Environmental Volunteering and Health Outcomes over a 20-Year Period

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Purpose: This study tested the hypothesis that volunteering in environmental organizations in midlife is associated with greater physical activity and improved mental and physical health over a 20-year period. Design and Methods: The study used data from two waves (1974 and 1994) of the Alameda County Study, a longitudinal study of health and mortality that has followed a cohort of 6,928 adults since 1965. Using logistic and multiple regression models, we examined the prospective association between environmental and other volunteerism and three outcomes (physical activity, self-reported health, and depression), with 1974 volunteerism predicting 1994 outcomes, controlling for a number of relevant covariates. Results: Midlife environmental volunteering was significantly associated with physical activity, self-reported health, and depressive symptoms. Implications: This population-based study offers the first epidemiological evidence for a significant positive relationship between environmental volunteering and health and well-being outcomes. Further research, including intervention studies, is needed to confirm and shed additional light on these initial findings.

Key Words: Volunteerism and civic engagement, Health, Well-being

Increasing attention is being paid to the urgency of environmental issues at the local and national levels, as our society faces problems like air and water pollution, toxic waste, degradation of sensitive natural areas, the challenges of sustainable growth, and the negative consequences of global climate change. These problems are directly associated with the health and well-being of individuals and the quality of life in communities. It is widely acknowledged that volunteerism and civic engagement are vitally necessary components of a solution to these problems, with organizations and agencies seeking citizen help for watershed monitoring (Firehock & West, 1995), policy input (Wagenet & Pfeffer, 2007), ecological restoration projects (Miles, Sullivan, & Kuo, 1998), environmental stewardship programs (Ryan, Kaplan, & Grese, 2001), and a host of other activities. There is also a growing sentiment that the rapidly increasing population of retirees is an untapped reservoir of volunteers for such efforts (Pillemer & Wagenet, 2008; Tonn, Waidley, & Petrich, 2001).

It is therefore surprising that empirical studies of environmental volunteering in general, and in later life in particular, are scarce. Despite a large literature on pro-environmental behavior more generally (Bamberg & Möser, 2007), few investigations have been conducted of either the predictors or outcomes of formal environmental volunteering. In addition, existing studies have employed small and unrepresentative samples (Kingsley, Townsend, & Henderson-Wilson, 2009; Miles, Sullivan, & Kuo, 2001). One area in particular has received little attention to date: whether environmental volunteer...
work confers benefits on those individuals who take part. Indeed, to our knowledge, no longitudinal research has been conducted regarding the effects of environmental volunteering.

There is a substantial empirical literature linking volunteer activity in general to positive physical and mental health outcomes in midlife and beyond. Volunteering has been found to be associated with better physical functioning (Fried et al., 2004; Lum & Lightfoot, 2005; Warburton & Peel, 2008), higher self-rated health (Morrow-Howell, Hinterlong, Rozario, & Tang, 2003), improved psychological well-being (Greenfield & Marks, 2004; Musick & Wilson, 2003; Thoits & Hewitt, 2001), and lower mortality (Ayalon, 2008; Luoh & Herzog, 2002; Moen, Dempster-McClain, & Williams, 1992; Musick, Herzog, & House, 1999; Oman, Thoresen, & McMahon, 1999). Thus, there is little question that volunteering provides benefits for middle-aged and older adults.

Although research suggests that volunteering in general is beneficial, outcomes associated with specific types of volunteering have not been widely explored. The limited evidence is contradictory; some studies support differential benefit from various types of volunteer work (Musick & Wilson, 2003; Van Willigen, 2000), whereas others do not (de León & Fuertes, 2007; Morrow-Howell et al., 2003). The goal of this article was to explore whether environmental volunteering is associated with benefits to individuals, including increased physical activity and better mental and physical health. Using the Alameda County Study, a large longitudinal data set, we test two hypotheses. First, we hypothesize that engaging in any form of volunteering will be positively associated with beneficial outcomes 20 years later. Second, we hypothesize that individuals who engage in environmental volunteering (either instead of or in addition to other types of volunteering) may receive additive benefits.

**Environmental Volunteering: Potential Benefits**

In this section, we provide a rationale for the assertion that environmental volunteering may provide additional benefits to individuals in midlife and later life. As we have noted, very limited prior research has examined outcomes of environmental volunteering. We have therefore drawn on several related literatures to justify the hypothesis that that environmental volunteering may be associated with three positive outcomes: physical activity, physical health, and mental health.

