# Volunteerism and Mortality among the Community-dwelling Elderly

DOUG OMAN
*Buck Center for Research in Aging, Novato, California, USA*

CARL E. THORESEN
*Stanford University, California, USA*

KAY McMAHON
*Buck Center for Research in Aging, Novato, California, USA*

DOUG OMAN, PhD, conducted this study while working in the Epidemiology Unit of the Buck Center for Research in Aging. His research interests include the epidemiology of healthy aging, and the influence of psychosocial and spiritual factors upon health.

CARL E. THORESEN, PhD, is a Professor of Education, Psychology and Psychiatry/Behavioral Sciences at Stanford University. His interests include the role of psychosocial factors in cardiovascular disease (Coronary-prone behavior pattern, hostility, and spirituality), forgiveness and health, science of spirituality and health, and structured small group interventions in health promotion and disease prevention.

KAY MCMAHON, MSUH, is Human Resource Associate and Volunteer Program Manager at the Buck Center for Research in Aging. Her current interests include Volunteer Program Development and Sustaining Volunteer Commitment.

ACKNOWLEDGMENTS. The authors wish to thank Ed Schneider for a critical review of an earlier draft of this manuscript, three anonymous reviewers for their constructive criticisms, and Ruth Fleshman, Ginny Gildengorin, Dwayne Reed, and numerous volunteers of the Buck Center for Research in Aging for their support throughout this study.

COMPETING INTERESTS: None declared.

ADDRESS. Correspondence should be directed to:
DOUG OMAN, Buck Center for Research in Aging, PO Box 638, Novato, CA 94948–0638, USA. [email: dougoman@post.harvard.edu]; or CARL E. THORESEN, School of Education, Stanford University. [email: thoresen@stanford.edu]

*Journal of Health Psychology*
Copyright © 1999 SAGE Publications
London, Thousand Oaks and New Delhi,
[1359–1053(199907)4:3]
Vol 4(3) 301–316; 008557

## Abstract

Older residents ($N$ = 1972) in California were investigated prospectively for association of volunteering service to others and all-cause mortality. Potential confounding factors were studied: demographics, health status, physical functioning, health habits, social support, religious involvement, and emotional states. Possible interaction effects of volunteering with religious involvement and social support were also explored. Results showed that 31 percent ($n$ = 630) of respondents volunteered, about half ($n$=289) for more than one organization. High volunteers (≥2 organizations) had 63 percent lower mortality than non-volunteers (age- and sex-adjusted) with relative hazard (RH) = 0.37, confidence interval (CI) = 0.24, 0.58. Multivariate adjustment moderately reduced difference to 44 percent (RH = 0.56, CI = 0.35, 0.89), mostly due to physical functioning, health habits, and social support. Unexpectedly, volunteering was slightly more protective for those with high religious involvement and perceived social support. After multivariate adjustment, any level of volunteering reduced mortality by 60 percent among weekly attenders at religious services (RH = 0.40; CI = 0.21,0.74). Lower mortality rates for community service volunteers were only partly explained by health habits, physical functioning, religious attendance, and social support.

## Keywords

*aged, mortality, religion, social support, spirituality, volunteer work*

LIKE THE PLACEBO EFFECT, the volunteerism effect has long been a source of methodological concern for health and social science researchers (Rosenthal & Rosnow, 1975; White, Tursky, & Schwartz, 1985). Volunteer study subjects have been found to differ from nonvolunteers in manifold ways, including better physical health, more sociability, more altruism, and more interest in religion (Ganguli, Lytle, Reynolds, & Dodge, 1998; Rosenthal & Rosnow, 1975). If left unrecognized, the effects of volunteerism could result in serious biases and flawed research conclusions (Criqui, 1979). But researchers are now learning to perceive the opportunities hidden by these apparent obstacles; like the placebo effect (Benson & Stark, 1997; Cousins, 1979; Frank, 1975), the effect of volunteering, of people serving others without financial or quid pro quo compensation, is increasingly being studied not as an artifact or bias but as a possible health promotion and disease prevention variable.

Adolescents who volunteered to help community members were the focus of a recent nationwide randomized intervention; those who helped others had less teen pregnancy and school dropout (Allen, Philliber, Herrling, & Kuperminc, 1997). Other studies support a wider range of effects among adolescents or college students who volunteer (Moore & Allen, 1996; Waterman, 1997). Among adults, predictors and possible motives for volunteering have been extensively studied (e.g. Anderson & Moore, 1978), but fewer studies have examined specific outcomes for volunteers. Only recently has adult volunteering been linked to outcomes such as better self-perceived health (Young & Glasgow, 1998) and higher morale, self-esteem, and social integration (Midlarsky & Kahana, 1994c). One recent intervention study found that just providing older adults with information about opportunities for volunteering increased both volunteerism and their well-being (Midlarsky & Kahana, 1994b). Increasingly, sociologists are applying theories and methods from labor sociology to study volunteerism as ‘a productive activity . . . rather than a simple act of consumption or a leisure time pursuit with purely expressive goals’ (Wilson & Musick, 1997a, p. 695). That is, the act of helping others provides tangible benefits to those helped and to those volunteering to provide help. As Rowe and Kahn (1998) point out, the ‘dependency ratio’, a well-known comparison between the number of people in society in paid positions and those not so employed, ‘gives a false picture of what older people are already contributing and gives no hint of their potential for making greater contributions’ (p. 169).

Volunteerism, sometimes termed selfless service, also has long been associated with religious involvement (Smith, 1991; Wuthnow & Hodgkinson, 1990), an increasingly studied predictor of positive physical and mental health outcomes (e.g. Krause, 1997; Levin, 1994; Matthews et al., 1998; McCullough, Larson, Hoyt, Koenig, & Thoresen, 1998). For example, residents of religious kibbutzim in Israel (Kark et al., 1996b) have been found to engage in significantly more volunteer work than residents of secular kibbutzim that constitute ‘almost identical cohesive communal settlements’ (Kark, Carmel, Sinnreich, Goldberger, & Friedlander, 1996a, p. 345). The association between volunteering to help others and the world’s major religions is understandable since, as Bohannan pointed out, the world religions’ most basic moral tenet is ‘that unselfishness is the primary virtue, and that human selfishness lies at the root of the world’s ills’ (Bohannan, 1963, p. 336; also see Smith, 1991 on this point). For example, Christians are not only enjoined to love their neighbor (Mark 12:31) but that ‘inasmuch as ye [give food to the hungry and drink to the thirsty] unto one of the least of these my bretheren, ye have done it unto me’ (Matthew 25:40). Unselfish actions inspired by religion commonly aim to benefit specific individuals, the community as a whole (Sinha, 1984), or both. Some persons who are religiously involved actively desire to benefit all of humanity, since ‘because the world contains a spark of the divine . . . the world deserves our attention, care, and even devotion’ (Pargament, 1997, p. 256). Others who are spiritually focused but not active in any organized religion may view serving others as a key dimension of their spiritual life and health (Thoresen, 1998). Such persons see service to others as a way to transcend the egoistic if not narcissistic desires promoted by today’s consumer-bound culture (Bracke & Thoresen, 1996).

Of course, not all volunteerism is religiously or spiritually motivated. As with attending religious services and engaging in communal pray-

ers, although with less stigma, volunteerism may arise from more 'extrinsic' motives, such as the desire to socialize or to foster one's career (Allport, 1966). Clary et al. (1998), for example, found consistent evidence for six motivational functions of volunteerism, including gaining social support and personal enhancement as well as the 'intrinsic' value of serving others (see also Batson, 1991; Carlo, Eisenberg, Troyer, Switzer, & Speer, 1991). Yet in comparison with informal social 'helping', Wilson and Musick (1997a) found that more formalized volunteering to help others, perhaps because it is less obligatory, had even higher correlation with beliefs and affirmations (e.g. 'life is not worth living if one cannot contribute to the well-being of other people').

