely randomly, but there is no reason to assume a bias in our selection process. The interviews typically required about 20 min, depending upon how many questions subjects asked about the survey or natural resources.

The questionnaire was divided into sections that included rating the importance of environmental features by consumptive and nonconsumptive activities, and frequency and relative importance of various activities. Demographic information included age, gender, education, family income, self-identified ethnicity, and self-identified tribal affiliation. The questionnaire had three classes of activities and perceptions (consumptive, nonconsumptive, religious/spiritual), and interviewers alternated the order in which they asked these questions (the religious/spiritual questions are not addressed in this article). Respondents were asked whether they hunted, fished, crabbed, gathered herbs or berries, or engaged in other consumptive activities, and then were asked to rate the importance of different environmental features of the habitats where they like to conduct these activities (on a Likert scale of 1 [unimportant] to 5 [very important]). Subjects were also asked about nonconsumptive activities, such as hiking, bird watching, biking, camping, picnicking, and others, followed by a rating of the environmental features. The full list can be found in Table 2. Although many other features could have been included, the list was refined to reduce the total time for the interviews. For example, people might distinguish between gathering herbs and berries compared to gathering herbs for medicine, for religious purposes, for dyes or weaving, or for food; these were all combined into one category. For nonconsumptive activities, photography could have been included, but it was usually part of either hiking or walking. Professional photographers were not interviewed.

Kruskal–Wallis nonparametric one-way analysis of variance χ^2 tests were used to distinguish differences among Caucasians and Native Americans and men and women (SAS, 1995). The criterion for significance was set at $p < .05$. Means and standard errors are provided in the text and figures.

RESULTS

There were few gender-related demographic differences in the sample for either the Caucasian or Native American subjects, although the mean age and years of education were lower for Native Americans (Table 1). Caucasian men had significantly higher incomes than did Caucasian women, but there were no gender differences in income for Native Americans.

Significantly more Caucasian men participated in any consumptive activity than did women, while there was no overall marked gender difference for Native Americans (Table 2). There were no significant gender-related differences in nonconsumptive activities for either ethnic group, although the percentage engaging in each type of activity varied by ethnic group. More individuals engaged in fishing than any other nonconsumptive activity, and more

individuals engaged in camping and hiking than other nonconsumptive activity (Table 2). For both ethnic groups, significantly more men hunted than did women, although a higher percentage of Native Americans of both genders hunted than did Caucasians. Although significantly more Caucasian men fished than women (63 vs. 41%), there were no marked differences in fishing for Native Americans. Significantly more Native American women gathered herbs (57%) compared to men (37%). There were no significant gender differences in nonconsumptive activities (camping, hiking, biking, bird watching, picnicking) for both ethnic groups.

For those who engage in consumptive (fishing, hunting) and nonconsumptive (hiking, camping, bird-watching) activities, however, there were few gender differences in the frequency (days per month) of these activities, except for fishing, hunting, and crabbing by Caucasians (men had higher rates), and collecting berries and herbs for Native Americans (women had higher rates) (Table 3). Both ethnic groups spent more time in spiritual nonconsumptive activities (praying, communing with nature) than they did in those activities normally thought of as recreational (hiking, biking, bird-watching) or as consumptive (and perhaps subsistence, i.e., fishing, crabbing, hunting, collecting berries and herbs; Burger, personal communication).

When asked to evaluate environmental characteristics or attributes on a scale of 1 (less important) to 5 (very important), unpolluted water, clean air, no visible smog, unpolluted groundwater, and appears unspoiled were rated the highest (Figure 2). "Appears unspoiled" was not defined; subjects used their own definition to answer this question. There were few significant gender differences in these evaluations by Native Americans, but there were significant gender differences for Caucasians: Women rated most features higher than did men (except for natural tidal flow). Distance from home was rated relatively low by both ethnic groups, and there were no gender-related differences. People stated that if they had a favorite place to go for consumptive and nonconsumptive activities, they did not care how far away from home it was.

DISCUSSION

The subject pool interviewed was relatively evenly balanced among Native Americans and Caucasians, and among male and female for each ethnic group, and there were no gender-related differences in age distribution or education (although Native Americans were younger, and had less education overall). The pow-wow continued for several days, and many individuals came and stayed for much of the event, making it impossible for people in a lower economic stratum to attend the event. A small percentage of subjects did not graduate at least from high school, another indication of economic status.

Rates of Participation

There were few gender-related differences in percentage of people who engaged in consumptive activities, and none for nonconsumptive rates of participation. For both ethnic groups, fishing, hunting, and gathering herbs had high participation rates. Men hunted more than women for both ethnic groups. Caucasian men fished more than did Caucasian women, and for gathering herbs Native American women gathered more than Native American men.