**Physical Activity**

Preliminary evidence suggests that increased physical activity is a result of volunteering in general and that such activity may be increased when participating in environmental volunteering activities. Librett, Yore, Buchner, and Schmid (2005) used a national survey of 2,032 respondents to explore the relationship between environmental volunteering and physical activity. They found that compared with nonvolunteers, individuals who performed any kind of volunteering were 1.8 times more likely to meet the Centers for Disease Control guidelines for physical activity, whereas environmental volunteers were 2.6 times more likely to do so. Studies have also connected nature access with increased physical activity (Ellaway, Macintyre, & Bonnefoy, 2005; Giles-Corti et al., 2005), providing a logical link between environmental volunteering and overall physical activity. The present study allows us to test whether this finding is replicated using longitudinal data.

**Physical Health**

Second, it is reasonable to hypothesize that environmental volunteering may be associated with general physical health. One obvious potential mechanism for this effect is the increased physical activity just noted, given the long-established relationship between higher levels of physical activity and physical health outcomes (Conn, Minor, Burks, Rantz, & Pomeroy, 2003; Prohaska et al., 2006).

A second potential mechanism linking environmental volunteering to physical health outcomes is increased exposure to nature because outdoor activities such as clearing trails, testing streams, cleaning up nature preserves, and similar activities characterize volunteering for the environment. Research over the past several decades has demonstrated various health-related benefits of exposure to nature for individuals of all ages, including older adults (Maas, Verheij, Groenewegen, de Vries, & Spreeuwenberg, 2006; Takano, Nakamura, & Watanabe, 2002; Ulrich, 1984). Nature has also been found to serve as a “social magnet”—drawing people together and fostering a sense of community (Coley, Kuo, & Sullivan, 1997; Faber Taylor, Wiley, Kuo, & Sullivan, 1998; Kweon, Sullivan, & Wiley, 1998). The beneficial effects of exposure to nature including greater social integration is thus a plausible pathway linking environmental volunteering with health (Gooch, 2005; Miles et al., 2001).
Psychological Well-being

Extensive empirical evidence has linked volunteer activity to positive mental health outcomes (Greenfield & Marks, 2004; Musick & Wilson, 2003; Thoits & Hewitt, 2001). We expect environmental volunteering may enhance such benefits for two reasons. First, theories of human development suggest that older persons experience a need for generativity—that is, for activities that are focused on improving the world and leaving a legacy for future generations (McAdams & de St. Aubin, 1998). A logical outgrowth of this developmental stage is an interest in making a positive contribution to the environment, given that such stewardship is of critical importance to the quality of life for future generations. Warburton and Gooch (2007) found that older volunteers did in fact experience benefits from opportunities to nurture the environment and connected their actions to creating a better future that they themselves would not live to see. The limited evidence from small-scale studies indicates that participation in environmental stewardship programs is linked to a variety of psychological benefits (Grese, Kaplan, Ryan, & Buxton, 2000) because of opportunities to express generativity in midlife and beyond. Furthermore, research has shown that taking environmental action can reduce feelings of helplessness and thereby contribute to psychological well-being (Miles, Sullivan, & Kuo, 1998).

Second, as is the case with physical health, the literature on nature exposure and psychological well-being suggests a potential association between environmental volunteering and reduced levels of depression. Research has shown both that nature access is directly related to enhanced psychological well-being (R. Kaplan, 1973) and that access to nature buffers the detrimental effects of life stress on psychological distress (Wells & Evans, 2003). As described above, nature fosters social interaction and enhances social connections. In turn, studies have shown that social support buffers the effects of stress on psychological well-being (Cohen, Underwood, & Gottlieb, 2000; McNaughton, Patterson, Irwin, & Grant, 1992). Furthermore, both theory and research suggest that exposure to nature enhances cognitive resources by allowing neural inhibitory mechanisms underlying effortful attention to rest and recover (Cimprich, 1990; R. Kaplan & Kaplan, 1989; S. Kaplan, 1995; S. Kaplan & Kaplan, 1983; Tennessen & Cimprich, 1995).

In summary, despite the dearth of empirical studies, the extant literature provides a plausible foundation for links between environmental volunteering and positive health outcomes for individuals. The present study examined in an exploratory fashion the association between self-reported volunteering for an environmental organization and three health and well-being outcomes: physical activity, self-reported health, and depression. These outcomes are examined over a 20-year period in a large community sample. In multivariate analyses, we compared persons engaged in environmental volunteering with nonvolunteers and with individuals who volunteered in other domains.