Possible causal connections between volunteerism and enhanced physical health outcomes are suggested by the large literature documenting health benefits associated with social support (House, Landis, & Umberson, 1988). By being of service to others, individuals may understandably develop stronger social networks that could buffer stress and reduce disease risk.

If the processes involved in serving others are comparable to those of social support, then increased levels of social support, such as perceived emotional support, might lead to reduced benefit from volunteerism after a threshold is reached (Krause, 1995). Alternatively, volunteerism could involve *specific* effects which make community volunteerism not 'equally substitutable' with other forms of social support. For example, being of service to others, without expecting 'payment in kind', rather than being chronically competitive and hostile toward others, may reduce chronic sympathetic hyperreactivity in ways not achieved by other forms of social support, such as receiving emotional or instrumental support (Bracke & Thoresen, 1996; Thoresen & Powell, 1992). The altruistic features of volunteerism might reduce destructive levels of self-absorption (McCullough & Worthington, 1994; Scherwitz, Graham, Grandits, Buehler, & Billings, 1986), focusing attention more effectively (Matthews & Wells, 1996), promoting more efficacious coping strategies (e.g. Pargament, 1997), greater life satisfaction and peace of mind, and positively impacting health through cognitive and emotional pathways (Kiecolt-Glaser & Glaser, 1995).

The health benefits that accrue from service to others are not limited to benefits that a volunteer consciously understands or envisions. For example, 'extrinsically' oriented religious persons may initially volunteer through desire for sociability, but still experience some benefits from lessened self-centered focus on 'me, my and mine' (Bracke & Thoresen, 1996). Over time, what Pargament (1997) calls 'transformational' religious coping could lead a person gradually to internalize core teachings of a religious or spiritual tradition. Such a person may then volunteer for primarily selfless motives, but still experience heightened social and emotional support by volunteering. The emphasis that many traditional religions as well as spiritual perspectives place upon a complementary relationship between prayer/meditation and selfless service (helping others) raises the possibility that volunteer work complements devotional practices in ways that enhance physical and mental health through more adaptive coping (Pargament, 1997). Perhaps Saint Francis in his widely used prayer well captured the practical implication of such a complementary relationship: 'For it is in giving that we receive' (quoted in Easwaran, 1991, p. 30).

The present study examined associations between level of volunteerism and all-cause mortality to see if volunteerism predicted lower mortality, independent of potentially confounding factors, such as health practices and social support. The possibility that volunteerism might be a substitute for or complementary to other social factors was also investigated by examining if the effect of volunteering to help others was altered when higher levels of other forms of social involvement were present.

## Methods

### Study population

Participants were a cohort of 2025 community-dwelling residents of Marin County, California, first examined in 1990–91. Respondents were 55 or older at baseline, 95 percent were non-Hispanic white, and 58 percent were female ($n = 1170$). Seventy-six percent of males and 51 percent of females had yearly income over \$15,000, much higher rates than many other

populations (Reed et al., 1995). Marin residents over the age of 75 years were oversampled, yielding approximately 500 respondents in each of the four age groups 55–64, 65–74, 75–84, and 85+ years, representing an overall response rate of 70 percent. See Reed et al. (1995) for an extensive description.

## Exposure

Previous studies have measured volunteerism by summing over the distinct *types* of formal volunteer involvement (Wilson & Musick, 1997a, 1997b; Young & Glasgow, 1998). Young and Glasgow found that self-rated health was independently predicted by a score from 0 to 5 for whether subjects had volunteered for committee work, educational tutoring, community fund-raising, environmental cleanup, or other activities. Such measures were unavailable to the present study but a similar dimension was tapped by eliciting the total number of volunteer organizations. Specifically, respondents reported whether or not they did 'any volunteer work at the present time' (see Wilson & Musick, 1997a, for precise definitions of volunteer work). Respondents were then asked, 'how many voluntary organizations are you involved with?' and were classified as practicing 'high volunteerism' if they were involved with two or more organizations and as practicing 'moderate volunteerism' if they were involved with one organization. Although it had less predictive power than number of organizations, the number of hours volunteered per week was measured and was dichotomized at its median (≥4 versus <4 hours).

## Outcome

Mortality experience was determined by screening local newspapers for obituary notices, or by attempted contact for reinterview at the time of the second examination. Identifying information obtained from baseline interviews was periodically submitted to the National Death Index for all members of the cohort, and all reported deaths were confirmed by obtaining death certificates. Mortality experience was examined from the first interview through 13 November 1995, the closing date of the second major examination of the cohort. Follow-up times averaged 4.9 years and ranged from 3.2 to 5.6 years.

## Covariables

Most variables were measured in a questionnaire administered at baseline (1990–1) which contained standardized instruments for assessing depression and memory as well as numerous requests for self-reports of demographic, social, and physical health and functioning variables. A physical performance examination measured respondents' capacities for tasks such as walking, holding balance in a tandem stand, and chairstands. Besides gender and age (rounded to years), we grouped the covariables into five categories corresponding roughly to different types of possible causal influence, all measured by self-report unless specified otherwise.

### Physical health and functioning status

Variables were included for the following chronic diseases as diagnosed by a physician (and reported by respondent): stroke; hypertension; diabetes; myocardial infarction (MI); other heart problems; and cancer. Also included as study variables were: tiring easily; limitations from arthritis, vision, hearing, balance, shortness of breath, or other health problems; recently having been hospitalized; ever having had surgery; self-perceived overall health; and concern about health. Observed physical performance measures included: able to complete a 100-foot walk; able to do five chairstands; balancing ability (Rossiter-Fornoff, Wolf, Wolfson, & Buchner, 1995); and able to do tandem stand (heel of one foot in front of other foot) for 10 seconds. Self-reported functioning measures included: does housework (none/light/heavy); leg problems; difficulty seeing steps; cataract; vision difficulty; recent fall; problems from falls; hearing problems; wears hearing aid; trouble sitting long periods; and urinary incontinence. A combined variable coded from 0 to 3 was used to indicate the number of prevalent conditions from among the four consistently predictive conditions: stroke; MI; cancer; and limitations from shortness of breath. A mobility score coded from 0 to 2 was used to indicate whether a respondent was observed able to walk 100 feet, do a tandem stand, or both.

*Health habits* Exercise (activities lasting at least 20 minutes and sometimes involving perspiration, per week), sleeping habits (number of hours), taking central nervous system medica-

tions, alcohol consumption (drinks per week), smoking, body mass index (BMI) calculated from reported height and weight, health insurance (yes/no), and personal physician (yes/no).

*Sociodemographic* Income, years of education, employment status (working/non-working), and ethnic group (white/non-white). Annual income was reported by 74 percent of the respondents (26 percent declined to state or did not know).