This information is useful for risk assessors because it suggests that there may be gender-related differences in consumption that relate to participation in the activity itself. That is, when gathering herbs and berries, it is difficult not to eat some, and for some fishing activities (where overnight trips are involved), people engaging in these activities may eat some of the fish before returning home with fish for the family. Further, since a higher percentage of Native American women interviewed gathered herbs and berries than Native American men, they may have children with them, and the children may also eat more berries than their fathers or other Native American men.

For both ethnic groups, percentage of individuals engaging in both consumptive and nonconsumptive activities is an indication of possible exposure while engaging in these activities. While many of the activities can be done with day (or less) trips, camping requires on-site exposure for a few to many days. Although hunting may be primarily done in the uplands (or at least on dry land), fishing may involve walking in the water, providing participants with another exposure route. That a higher percentage of Caucasians engaged in nonconsumptive activities than in consumptive ones also suggests the importance of that exposure route (see Table 2).

The general lack of a gender-related difference in percentage of people engaging in most activities (once ethnic differences are accounted for) indicates that men and women may be participating in these activities together (as families perhaps), and risk assessors might assume that information on one gender reflects both genders. However, this was not the case for hunting, for fishing for Caucasians, and for gathering herbs by Native Americans; all three need to be considered to be gender-related when conducting risk assessments.

Few other gender-related data on percentage of individuals engaging in both nonconsumptive and consumptive activities are available for comparison. However, Burger (1999) conducted a similar study at the Shoshone–Bannock Pow Wow near Ft. Hall in 1997, but did not examine gender-related differences. The data can be compared, however, to give an indication of overall rates. Burger (1999) reported that for Native Americans, 63% engaged in hunting (compared to 57% males; 38% females for the present study), 66% engaged in fishing (67%; 59%), 61% engaged in camping (57%; 61%), and 56% engaged in hiking (45%; 53%). Thus, the current rates for Native Americans were similar to or lower than those reported by Burger (1999).

Frequency of Participation by Participants

As well as knowing percentages of men and women engage in particular activities, it is important to determine what the frequency of participation is by subjects who engage in these activities. Often, the frequency of participation is computed on the entire population, and while this may be useful for management decisions, it is not necessarily useful for risk calculations. That is, if a large part of the populations does not participate in activities, then the mean (and perhaps the standard error) of participation will be low, and will not estimate the actual risk to people who do engage in these activities. In other words, nonparticipants dilute the sample of participants. Ideally such information needs to be expressed in terms of frequencies by different time periods.

In the present study, people who engaged in nonconsumptive activities (such as communing with nature, praying or meditating in nature, hiking, or bird-watching) often engaged in them half or more of the days of the month. Thus, an important possible exposure route exists for nonconsumptive activities, and this needs to be examined specifically for both Native Americans and Caucasians.

The average number of days per month people engaged in fishing, crabbing, or hunting varied from 2.9 for Caucasian females to 6.2 for Native American men. This is equivalent to 36 days per year for Caucasian females (if the activity level continues throughout the year) and more than 72 days per year for Native American men. It is difficult to compare these data to previous data because such information is usually gathered as days spent hunting and days spent fishing. However, when information is gathered separately for hunting and fishing it is difficult to determine the total days spent in these activities, and thus the total days to be used in exposure assessments. Subjects often mentioned that they hunted and fished on the same trips, and often on the same days. This provides a problem for risk assessors, but overall, it is essential to determine the total days subjects are exposed in a given environment, regardless of the activities they engage in.

Evaluation of Features of Favorite Sites

In the initial model proposed (Figure 1), it was suggested that both perceptions and behaviors affect a range of decisions relating to ecosystem management and protection, habitat used for particular activities, and consumptive/nonconsumptive activities. In this study, both Native Americans and Caucasians rated a series of environmental features rather highly, and there were few gender-related differences in evaluations, although there were more for Caucasians. In general, Caucasian females rated many characteristics higher than did their male counterparts, but they rated them similarly to Native Americans of both genders. That is, the same characteristics were rated high, and the same ones were rated lower. Only the human dimensions (buildings, roads, lack of people, distance from home) were rated relatively lower than all other attributes, which related to ecocultural aspects of ecosystems and to the goods and services they provide.

Overall there were fewer differences in their evaluations of ecosystem attributes (Figure 2) than there were either in the percentages of people who engaged in different types of activities or in the frequency of engagement for these activities. This indicates either that individuals consider a wide range of attributes all important for the places they prefer to engage in these activities, or that the list of attributes was not sufficiently long and diverse.