Methods

Study Population

This study draws on data from the Alameda County Study, the study design and sampling strategy of which have been described in detail elsewhere (Berkman & Breslow, 1983, Hochstim, 1970). The Alameda County Study is a longitudinal study of health and mortality that has followed an original cohort of 6,928 adults since 1965. Participants in the study were randomly sampled to represent the noninstitutionalized adult population of Alameda County, California. Follow-up surveys were conducted in 1974, 1983 (50% sample), and 1994 with response rates of 85%, 87%, and 93%, respectively. We employ the 1974 and 1994 data because questions relating to environmental volunteering were asked for the first time in 1974 and because all available participants from the initial sample were recruited at each of these waves. In 1974, there were 4,864 individuals in the sample, which declined to 2,730 in 1994, for an attrition rate of 44%. Of those no longer in the sample, 1,878 (88%) were known to have died. Of the 2,730 who participated in the 1994 follow-up, 2,630 had complete data on the variables of interest.

The participants included in our final sample were compared with persons who had data from the 1974 survey but did not have follow-up data. These analyses suggested that our final sample was younger at baseline and reported better physical health (fewer chronic conditions, less functional impairment, and lower perceived health) and worse mental health (higher levels of depression) than those who were excluded (all \(p < .001\)). These findings are not surprising given that many of those without follow-up data had died.
Independent Variables

In this analysis, we are interested in the impact of volunteer activity on three prespecified outcomes. To measure volunteer activity, in the 1974 questionnaire participants were asked to indicate whether they were involved in any of the following groups and how active they were in each: “a group concerned with children (such as Parents-Teachers Association or Boy Scouts); a group concerned with community betterment, charity, or service; a church connected group; a group concerned with public issues such as civil liberties, property rights, etc; a group concerned with self-improvement that meets regularly; a group concerned with the environment, pollution, etc.” A respondent’s level of involvement in each group was measured on a 3-point scale with the response options very active, somewhat active, and inactive. Based on this information, we created dummy variables to indicate persons who were somewhat active or very active in an environmental group (environmental volunteers), and persons who were somewhat active or very active in one or more of the other types of groups but were not environmental volunteers (other volunteers). Environmental volunteers represented 6% of the overall sample (n = 155) and other volunteers made up 45% (n = 1,186).

Of the environmental volunteers, 81% were also involved in other types of volunteer work (n = 126). The remaining 19% were only involved in environmental volunteering (n = 29). These two categories of environmental volunteers were originally considered separately. However, preliminary analyses indicated no substantive differences in the parameters of interest between the two groups. Furthermore, we are interested conceptually in whether environmental volunteering is associated with additional benefit to individuals, beyond conventional volunteering. For this reason, individuals who combined environmental volunteering with other volunteer activities were considered appropriate for inclusion. The categories were therefore combined in the analyses presented (n = 155).

Outcomes

Physical Activity.—Physical activity in 1974 and 1994 was measured using a 4-item scale that asked subjects to report how often they did several things, including “active sports, swimming or taking long walks, working in the garden, and doing physical exercises.” Responses were on a 3-point scale with often, sometimes, and never as the options. In line with previous studies using this data set, often was coded as 4 (2 for gardening), sometimes was coded as 2 (1 for gardening), and never was coded as 0. Responses to the four items were then summed to create an overall physical activity score, which ranged from 0 to 14 at both time points. (In 1994, swimming and taking long walks were measured as two separate items. The mean of these two items was therefore used in the 1994 measure so that the 1974 and 1994 scales were equivalent.) The same or very similar scales have been used previously and associated with mortality and several health outcomes (G. A. Kaplan, Seeman, Cohen, Knudsen, & Guralnik, 1987; G. A. Kaplan, Strawbridge, Cohen, & Hungerford, 1996; Lazarus, Kaplan, Cohen, Leu, 1989; Strawbridge, Deleger, Roberts, & Kaplan, 2002; Yen & Kaplan, 1998).