*Social functioning and support* Living with others, marital status, social activities (scored 0–8 for attending in past 6 months: concert, play or sporting event; movie; museum or art gallery; dance; cards or bingo; meeting of club or organization; auction or yard sale; other), socially connected (positive response to two of three questions: feels close to three or more friends; feels close to three or more relatives; sees three of these close friends or relatives monthly as in Kaplan, Strawbridge, Cohen, & Hungerford, 1996), organized group activities ('How often do you attend meetings of clubs or organizations such as school groups, unions, fraternal organizations, athletic groups or the like?'), frequency of attendance at religious services, frequency of other religious group activities, has confidant(e), satisfaction with marriage, giving social support (household tasks, transport, advice, money, discussion, tried to help family or friends 'feel good about themselves'), automobile driving status, lack of access to public transportation, health of spouse (better/same/worse than others of same age), and days out of house per week ('How many days, on average … did you spend anywhere outside the house (apartment) during the last month? This could be time spent in your yard').

*Psychological* Depression (CES-D continuous; $\geq 16$ describes depression), CES-D subscales for negative affect, somatic, positive affect, and interpersonal (Berkman et al., 1986; Radloff, 1977), fearfulness (single CES-D item no. 10), and the East Boston Memory Test (Gfeller & Horn, 1996), and self-rated health ('Compared to other men/women your age, would you say that your health is better/the same/worse than most?').

### Statistical analyses

Two-tailed Pearson chi-squared tests were used to assess differences in rates of volunteerism by age and sex and to assess differences in proportions of high volunteerism among volunteers. Death rates per 1000 person years were calculated for various subgroups by dividing the total number of deaths in the subgroup by the total number of years of follow-up for members of the subgroup. Potential explanatory variables, such as health status and social connection, were screened and retained for further analyses if significantly associated ($p < .10$) with both death and volunteerism (any/none) in age- and gender-adjusted logistic models. Patterns among predictor variables were assessed with Pearson correlations and Pearson partial correlations adjusted for age and gender.

When survival times are available, Cox proportional hazards modeling may provide more refined relative risk estimates for mortality than can be provided by logistic modeling (Annesi, Moreau, & Lellouch, 1989; Cox & Oakes, 1984). A series of six multivariate adjusted Cox proportional hazards models relating volunteerism (high/moderate/none) to mortality were sequentially constructed in the same manner as in previous analyses of this same cohort (Oman & Reed, 1998). The effect of volunteerism in the final model was age-adjusted to the US 1990 census by using direct adjustment (Fleiss, 1981) based upon separate terms for volunteerism (high versus none, moderate versus none) at each of the four age strata.

To explore the possibility that other forms of social support might substitute for volunteerism, dichotomous forms of eight variables related to social support were constructed (i.e. out of house seven days per week, any organized group activities, three or more social activities, living with others, socially connected, ever attends religious services, attends religious services weekly, and monthly religious group activities). We constructed interaction terms between each of these dichotomous variables and volunteerism (which was coded any/none to permit adequate statistical power). The significance of each interaction term (e.g. any volunteerism × socially connected) when added to the first and final proportional hazards models was determined, in both combined and gender-stratified models, with and without adjusting for high

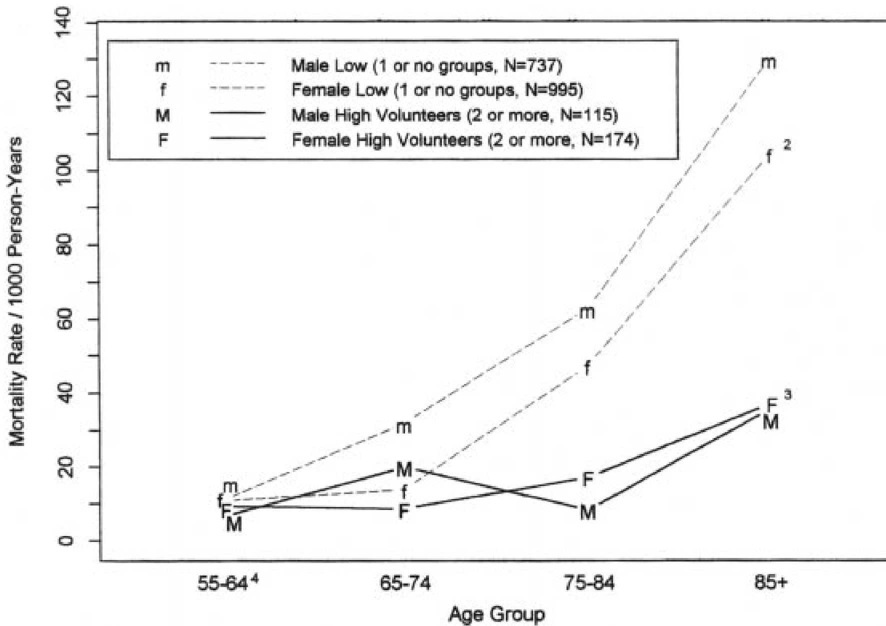
volunteerism. Based on these interaction terms, separate relative hazards and confidence intervals were computed for the effect of volunteerism at high and low levels of each social support variable (high versus low social support). Interaction between volunteerism and gender was explored similarly within all six models. All individual chronic conditions (together) and all six dimensions of giving social support (together) were inserted into the final model to examine sensitivity of results to these variables. Income, coded with a separate dummy variable for respondents who did not state income, was also inserted into the final model to examine sensitivity of the results to adjustment by income. Possible effects from end-stage illness were examined by fitting the final model with all individuals dying within 1 year of baseline removed from the cohort.

## Results

Of the 2025 respondents in the overall study, 2021 (99.8 percent) reported on volunteer work, with 31.2 percent ($n = 630$) of this subset practicing volunteerism. Volunteers assisted others in up to 20 organizations but 98.1 percent ($n = 618$) participated in five or fewer organizations. Of all respondents, 14.6 percent ($n = 124$) of men and 18.6 percent ($n = 217$) of women practiced moderate volunteerism (one organization) and 13.5 percent ($n = 115$) of men and 14.9 percent ($n = 174$) of women practiced high volunteerism (two or more organizations). The total percentage of volunteerism was 35 percent at age 55–64, increased to 41 percent at age 65–74 (increase, $p = .06$), decreased to 31 percent at age 75–84 (decrease, $p = .001$), to 18 percent at age 85 and over ($p = .001$), and was slightly higher for women than for men within each age group ($p = .01$ for age-combined sex difference). Moderate and high volunteerism were nearly equal in prevalence among the three younger age groups, but the proportion of high volunteerism declined to 26 percent among respondents over the age of 85 (decrease, $p = .001$).

### *Deaths*

Deaths during the follow-up period of 3.2 to 5.6 years were recorded for 203 (23.8 percent) of




[1] Rates per 1000 person years [2] Fewer female deaths (among respondents with 1 or no volunteer groups) compared to male deaths in age-adjusted Cox model, p=.0001

[3] Fewer deaths of high volunteers (2 or more groups) than low volunteers in age, gender-adjusted Cox model, p=.0001

4 Age-specific gender-adjusted relative hazards (and 95%CI): .74(.22, 2.48), .60(.28, 1.26), .22(.09, .54), .27(.10, .73), respectively.