Even though the differences between the relative rankings of most features or characteristics were small, there were some noteworthy conclusions: (1) Both men and women of both ethnic groups rated services (clean air and unpolluted water) the highest, (2) both men and women of both ethnic groups rated ecocultural aspects (no smog, lack of radionuclides that present a health risk, appears unspoiled) relatively high, and (3) both men and women of both ethnic groups rated consumptive qualities (abundant fish/crabs, complexity of nature, diversity of plants) lower. This suggests that both men and women, who in fact engaged in more frequent nonconsumptive activities (camping, hiking) than consumptive ones, rated services and ecocultural aspects higher than those relating to consumptive resources. This is

a fruitful area of research, and more attention needs to be devoted to understanding the relationship between valuations, activity participation, and frequency of participation, as well as its importance to risk evaluations and assessments.

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REFERENCES

- Burger J. American Indians, hunting, and fishing rates, risks, and the Idaho National Engineering and Environmental Laboratory. *Environ. Res.* 1999; 80:317–329. [PubMed: 10330305]
- Burger J. The effect on ecological systems of remediation to protect human health. *Am. J. Public Health.* 2007; 97:1572–1578. [PubMed: 17666693]
- Burger J, Gochfeld M, Pletnikoff K, Snigaroff R, Snigaroff D, Stamm T. Ecocultural attributes: Evaluating ecological degradation in terms of ecological goods and services versus subsistence and tribal values. *Risk Anal.* 2008; 28:1261–1271. [PubMed: 18657067]
- Chambers C, Whitehead J. A contingent valuation estimate of the value of wolves in Minnesota. *Environ. Res. Econ.* 2003; 9:225–238.
- Costanza R, d'Arge R, deGroot RS, Farber S, Grasso M, Hannon B, Limburg K, Naeem S, O'Neill RV, Paruelo J, Raskjning RG, Sutton P, van den Belt M. The value of the world's ecosystem services and natural capital. *Nature.* 1997; 387:253–260.
- deGroot RS, Wilson MA, Boumans RMJ. A typology for the classification, description and valuation of ecosystem functions, goods, and services. *Ecol. Econ.* 2002; 41:393–408.
- Diamond P, Hausman J. Contingent valuation: is some number better than no number? *J. Econ. Perspect.* 1994; 8:45–64. [PubMed: 10136765]
- Efroymson RA, Peterson MJ, Welsh CJ, Druckenbrod DL, Ryon MG, Smith JG, Hargrove WW, Griffen NR, Roy WK, Quarles HD. Investigating habitat value to inform contaminant remediation options: Approach. *J. Environ. Manage.* 2008; 88:1436–1451. [PubMed: 17897773]
- Greenberg, MR.; Anderson, R. Hazardous waste sites: The credibility gap. Rutgers University Press; New Brunswick, NJ: 1984.
- Gustafson PE. Gender differences in risk perception: theoretical and methodological perspectives. *Risk Anal.* 1998; 18:805–811. [PubMed: 9972583]
- Harper, BL.; Harding, AK.; Waterhouse, T.; Harris, SG. Traditional tribal subsistence exposure scenario and risk assessment guidance manual. EPA Star grant J1-R831046. 2008. http://www.hhs.oregonstate.edu/.../xposure_scenario_and_risk_guidance_manual_v2p
- Kunreuther H, Easterling D, Desvousges W, Slovic P. Public attitudes toward siting a high-level nuclear waste repository in Nevada. *Risk Anal.* 1990; 10:469–484.
- Lowrie K, Greenberg M. Placing future land use planning in a regional context: The Savannah River Site. *Fed. Facil. Environ. J.* 1997; 1:51–65.
- Martinez-Espineira R. A box-cox double-hurdle model of wildlife valuation: The citizen's perspective. *Ecol. Econ.* 2006; 58:192–208.
- Mitchell, RC.; Carson, RT. Using surveys to value public goods. John Hopkins University for Resources for the Future; Baltimore, MD: 1989.

- Mitchell, RG.; Peterson, D.; Roush, D.; Brooks, RW.; Paulus, LR.; Martin, DB.; Lantz, BS. Idaho National Engineering and Environmental Laboratory site environmental report. Environmental Science and Research Foundation; Idaho Falls, ID: 1997.
- SAS Institute, Inc. User's guide to SAS. SAS Publishing; Cary, NC: 1995.
- Slocombe DS. Environmental planning, ecosystem science, and ecosystem approaches for integrating environment and development. *Environ. Manage.* 1993; 7:289–303.
- Slovic P. Perceived risk, trust, and democracy. *Risk Anal.* 1993; 13:675–682.
- Slovic P, Layman M, Flynn J. Lessons from Yucca Mountain. *Environment.* 1991; 3:7–11. 28–30.
- Yin Y, Pierce JT. Integrated resource assessment and sustainable land use. *Environ. Manage.* 1993; 17:319–327.