Perceived Health.—Perceived health in 1974 and 1994 was measured by subjects’ responses to the question, “All in all, would you say your health is excellent, good, fair, or poor? The four response options were collapsed into two categories to create a dichotomous variable with fair/poor health coded as 1 and good/excellent health coded as 0. This dichotomous measure of fair/poor perceived health has been used as an outcome measure in several previous studies and shown to be an important predictor of mortality (Idler, Kasl, & Lemke, 1990; G. A. Kaplan & Camacho, 1983; Mossey & Shapiro, 1982; Yen & Kaplan, 1999).

Depression.—Depression was measured in 1974 and 1994 using an 18-item scale (G. A. Kaplan, Roberts, Camacho, & Coyne, 1987). Items in the scale capture various aspects of depression including psychomotor retardation, mood disturbance, loss of energy, problems with eating and sleeping, and agitation. Each item is recoded into a dummy variable format such that 1 indicated a depressed response. Items were then sum scored such that the maximum possible depression score was 18. Those with scores of 5 or more on the scale were coded as depressed as has been done in previous analyses of the data. Scale properties have been described in detail in previous studies (G. A. Kaplan & Reynolds, 1988; G. A. Kaplan, Roberts, et al., 1987).

Baseline Covariates

The following covariates (representing data collected at the 1974 assessment) were included in the
multivariate models and were selected based on their potential association with either the dependent variables or the primary independent variables. In particular, we were concerned about the possibility of self-selection bias (see Results section). For modeling purposes, the covariates were grouped into two domains: demographic (age, gender, education, and marital status) and other (i.e., social isolation, chronic conditions, and functional impairment).

**Social Isolation.**—Subjects reported the number of close friends or relatives they saw at least once a month (range 0–12 or more). In line with previous work (Reynolds & Kaplan, 1990; Seeman & Syme, 1987), responses of 0 and 1 were coded as socially isolated.

**Chronic Conditions.**—Participants were asked to indicate which of the following nine physical conditions they had experienced during the past 12 months: high blood pressure, heart trouble, stroke, chronic bronchitis, asthma, arthritis or rheumatism, diabetes, cancer, stomach ulcer or duodenal ulcer. A sum score of the number of reported conditions was calculated (range 0–5; no respondent reported more than five conditions). Based on previous research, three categories were used: zero symptoms, one symptom, two or more symptoms (Roberts, Kaplan, Shema, & Strawbridge, 1997; Yen and Kaplan, 1999).

**Functional Impairment.**—Subjects reported whether they had problems with basic activities of daily living (feeding themselves, dressing themselves, or moving around). A dummy variable was created such that those who reported trouble with any of these activities were coded as functionally impaired.

**Other Covariates.**—Other covariates included in the models were age, gender, education, and marital status. Age was included as a continuous variable, gender was dummy coded with 1 indicating women. Education was dummy coded such that 1 indicated ≥12 years of education and 0 indicated <12 years of education. Marital status was dummy coded such that 1 indicated married and 0 indicated divorced, separated, widowed, or never married.

**Analysis Strategy**

To examine the effects of volunteering on subsequent physical activity in 1994, multiple regression models were estimated, adjusting for levels of physical activity in 1974. Model 1 also adjusted for age, gender, education, and marital status in 1974; Model 2 adjusted for Model 1 covariates as well as social isolation, chronic conditions, and functional impairment in 1974.

To examine the effects of volunteering on subsequent perceived health, logistic regression models were estimated. Odds ratios (ORs) estimating the effects of volunteering on subsequent perceived health and on depression in 1994 were calculated, adjusting for perceived health/depression in 1974. In both analyses, Model 1 adjusted for age, gender, education, and marital status in 1974; Model 2 adjusted for Model 1 covariates as well as social isolation, chronic conditions, and functional impairment in 1974.

**Results**

Table 1 presents the descriptive statistics for the sample based on 1974 data. The mean age was 44.7 years) and the majority (57%) were women. Approximately 6% of the sample was somewhat or very active in environmental volunteer work.

Table 2 shows that after adjusting for levels of physical activity in 1974 both volunteering for the environment and other types of volunteering were significant predictors of physical activity in 1994. Examination of the parameter estimates suggests that environmental volunteering is a stronger predictor of later physical activity than other volunteering, confirming earlier findings by Librett and colleagues (2005).

With respect to self-reported health, Table 3 presents a more compelling picture of the benefits of environmental volunteering specifically. The ORs were not statistically significant for other volunteering, whereas a significant relationship was found for environmental volunteering. Engagement as an environmental volunteer at baseline was associated with reduced odds of perceiving oneself in fair/poor health 20 years later, even when controlling for initial perceived health and other covariates.