*Fig. 1.* Mortality Rates by Gender, Age and High or Low Volunteering Groups[1]

*Table 1.* Reductions in mortality rates and relative hazards (RH) of mortality by level of volunteer work involvement

| *Level of volunteer work* | *N* | *Deaths/ 1000 py*[b] | *% reduction in mortality and RH (95% CI)*[c] *versus non-volunteers* | *% reduction in mortality and RH (95% CI)*[c] *versus moderate volunteers* |
|---|---|---|---|---|
| Number of volunteer organizations | | | | |
| High (≥2 organizations) | 289 | 12.8 | −63% 0.37 (0.23, 0.58) | −50% 0.50 (0.30, 0.83) |
| Moderate (1 organization) | 341 | 24.2 | −26% 0.74 (0.55, 0.98)[a] | |
| All volunteers | 630 | 19.3 | −42% 0.58 (0.45, 0.75) | |
| Non-volunteer | 1391 | 30.1 | | |
| Total | 2021 | 27.0 | | |
| Number of hours volunteered | | | | |
| High (≥4 hours) | 281 | 17.6 | −51% 0.49 (0.33, 0.72) | −29% 0.71 (0.45, 1.13) |
| Moderate (<4 hours) | 343 | 22.3 | −31% 0.69 (0.50, 0.94) | |

[a] Lower mortality for moderate volunteers relative to non-volunteers for women ($RH_{MvN}$ =0.54, CI= 0.36, 0.82) but not men ($RH_{MvN}$ =1.03, CI= 0.70, 1.53), interaction significant ($p$ = .03)
[b] Mortality rates per 1000 person-years of follow-up, adjusted by age and gender to 1990 US Census
[c] From Cox proportional hazards models adjusted for age and gender

the men and 247 (21.1 percent) of the women. Table 1 shows that the overall mortality rate was 27.0 deaths per 1000 person years of follow-up. The mortality rate of 30.1 among non-volunteers declined by 26 percent to 24.2 ($p$ = .04) among moderate volunteers (one organization), and by an *additional* 50 percent to 12.8 ($p$ = .008) among high volunteers (two or more organizations). For each gender separately, high volunteers had the lowest mortality and tests for trend were significant ($p < .02$). Female mortality rates were highest among non-volunteers and exhibited a near-linear trend, while male mortality rates suggested a threshold effect for high volunteers in contrast to moderate or non-volunteers. Volunteers who worked longer weekly hours (≥4) did not have significantly lower mortality than volunteers working fewer hours (RH = 0.71, CI = 0.45, 1.13, $p$ = .15), a result which was unchanged by varying the coding scheme for volunteer hours.

Age-specific mortality rates comparing high volunteerism (two or more organizations) with moderate or non-volunteerism for each gender are displayed in Figure 1. The figure suggests a trend toward increasing differences in mortality ratios among older age groups. Similar tendencies are apparent in age-specific relative hazards of 0.76, 0.58, 0.21, and 0.25 for high versus no volunteerism, and of 1.14, 0.86, 0.71, and 0.55 for moderate versus no volunteerism in the four age groups in Figure 1, lowest to highest. The former trend (high versus none) was marginally significant ($p$ = .07, analyses not shown), while the latter trend was non-significant.

## Possible explanatory variables

Univariate screening as described in the methods section resulted in keeping variables in all five categories, as follows. *Physical health and functioning status*: stroke, cancer, and MI; observed walking, chairstands, and balance; self-reported stair climbing, balance difficulty, vision difficulty, shortness of breath, number of chronic conditions, and mobility score. *Socio-demographic*: income, education. *Social functioning and support*: marital status, social activities, days out of house, religious attendance, religious group activities, gives social support (transport, advice), organized group activity, driving status. *Psychological*: depression, positive affect, self-rated health, poor memory, reads, watches television.

Table 2 shows that level of volunteering was not significantly associated with likelihood of having a chronic disease, one of the most important potential confounding variables. Volunteerism (coded 0/1/2) was associated with fewer strokes ($r = -.064$, $p = .004$) and less shortness of breath ($r = -.054$, $p = .02$) (both age- and gender-partialed, analyses not shown), but these were offset by positive associations of volunteerism with cancer among women ($r = .065$, $p = .03$) and with history of MI among

*Table 2.* Age-adjusted[a] percentages and/or means for selected characteristics at high (≥2 organizations), moderate (1 organization), and no volunteerism levels, by gender

| *Characteristic* | *Volunteering* | *Men* | | | *Women* | | |
|---|---|---|---|---|---|---|---|
| | | *None* | *1* | *2+* | *None* | *1* | *2+* |
| | *(n at risk)*→ | *(613)* | *(124)* | *(115)* | *(778)* | *(217)* | *(174)* |
| Physical health and functioning status | | | | | | | |
| Any chronic condition[d] (%) | | 34.5 | 31.9 | 31.3 | 36.2 | 34.1 | 35.0 |
| Mobility difficulties (any) (%) | | 15.9 | 11.9 | 10.9 | 26.6*** | 17.5 | 12.8 |
| Health habits | | | | | | | |
| Exercises (any) (%) | | 74.3 | 78.4 | 81.8 | 52.3* | 58.7 | 62.7 |
| Currently smokes (%) | | 15.7 | 14.5 | 8.4† | 15.7† | 9.1 | 7.5 |
| Alcohol (none) (%) | | 14.8 | 16.7 | 15.2 | 24.5* | 17.6 | 14.8 |
| Body Mass Index[b] | | 25.3 | 25.5 | 25.7 | 24.1 | 23.7 | 24.6† |
| Sociodemographic | | | | | | | |
| Employed, paid (%) | | 46.7* | 57.3 | 57.7 | 28.9 | 25.3 | 30.9 |
| Low education (no HS) (%) | | 8.2 | 6.4 | 4.0 | 12.3** | 6.3 | 3.2† |
| Income (reported >US$45,000)[c] (%) | | 49.2 | 54.5 | 59.5 | 24.0 | 22.9 | 30.8 |
| (unknown/not disclosed) (%) | | 16.8 | 12.9 | 8.1 | 26.0 | 27.8 | 26.9 |
| Social functioning and support | | | | | | | |
| Unmarried (%) | | 23.7 | 17.4 | 16.8 | 53.2 | 48.0 | 52.6 |
| Gives social support (mean)[b] | | 9.5 | 9.9 | 11.5** | 9.2*** | 10.3 | 11.5* |
| Out of house every day (%) | | 84.7 | 87.4 | 93.4† | 70.5* | 75.4 | 81.0 |
| Socially connected (%) | | 63.9† | 75.4 | 88.5** | 63.9** | 73.5 | 83.5* |
| Religious groups (monthly) (%) | | 6.7*** | 16.4 | 30.5* | 8.8*** | 30.6 | 35.3 |
| Religious attendance (any) (%) | | 49.0* | 63.5 | 67.5 | 48.1*** | 65.9 | 74.8* |
| (weekly) (%) | | 16.4** | 31.3 | 33.2 | 19.2*** | 38.4 | 35.0 |
| Psychological | | | | | | | |
| Depression (mean CES-D)[b] | | 5.0*** | 2.9 | 3.5 | 6.7* | 5.2 | 5.2 |
| Self-rated health (better) (%) | | 57.8* | 67.8 | 75.7 | 57.4** | 65.2 | 61.9 |

† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$ for prevalence differences versus moderate volunteerism (1 organization) in age-adjusted logistic regression models (e.g. a note in column 2 or 5 represents significant difference for moderate versus no volunteerism; in column 4 or 7, for high versus moderate volunteerism)
[a] Age-adjusted to 1990 US Census
[b] Used linear regression
[c] $p$ values calculated after dropping respondents with unknown income ($n = 528$)
[d] Includes shortness of breath and diagnosed MI, stroke and cancer.

men ($r = .049$, $p = .15$). Most other variables (e.g. exercise, socially connected) demonstrated trends toward better health and lower risk with more volunteerism. Across all three levels of volunteerism, tendencies appeared for higher levels of volunteerism to be associated with less mobility difficulty, more exercise, less smoking, more alcohol consumption (women), more years of education, more income (men), more marriage (men), more days out of the house, more often being religious, and better self-rated health (men). High volunteers differed from moderate volunteers most strikingly in having significantly lower smoking rates (men), greater weight (women), giving more social support (men), and higher income. High and moderate volunteers had no significant differences in rates of *weekly* religious attendance.