FIGURE 1.
Model of gender beliefs in affecting behavior and public policy.

FIGURE 2.

Relative importance of environmental characteristics in males and females. 5 is most important.

TABLE 1

Demographics of Study Population in Post Falls, ID (2009)

	Caucasian				Native American			
	Female (n = 100)	Male (n = 70)	χ^2		Female (n = 100)	Male (n = 102)	χ^2	
Age	85	57	51.9±1.65	22-81	68	42.6±1.69	16-87	75
Education	102	71	102		103			
Less than high school	0	0%	2	3%	14	14%	13	13%
High school graduate	25	25%	13	18%	35.0	34%	36.0	35%
Some college	25	25%	17	24%	19	19%	23	22%
College graduate	45	44%	34	48%	31	30%	27	26%
Graduate level education	7	7%	5	7%	3	3%	4	4%
Income (thousands of dollars)	49.8±4.2	6-300	59.7±5.5	18-300	4.4 (0.04)	36.8±2.97	504	7-125
% household income below mean (\$48,500)	50	59%	27	47%	52	76%	48	64%

Note. Given are means ± standard error and range for age and income (n = 401).

TABLE 2

Percent of Respondents Who Use Natural Areas for Consumptive and Nonconsumptive Activities

Consumptive	Caucasian		χ^2	Native American		χ^2
	Female (n = 100)	Male (n = 70)		Female (n = 100)	Male (n = 102)	
Fish	41%	63%	7.6 (0.006)	59%	67%	1.2 (NS)
Hunt	11%	33%	11.6 (0.0007)	38%	57%	6.2 (0.01)
Gather herbs or berries	30%	29%	0.3 (NS)	57%	37%	7.7 (0.006)
Crab	2%	4%	0.7 (NS)	11%	11%	0.0 (NS)
Other	1%	0%	0.7 (NS)	0%	0%	
Do any consumptive activity	59%	71%	3.7 (0.05)	86%	83%	0.8 (NS)
Nonconsumptive						
Camp	46%	49%	0.5 (NS)	61%	57%	0.2 (NS)
Hike	59%	60%	0.5 (NS)	53%	45%	1.0 (NS)
Picnic	43%	33%	1.1 (NS)	40%	32%	1.4 (NS)
Bird watch	33%	30%	0.01 (NS)	27%	16%	2.9 (NS)
Bike	36%	36%	0.08 (NS)	25%	21%	0.5 (NS)
Walk / Run	22%	13%	1.6 (NS)	14%	7%	2.6 (NS)
Vision Quest	3%	0%	2.1 (NS)	12%	14%	0.2 (NS)
Do any non-consumptive activity	86%	84%	0.8 (NS)	86%	81%	1.0 (NS)

TABLE 3
Mean Number of Times per Month Respondents Participate in Activities (for Those Who Do the Activity)

	Caucasian				Native American			
	n	Female	n	Male	n	Female	n	Male
How many times a month activity is done in natural area:								
Pray or meditate	57	19.4±1.80	29	16.4±2.53	77	21.3±1.33	67	22.5±1.36
								0.6 (NS)
Commune with nature	82	17.0±1.33	51	15.7±1.77	83	20.8±1.27	79	21.0±1.24
								0.04 (NS)
Bird-watch	48	16.6±1.76	28	14.5±2.46	48	14.9±1.94	32	15.1±2.20
								1.7 (NS)
Hike, walk, or Bike	80	11.9±1.20	60	9.8±1.38	76	15.2±1.33	76	11.7±1.20
								2.5 (NS)
Fish, crab, or hunt	41	2.9±0.49	39	3.9±0.47	59	4.7±0.73	63	6.2±0.77
								2.3 (NS)
Vision quest or other ceremony	5	1.9±0.87	6	8.2±4.53	40	2.7±0.42	35	4.8±1.38
								0.5 (NS)
Picnic or feast	67	5.5±0.83	39	6.3±1.24	69	5.8±0.76	66	4.8±0.61
								0.3 (NS)
Collect herbs, berries, etc	40	2.9±0.79	17	4.2±1.56	63	4.7±0.80	47	3.0±0.55
								4.7 (0.03)
Other (name it) ^a	11	12.3±3.96	6	12.0±5.71	7	4.3±2.19	4	4.5±2.60
								0.2 (NS)

Note. Given are means ± standard error and Kruskal–Wallis, nonparametric one-way ANOVA, χ^2 (p).

^aThis includes biking, camping, gardening, swimming and boating.