Table 4 shows associations with depressive symptoms. Similar to the findings for self-reported health, in Model 1, the model shows reduced odds for depressive symptoms, with an estimated 50% reduction in the odds of being depressed for environmental volunteers. A similar result was obtained after adding substantive covariates in Model 2, with a trend toward significance (p < .10).
An important concern for the analyses presented here is the possibility of self-selection bias, given that environmental volunteers’ decision to participate in such activity may be correlated with other characteristics that could themselves affect study outcomes. In particular, individuals who have more personal and social resources might also be more likely to become environmental volunteers. It is not possible in this study to eliminate such potential bias, but we conducted two analyses to assess the degree to which selection may have operated in the current study.

First, we compared environmental volunteers with nonenvironmental volunteers on all covariates in the 1974 data. The two groups differed significantly only on gender and education (with the environmental volunteers somewhat more likely to be men and more highly educated). Importantly, both variables were controlled for in all analyses reported in the current study. No differences were found for age, social isolation, presence of chronic conditions, or functional impairment. Second, we conducted an analysis using the 1965 data for the volunteers in our analysis, again comparing them on all covariates. This analysis allowed us to examine differences between the two groups 10 years prior to the first measurement of environmental volunteering. The findings were identical, with only education and gender differing significantly. Thus, although selection bias is certainly possible, it does not seem likely that it affected the findings to a great degree. As noted in the Discussion section, randomized controlled designs are necessary to confirm the findings reported here.

### Discussion

In this population-based cohort followed for 20 years, environmental volunteering was significantly associated with physical activity, self-reported health, and depressive symptoms. The longitudinal analyses demonstrated a positive effect of both environmental volunteering and other types of volunteering on subsequent physical activity. Furthermore, a positive effect was found uniquely for environmental volunteering in the case of both self-reported health and depression. These results lend support to the limited body of evidence from cross-sectional survey and qualitative interview studies that have previously reported positive effects of environmental volunteering in the second half of the life course.

We would note three limitations to the present study. First, a report of volunteering at baseline is not fully representative of volunteer status during the follow-up period, allowing us to miss individuals who volunteered later in life. Moen and colleagues (1992) have demonstrated that people move into and out of volunteer roles over the life course; future research should examine the relationship between trajectories of volunteering and health and well-being outcomes. It should be noted, however, that this type of underestimation leads to a conservative bias in assessing the association of environmental volunteering with the three outcomes. Indeed, it is striking that a single question about environmental volunteerism asked 20 years prior to assessing physical activity, self-reported health, and depression was so strongly related to these outcomes.

A second limitation also relates to the measure of volunteering. On the positive side, the Alameda Study questions provide more details than most
other data sets that have been used to assess the impact of volunteering over time, particularly by breaking down a number of types of volunteering. It would be useful, however, to have both additional details regarding the type of environmental activity performed as well as better measures of frequency and duration (e.g., hours spent volunteering over a specific time period). Furthermore, it was not possible to establish the independent effect of environmental volunteering due to the small number of participants who only engaged in such activity. It does appear from this study to have an important additive effect, but independent effects of environmental volunteering should also be examined.

A third limitation concerns our capacity to make causal conclusions. Because this study is not a true experiment in which people were randomly assigned to environmental volunteering, other types of volunteering, or no volunteering, causal conclusions cannot be made. However, the nature of this study—employing longitudinal data with controls for confounding variables moves us closer to a causal understanding than studies relying merely on cross-sectional data.

Further research is greatly needed to shed additional light on these initial findings. Environmental volunteering has the great potential benefit of solving two problems at once: the need for social engagement of older persons and for urgent attention to environmental issues affecting public health (Sykes, 2005; Wright & Lund, 2000). The potential health benefits should be explored in more detail, with attention to the mediating mechanisms by which environmental volunteering may have benefits. Randomized controlled trials are recommended with individuals assigned to environmental volunteer programs versus other volunteer activities. Such designs have only begun to be used to study the effects of volunteering (Martinez et al., 2006) and would be highly useful in the specific case of environmental volunteering.