## Multivariate adjusted associations

Possible explanatory variables retained from bivariate and trivariate screening were entered sequentially into multivariate models as described in the statistical methods section. Moderate volunteerism was no longer statistically significant after controlling for health status. High volunteerism, however, remained significantly associated with lower mortality rates in the final

model, for which 98 percent ($n$ = 1973) of subjects had non-missing values on relevant variables. Table 3 presents the final multivariate model in which all variables are adjusted for each other. High volunteerism was associated with a 44 percent reduction in mortality compared to not volunteering ($RH_{HvN}$ = 0.56, $p$ = .01). Alcohol consumption (any) was marginally significant when added to the final model (RH = 0.81, CI = 0.66, 1.01, $p$ = .06) as was BMI (RH = 0.98, CI = 0.95, 1.00, $p$ = .08) but neither their inclusion or inclusion of all individual chronic diseases, nor inclusion of all six separate dimensions of giving social support, produced appreciable effects upon the coefficients or $p$ values of the other variables. Income significantly predicted mortality when coded as an indicator for high income (≥$45,000) but also did not appreciably affect the volunteerism coefficients, nor did removal of respondents dying within 1 year of baseline. Direct adjustment to the 1990 US Census showed a significant protective effect among the over 65 population for high versus no volunteerism ($RH_{HvN}$ = 0.58, CI = 0.34, 0.99) although the effect did not attain significance when the 55–64 year age group was included ($RH_{HvN}$ = 0.75, CI = 0.49, 1.14). When volunteer work was dichotomously coded (any/none) and entered into the sequence of multivariate models, it remained significantly protective after controlling for chronic conditions, health habits and sociodemographic variables ($RH_{VvN}$ = 0.72, CI = 0.56, 0.93), but was no longer significant ($RH_{VvN}$ = 0.81, CI = 0.62, 1.05) after inclusion of social functioning and support.

## Interactions

Although the age- and gender-adjusted interaction of volunteerism (any/none) with gender was not significant ($p$ = .15), inclusion of separate interaction terms for high and moderate volunteerism showed that the protective effect from moderate volunteerism was significantly lower ($p$ = .03) for men. However, the interaction of moderate volunteerism with gender dropped to non-significance after inclusion of health habits.

Volunteerism was significantly more protective at higher levels of several of the dichotomous variables related to social support, suggesting a possible 'complementary' relationship with these other constructs. In age- and gender-adjusted models, volunteerism (any/none) interacted significantly with social connection ($p$ = .04), weekly attendance at religious services ($p$ = .01), and religious group activity ($p$ = .006), and interacted non-significantly with living with others and ever attending religious services, being *more* protective when higher levels of these other forms of social support were present. In the full model, volunteerism was more protective at higher levels of social support for all social support variables except for 'social activities', with the interactions with weekly religious attendance and religious group activity remaining statistically significant (both $p$ = .01). Among respondents engaging in these religious activities, volunteer work was associated with reductions in mortality rates of over 60 percent (weekly attenders RH = 0.40, CI = 0.21, 0.74; groups RH = 0.37, CI = 0.18,0.73). Volunteerism was also significantly protective among those who were socially connected (RH = 0.69, CI = 0.50, 0.96), those with any religious attendance (RH = 0.66, CI = 0.45, 0.98), and those with *few* social activities (RH = 0.57, CI = 0.34, 0.94). These directions of interaction did not vary by gender. For both men and women in gender-stratified initial and final models, volunteerism was more protective at higher levels of the three religion variables and of social connections, and at lower levels of social activities.

## Intercorrelations

While many of the variables in the final model (Table 3) were significantly correlated, these correlations were small in absolute magnitude after partialling out age and gender. Direct correlations of 0.40 magnitude or larger were obtained for age and mobility score (−0.59), age and exercise frequency (−0.40), age and being married (−0.40), and between mobility score and days out of house (0.40). After partialling out age and gender, the only pair of predictors that correlated larger than 0.25 was self-rated health and number of chronic conditions (−0.28).

Correlations of the social support variables (days out of house, living with others, socially connected, religious groups, and religious attendance coded never/<weekly/weekly) were larger than 0.40 (direct) or 0.25 (age-, gender-

*Table 3.* Relative hazards (RH) and 95% confidence interval (CI) relating volunteer work and selected variables to mortality in final multivariate model (all variables adjusted for each other, $n = 1973$)

| *Predictor variable* | *Risk, % change* | *RH* | *(95% CI)* | *P value* |
|---|---|---|---|---|
| Volunteer work[a] | | | | |
| (≥2 organizations vs none) | −44 | 0.56 | (0.35, 0.89) | .01 |
| (1 organization vs none) | −6 | 0.94 | (0.70, 1.27) | .70 |
| Biological | | | | |
| Age (decades) | +111 | 2.11 | (1.82, 2.44) | .0001 |
| Gender (female) | −56 | 0.44 | (0.36, 0.55) | .0001 |
| Physical health and functioning status | | | | |
| Number of chronic conditions[b] | +27 | 1.27 | (1.13, 1.43) | .0001 |
| Physically mobile[c] | −39 | 0.61 | (0.45, 0.82) | .001 |
| Health habits | | | | |
| Exercise (4 times per week)[d] | −30 | 0.70 | (0.55, 0.89) | .004 |
| Non-smoker (currently) | −49 | 0.51 | (0.38, 0.68) | .0001 |
| Social functioning and support | | | | |
| Married | −26 | 0.74 | (0.58, 0.94) | .01 |
| Days not out of house per week | +6 | 1.06 | (1.01, 1.12) | .01 |
| Attends religious services[e] | −29 | 0.71 | (0.55, 0.92) | .01 |
| Psychological | | | | |
| Depression (CES-D score) | +2 | 1.02 | (1.01, 1.03) | .01 |
| Self-rated general health[f] | −30 | 0.70 | (0.51, 0.98) | .04 |

[a] When coded any/none, volunteerism was marginally protective (RH = 0.80, CI = 0.62, 1.04, $p = .096$)
[b] Includes shortness of breath and diagnosed MI, stroke and cancer
[c] Scored 0, 0.5 or 1.0 based on one or both of walking 100 feet and doing five chairstands
[d] Scored 0 = no exercise, 0.25 = 1/week, 1.00 = 4/week, 1.25 = 5/week, etc.
[e] Scored 0 = never, 0.5 = less than weekly, 1.0 = weekly or more
[f] Scored 0 = worse, 0.5 = same, 1.0 = better than others of same age

partialled) only between religious attendance and religious groups (0.54 direct, 0.53 partial) and between organized group activities and social activities (0.46 direct, 0.45 partial). Correlations between these social support variables and *giving* social support (total and each of six specific subtypes) were all less than 0.40 (direct) or 0.25 (age-, gender-partialled), as were correlations between giving social support and volunteerism.

## Discussion

This study demonstrated that volunteering to help others in two or more organizations ('high' volunteering) offered a persistent protective effect against mortality in an elderly population. The protective effects from such volunteering found in this study are an important extension of earlier results in other populations which linked volunteerism with improved self-rated health and life satisfaction. The 44 percent reduction in mortality associated with high volunteerism in this study was larger than the reductions associated with physical mobility (39 percent), exercising four times weekly (30 percent), and weekly attendance at religious services (29 percent), and was only slightly smaller than the reduction associated with not smoking (49 percent).

The present study tended to contradict the hypothesis that the protective effect from volunteering to help others would be attenuated among those with higher levels of social support. After multivariate adjustment, volunteerism was even more protective among individuals with *higher* levels of religious involvement or close social relationships (social connection).

These results suggest that volunteering service is complementary to attendance at religious services in protecting against mortality. However, the present study does not explain why this

complementary relationship exists or whether it is causal. Patterns of religious and volunteer involvement evolve over decades and are features of 'lifestyles' (Coreil, Levin, & Jaco, 1985) that may influence physical and mental health through variables not assessed in this study. Clues to explain the present results could come from future studies that include variables likely to lie on causal pathways between volunteering to help others, spirituality, religion, and health.

### Potential mechanisms

The independence of effects of high volunteerism from the adjustment variables used is consistent with the hypothesis that volunteerism may reduce mortality in part through psychosocial pathways. As Riessman (1965) observed long ago in enunciating his 'helper-therapy principle', those who help others may benefit in many ways, more so than those being helped. Midlarsky (1991) enumerates five analytically distinguishable reasons why helping others can operate as a form of coping benefiting the helper, 'even—or perhaps especially when the help is given by an individual who is experiencing stress' (p. 240). Those who help others may experience enhanced social integration (Berkman & Syme, 1979), distraction from their own troubles (Matthews & Wells, 1996; Scherwitz et al., 1986), enhanced meaningfulness (Pargament, 1997), increased perceived self-efficacy and competence (Bandura, 1997), improved mood tone, or a more physically active lifestyle. Primarily altruistic motivations to volunteer need not impede (and could actively facilitate) the transmission of these benefits. Such mechanisms are consistent with observations that adult helping behavior is associated with improved morale, self-esteem, positive affect, and well-being (Midlarsky & Kahana, 1994a), which may in turn influence the body independently of social support through psychoneuroimmunologic or psychoendocrinologic pathways (Kiecolt-Glaser & Glaser, 1995). For some elders, the element of challenge in volunteer work may strengthen the endocrine and immune systems by providing 'stress inoculation' (e.g. Dienstbier, 1989). Controlled experiments provide an important further source of information regarding causal influences from volunteerism. In a national randomized intervention study of adolescents, volunteerism was found to be helpful in resolving multiple problem behaviors that 'share a common underlying causal agent or, alternatively, [that] share a common protective factor' (Allen et al., 1997, p. 738).

The present study found that volunteerism was associated with greater benefit for specific subgroups including high volunteers (two or more organizations), religious individuals, socially connected individuals, and perhaps the oldest old. The difference in effect between subgroups is consistent with recent work, noted earlier, showing that those who volunteer service may have several distinct motivational styles (Clary et al., 1998), which may in turn activate different sets of causal pathways relating to physical health. The gender differences found in reduced mortality associated with moderate volunteerism (one organization) are consistent with Wilson and Musick's (1997b) finding that different motivational patterns were associated with different occupational backgrounds. Religious involvement could also contribute to less mortality among volunteers by helping those who volunteer to attain various skills and find more satisfying or meaningful volunteer opportunities.

The experimental work of Allen et al. (1997) cited earlier noted that the most successful program sites for adolescent volunteers offered a second intervention component consisting of classroom activities which helped the students to 'cope with important [psychosocial] developmental tasks' (pp. 731–2). While Allen et al. offered no theory to explain the observed complementary relationship between the two components of his intervention, the analogy with the present study is striking. Both studies suggest a complementary relationship between volunteering to help others and activities that enhance the helper's skills for coping with urgent life tasks. Aging gives older adults 'an accumulation of burdens at the same time that certain internal and external resources are diminished' (McFadden, 1996, p. 167), making the developmental tasks of old age often quite formidable. Even as their faculties decline, older adults may need to expand their repertoire of coping skills. For some individuals, close personal relationships could enhance coping by allowing the individual to share problems and form more appropriate and realistic appraisals. For others, religious involvement or spiritual activities may enhance

adaptive coping. Pargament (1997) writes that religion's distinctive contribution to the coping process is to 'complement nonreligious coping, with its emphasis on personal control, by offering responses to the limits of personal powers' (p. 310). The possibility that religious involvement and close personal relationships may complement volunteering in contributing to effective coping should be subjected to further empirical and theoretical study.

### Independence of effects

This study appears to be the first either to investigate or confirm that formal volunteerism is an independent predictor of a biological health outcome in the elderly. The present results are consistent with Young and Glasgow (1998) who found that volunteerism was independently associated among both men and women with higher self-rated health. Young distinguishes between two kinds of formal voluntary participation, 'instrumental' social participation—what the present study calls volunteerism or selfless service—and 'expressive' social participation in membership-oriented sports or cultural clubs. Earlier, House, Robbins and Metzner (1982) found that a pooled measure involving both club memberships and community volunteerism (i.e. expressive and instrumental) predicted lower mortality after 12 years, a result that was (it should be noted) widely misreported in the popular media as having demonstrated protection from volunteer work per se (Growald & Luks, 1988).

### Characteristics of volunteers

The characteristics of high volunteers (two or more organizations) and moderate volunteers (one organization) found in the present study are generally consistent with previous studies. A recent representative national survey reported that higher proportions of women than men were volunteers, and found steady gradual declines in volunteerism rates over the age of 55 (Hodgkinson & Weitzman, 1996). However, when older adults were stratified by whether or not they had been *asked* to volunteer, the highest rates of older volunteerism were in the 65–74 age group, consistent with the present study. Whether or not older adults have been asked to volunteer is thus a potential 'suppresser variable' (Rosenberg, 1973) which if uncontrolled could mask surges of interest in volunteering after the age of 65 years.

Previous studies have also found volunteers to have less physical disability (Okun, 1993; Wilson & Musick, 1997a), better self-rated health (Young & Glasgow, 1998), more education (Harootyan & Vorek, 1994; Hodgkinson & Weitzman, 1996; Okun, 1993), higher income (Harootyan & Vorek, 1994; Midlarsky & Kahana, 1994c; Wilson & Musick, 1997a), more likely to be married (Harootyan & Vorek, 1994; Hodgkinson & Weitzman, 1996), and to be involved in more social activities (Wilson & Musick, 1997a). The lower rates of depression found by this study among volunteers are consistent with higher life satisfaction experienced by volunteers (Midlarsky & Kahana, 1994c). Positive associations of formal volunteering with religious attendance and with giving informal help and social support to others have both been extensively documented elsewhere (e.g. Hodgkinson & Weitzman, 1996; Wilson & Musick, 1997a).

Present results regarding lower rates of shortness of breath and stroke among volunteers are consistent with Wilson's finding of a negative association between formal volunteerism and a measure based on the previous year's experience of 10 chronic conditions (Wilson & Musick, 1997a). The weak positive associations between volunteerism and cancer (women) and myocardial infarction (men) in the present study have not been observed before. They may reflect changes in personal priorities due to the diagnosis of these life-threatening diseases, or the availability of support groups for persons with these diseases. We found no previous studies of volunteerism and health habits with which to compare the present finding of salutary associations between volunteer work and exercise, smoking, alcohol consumption (Langer, Criqui, & Reed, 1992), and BMI (Losonczy et al., 1995).