Table 2. Multiple Regression Models Showing Longitudinal Associations Between 1974 Volunteering and Physical Activity in 1994, With Adjustments for 1974 Physical Activity and Covariates (N = 2,630)

<table>
<thead>
<tr>
<th>Physical activity, 1994</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estimate (SE)</td>
<td>Standardized β</td>
</tr>
<tr>
<td>Intercept</td>
<td>4.495 (0.332)</td>
<td>—</td>
</tr>
<tr>
<td>Physical activity, 1974</td>
<td>0.439 (0.017)**</td>
<td>.442</td>
</tr>
<tr>
<td>Age</td>
<td>−0.042 (0.005)**</td>
<td>−.140</td>
</tr>
<tr>
<td>Gender (female)</td>
<td>−0.591 (0.107)**</td>
<td>−.092</td>
</tr>
<tr>
<td>Education (≥12 years)</td>
<td>0.715 (0.140)**</td>
<td>.087</td>
</tr>
<tr>
<td>Marital status (married)</td>
<td>0.077 (0.140)</td>
<td>.009</td>
</tr>
<tr>
<td>Social isolation</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Chronic conditions (one)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Chronic conditions (two or more)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Functional impairment</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Environmental volunteering</td>
<td>1.196 (0.231)**</td>
<td>.088</td>
</tr>
<tr>
<td>Other volunteering</td>
<td>0.262 (0.109)*</td>
<td>.041</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.299</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Dummy variables are coded such that the reference category in Model 2 represents persons who are male, have less than 12 years of education, are not married, are not socially isolated, do not have any chronic conditions, are not functionally impaired, and do not volunteer in any of the domains considered.

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

Table 3. Logistic Regression Models Showing Longitudinal Associations Between 1974 Volunteering and Perceived Fair/Poor Physical Health in 1994, With Adjustments for 1974 Covariates (N = 2,630)

<table>
<thead>
<tr>
<th>Fair/poor perceived physical health, 1994</th>
<th>Other volunteering, OR (95% CI)</th>
<th>Environmental volunteering, OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, gender, education, and marital status</td>
<td>0.87 (0.70–1.09)</td>
<td>0.54 (0.30–0.98)*</td>
</tr>
<tr>
<td>Model 1 + social isolation, chronic condition, and functional impairment</td>
<td>0.87 (0.69–1.10)</td>
<td>0.55 (0.30–0.99)*</td>
</tr>
</tbody>
</table>

Notes: Adjusting for perceived physical health in 1974.

*p < .05.
Randomized controlled trials could also ascertain whether older individuals with diverse chronic conditions (e.g., osteoarthritis, diabetes, and heart disease) could potentially benefit from engaging in this particular type of volunteering activity. The rapidly growing numbers of older adults with persistent pain disorders (e.g., painful arthropathies and back pain) may be a particularly appropriate target population (American Geriatrics Society Panel on Persistent Pain in Older Persons, 2002) for intervention studies. Environmental volunteering could be tested as a method of addressing the social isolation that often occurs as a consequence of pain (Smith, Hopton, & Chambers, 1999), as well as helping to preserve physical functioning (Reid, Williams, & Gill, 2005) and mitigate pain levels via distraction and increased social support (Keefe, Somers, & Martire, 2008).

In conclusion, to our knowledge this population-based study offers the first epidemiological evidence for a positive association between environmental volunteering and health and well-being outcomes. After adjustment for a number of relevant characteristics, persons volunteering for the environment maintained higher levels of physical activity and reported better self-rated health and fewer depressive symptoms. If results from future research are similarly positive, both volunteer programs (e.g., the Retired Senior Volunteer Program) and environmental organizations may be encouraged to expand opportunities to promote environmental volunteering in late midlife and beyond. Given the urgent need for volunteers to ameliorate environmental problems, the prospect of health benefits could serve as an important motivator for individuals to participate in greater numbers.

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**References**


**Table 4. Logistic Regression Models Showing Longitudinal Associations Between 1974 Volunteering and Depression in 1994, With adjustments for 1974 Covariates (N = 2,630)**

<table>
<thead>
<tr>
<th>Depression, 1994</th>
<th>Other volunteering, OR (95% CI)</th>
<th>Environmental volunteering, OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, gender, education, and marital status</td>
<td>0.88 (0.67–1.14)</td>
<td>0.47 (0.22–1.00)*</td>
</tr>
<tr>
<td>Model 1 + social isolation, chronic condition, and functional impairment</td>
<td>0.88 (0.68–1.15)</td>
<td>0.49 (0.23–1.05)**</td>
</tr>
</tbody>
</table>

*Note: Adjusting for depression in 1974. *p < .05. **p < .10.