### Caveats

The findings of this study are much more tentative with regard to younger age groups due to the marginal trend toward less protection from volunteering in younger age strata, and the non-significance of the census-adjusted effect when the youngest respondents under the age of 65 were included. Another drawback of the

present study was the unavailability of measures of several constructs which might have served to characterize further which subgroups of volunteers are protected, thus clarifying possible underlying causal pathways. Also of interest is whether or not rates of mortality and morbidity are influenced by the specific type of volunteer activity, e.g. helping single mothers complete their schooling versus volunteering at the local library. Desirable measures for future studies include motivation to volunteer (Clary et al., 1998), prior history of volunteering (Okun, 1993), occupational background and skills (Wilson & Musick, 1997b), coping styles (Pargament, 1997), and multiple dimensions of religion and spirituality beyond religious membership or frequency of attendance at religious services (Miller & Thoresen, in press). A fuller characterization of mood and emotional states, including depression, anger, and hostility (e.g. Kawachi, Sparrow, Spiro, Vokonas, & Weiss, 1996; Miller, Smith, Turner, Guijarro, & Hallet, 1996), would be especially useful since sole reliance on questionnaire data often overstates positive emotions (false positive problem) in assessing depression and other emotional problems (Shedler, Mayman, & Manis, 1993). Information on coping styles used by spouses, friends, and relatives with whom participants are personally close or in frequent contact would also be very helpful.

## Implications

The present results may have widespread public policy implications, especially if these results are replicated. Secondary analyses of existing data sets that included measures of voluntary involvement could assess if the present results are replicable. If further research supports a predictive relationship between volunteerism and health, then from a public health perspective, the promotion of community volunteerism would seem appropriate. Efforts to instill an ethic of helping others in need among the young should be continued since early age volunteerism strongly predicts current volunteerism (Clary & Miller, 1986; Hodgkinson & Weitzman, 1996). This relationship may occur because the practice of volunteering to help others supports a moral or spiritual orientation toward giving to others (Sokolowski, 1996). Some communities need to provide more volunteer opportunities and to improve available transportation to reach them. Primary health care delivery can be expanded with the help of volunteers and volunteer-led patient-support groups (Sullivan & Sullivan, 1997). Furthermore, health researchers can document the benefits of volunteerism, both on those helped and the helpers as well as employ volunteers as research colleagues, a strategy used by Lorig and Holman (1993) and others (McMahon, McEnhill, & Youngquist, 1996; Prager, 1995). The use by Lorig and Holman (1993) of arthritis volunteers to lead small psychosocial training groups of arthritis patients clearly documents the extraordinary economic cost-effectiveness of such helping. Public policy advocacy also has its place (Midlarsky & Kahana, 1994a). Elderly persons volunteering to help others can in turn benefit other at-risk groups. For example, even disabled and housebound elders can make important contributions to the well-being of inner-city children (Szendre & Jose, 1996).

The present results may have international public health implications as well. A cross-national study of health assessments by the elderly suggests that the older person's perceived contribution to society is more strongly related to health in industrialized societies (Su & Ferraro, 1997). Consequently, as global modernization proceeds (Yach & Bettcher, 1998), an increasing worldwide population of older men and women may emerge whose continued formal voluntary contribution to society could benefit both their own health as well as that of society (Curtis, Grabb, & Baer, 1992).

In conclusion, this study found that volunteering to help others in two or more organizations predicted lower mortality in a community-dwelling elderly population, extending previous findings of an association between volunteerism and self-rated health. Even after controlling for five classes of potential confounding and intervening variables, the present study was unable to identify other explanations for the protection against mortality associated with higher volunteerism. Empirical evidence was presented that religious involvement and close personal relationships may serve to complement volunteerism in preventing mortality; it was hypothesized that different ways of coping, including religious and spiritually focused coping, may medi-

ate these relationships. If the present results are sustained, then volunteerism has the potential to add not only quality but also length to the lives of older individuals worldwide.

## References


Allen, J. P., Philliber, S., Herrling, S., & Kuperminc, G. P. (1997). Preventing teen pregnancy and academic failure: Experimental evaluation of a developmentally based approach. *Child Development*, *68*, 729–742.

Allport, G. W. (1966). The religious context of prejudice. *Journal for the Scientific Study of Religion*, *5*, 448–451.

Anderson, J. C., & Moore, L. (1978). The motivation to volunteer. *Journal of Voluntary Action Research*, *7*, 120–125.

Annesi, I., Moreau, T., & Lellouch, J. (1989). Efficiency of the logistic regression and Cox proportional hazards models in longitudinal studies. *Statistics in Medicine*, *8*, 1515–1521.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman.

Batson, C. D. (1991). *The altruism question: Toward a social-psychological answer*. Hillsdale, NJ: Erlbaum.

Benson, H., & Stark, M. (1997). *Timeless healing: The power and biology of belief*. New York: Fireside.

Berkman, L. F., Berkman, C. S., Kasl, S., Freeman, D. H., Jr., Leo, L., Ostfeld, A. M., Cornoni-Huntley, J., & Brody, J. A. (1986). Depressive symptoms in relation to physical health and functioning in the elderly. *American Journal of Epidemiology*, *124*, 372–388.

Berkman, L. F., & Syme, S. L. (1979). Social networks, host resistance, and mortality: a nine-year follow-up study of Alameda County residents. *American Journal of Epidemiology*, *109*, 186–204.

Bohannan, P. (1963). *Social anthropology*. New York: Holt, Rinehart & Winston.

Bracke, P. E., & Thoresen, C. E. (1996). Reducing type A behavior patterns: A structured-group approach. In R. Allan & S. S. Scheidt (Eds.), *Heart & mind: The practice of cardiac psychology* (pp. 255–290). Washington, DC: American Psychological Association.

Carlo, G., Eisenberg, N., Troyer, D., Switzer, G., & Speer, A. L. (1991). The altruistic personality: In what contexts is it apparent? *Journal of Personality and Social Psychology*, *61*, 450–458.

Clary, E. G., & Miller, J. (1986). Socialization and situational influences on sustained altruism. *Child Development*, *57*, 1358–1369.

Clary, E. G., Snyder, M., Ridge, R. D., Copeland, J., Stukas, A. A., Haugen, J., & Miene, P. (1998). Understanding and assessing the motivations of volunteers: A functional approach. *Journal of Personality and Social Psychology*, *74*, 1516–1530.

Coreil, J., Levin, J. S., & Jaco, E. G. (1985). Life style—An emergent concept in the sociomedical sciences. *Culture, Medicine and Psychiatry*, *9*, 423–437.

Cousins, N. (1979). *Anatomy of an illness as perceived by the patient*. New York: W. W. Norton.

Cox, D. R., & Oakes, D. (1984). *Analysis of survival data*. New York: Chapman & Hall.

Criqui, M. H. (1979). Response bias and risk ratios in epidemiologic studies. *American Journal of Epidemiology*, *109*, 394–399.

Curtis, J. E., Grabb, E. G., & Baer, D. E. (1992). Voluntary association membership in fifteen countries: A comparative analysis. *American Sociological Review*, *57*, 139–152.

Dienstbier, R. A. (1989). Arousal and physiological toughness: Implications for mental and physical health. *Psychological Review*, *96*, 84–100.

Easwaran, E. (1991). *Meditation: A simple eight-point program for translating spiritual ideals into daily life* (2nd ed.). Tomales, CA: Nilgiri.

Fleiss, J. L. (1981). *Statistical methods for rates and proportions* (2nd ed.). New York: Wiley.

Frank, J. (1975). The faith that heals. *Johns Hopkins Medical Journal*, *137*, 127–131.

Ganguli, M., Lytle, M. E., Reynolds, M. D., & Dodge, H. H. (1998). Random versus volunteer selection for a community-based study. *Journal of Gerontology*, *53A*, M39–M46.

Gfeller, J. D., & Horn, G. J. (1996). The east Boston memory test: A clinical screening measure for memory impairment in the elderly. *Journal of Clinical Psychology*, *52*, 191–196.

Growald, E. R., & Luks, A. (1988). Beyond self. *American Health*, 51–53.

Harootyan, R. A., & Vorek, R. E. (1994). Volunteering, helping, and gift giving in families and communities. In R. A. H. Vern L. Bengtson (Ed.), *Intergenerational linkages: Hidden connections in American society* (pp. 77–111). New York: Springer.

Hodgkinson, V. A., & Weitzman, M. S. (1996). *Giving and volunteering in the United States, 1996*. Washington, DC: Independent Sector.

House, J. S., Landis, K. R., & Umberson, D. (1988). Social relationships and health. *Science*, *241*, 540–545.

House, J. S., Robbins, C., & Metzner, H. L. (1982). The association of social relationships and activities with mortality: prospective evidence from the Tecumseh Community Health Study. *American Journal of Epidemiology*, *116*, 123–140.

Kaplan, G., Strawbridge, W., Cohen, R., & Hungerford, L. (1996). Natural history of leisure-time physical activity and its correlates: Associations with mortality from all causes and cardiovascular disease over 28 years. *American Journal of Epidemiology*, *144*, 793–797.

Kark, J. D., Carmel, S., Sinnreich, R., Goldberger, N., & Friedlander, Y. (1996a) Psychosocial factors among members of religious and secular kibbutzim. *Israel Journal of Medical Sciences*, *3224*, 185–194.

Kark, J. D., Shemi, G., Friedlander, Y., Martin, O., Manor, O., & Blondheim, S. H. (1996b). Does religious observance promote health? Mortality in secular vs religious kibbutzim in Israel. *American Journal of Public Health*, *86*, 341–346.

Kawachi, I., Sparrow, D., Spiro, A. 3rd, Vokonas, P., & Weiss, S. T. (1996). A prospective study of anger and coronary heart disease. The normative aging study. *Circulation*, *94*, 2090–2095.

Kiecolt-Glaser, J. K., & Glaser, R. (1995). Psychoneuroimmunology and health consequences: Data and shared mechanisms. *Psychosomatic Medicine*, *57*, 269–274.

Krause, N. (1995). Assessing stress-buffering effects: A cautionary note. *Psychology and Aging*, *10*, 518–526.

Krause, N. (1997). Religion, aging, and health: Current status and future prospects. *Journal of Gerontology: Social Sciences*, *52*, S291–S293.

Langer, R. D., Criqui, M. H., & Reed, D. M. (1992). Lipoproteins and blood pressure as biological pathways for effect of moderate alcohol consumption on coronary heart disease. *Circulation*, *85*, 910–915.

Levin, J. S. (1994). Religion and health: Is there an association, is it valid, and is it causal? *Social Science and Medicine*, *38*, 1475–1482.

Lorig, K., & Holman, H. (1993). Arthritis self-management studies: A twelve-year review. *Health Education Quarterly*, *20*, 17–28.

Losonczy, K. G., Harris, T. B., Cornoni-Huntley, J., Simonsick, E. M., Wallace, R. B., Cook, N. R., Ostfeld, A. M., & Blazer, D. G. (1995). Does weight loss from middle age to old age explain the inverse weight mortality relation in old age? *American Journal of Epidemiology*, *141*, 312–321.

Matthews, D. A., McCullough, M. E., Larson, D. B., Koenig, H. G., Swyers, J. P., & Milano, M. G. (1998). Religious commitment and health status: A review of the research and implications for family medicine. *Archives of Family Medicine*, *7*, 118–124.

Matthews, G., & Wells, A. (1996). Attentional processes, dysfunctional coping, and clinical intervention. In N. S. E. Moshe Zeidner (Ed.), *Handbook of coping: Theory, research, applications* (pp. 573–601). New York: Wiley.

McCullough, M. E., Larson, D. B., Hoyt, W. T., Koenig, H. G., & Thoresen, C. (1998). A meta-analytic review of research on religious involvement and mortality. (Unpublished manuscript.)

McCullough, M. E., & Worthington, E. L. (1994). Encouraging clients to forgive people who have hurt them: Review, critique, and research prospectus. *Journal of Psychology & Theology*, *22*, 3–20.

McFadden, S. H. (1996). Religion, spirituality, and aging. In James E. Birren, Klaus Warner Schaie, Ronald P. Abeles, Margaret Gatz, & Timothy A. Salthouse (Eds.) *Handbook of the psychology of aging* (4th ed.) (pp. 162–177). San Diego, CA: Academic Press.

McMahon, K., McEnhill, M., & Youngquist, R. (1996). Utilizing volunteer research assistants in epidemiologic studies. *Journal of Aging and Social Policy*, *8*, 39–58.

Midlarsky, E. (1991). Helping as coping. In S. C. Margaret (Ed.), *Prosocial behavior. Review of personality and social psychology* (Vol. 12, pp. 238–264). Newbury Park, CA: Sage.

Midlarsky, E., & Kahana, E. (1994a). *Altruism in later life* (Vol. 196). Thousand Oaks, CA: Sage.

Midlarsky, E., & Kahana, E. (1994b). Helping and volunteering in late life: The results of an experimental intervention. In *Altruism in Later Life* (pp. 189–220). Thousand Oaks, CA: Sage.

Midlarsky, E., & Kahana, E. (1994c). Predictors of helping and well-being in older adults: A cross-sectional survey research project. In *Altruism in Later Life* (pp. 126–188). Thousand Oaks, CA: Sage.

Miller, T. Q., Smith, T. W., Turner, C. W., Guijarro, M. L., & Hallet, A. J. (1996). A meta-analytic review of research on hostility and physical health. *Psychological Bulletin*, *119*, 322–348.

Miller, W. E., & Thoresen, C. E. (in press). Spirituality and health. In W. E. Miller (Ed.) *Integrating spirituality into treatment: Resources for practitioners*. Washington, DC: American Psychological Association.

Moore, C. W., & Allen, J. P. (1996). The effects of volunteering on the young volunteer. *Journal of Primary Prevention*, *17*, 231–258.

Okun, M. A. (1993). Predictors of volunteer status in a retirement community. *International Journal of Aging and Human Development*, *36*, 57–74.

Oman, D., & Reed, D. (1998). Religion and mortality among the community-dwelling elderly. *American Journal of Public Health*, *88*, 1469–1475.

Pargament, K. I. (1997). *The psychology of religion and coping: Theory, research, practice*. New York: Guilford.

Prager, E. (1995). The older volunteer as research

colleague: Toward ‘generative participation’ for older adults. *Educational Gerontology*, *21*, 209–218.

Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, *1*, 385–401.

Reed, D., Satariano, W. A., Gildengorin, G., McMahon, K., Fleshman, R., & Schneider, E. (1995). Health and functioning among the elderly of Marin County, California: A glimpse of the future. *Journal of Gerontology: Biological Sciences*, *50*, M61–M69.

Riessman, F. (1965). The ‘helper’ therapy principle. *Social Work*, *10*, 27–32.

Rosenberg, M. (1973). The logical status of suppressor variables. *Public Opinion Quarterly*, *37*, 359–372.

Rosenthal, R., & Rosnow, R. L. (1975). *The volunteer subject*. New York: Wiley.

Rossiter-Fornoff, J. E., Wolf, S. L., Wolfson, L. I., & Buchner, D. M. (1995). A cross-sectional validation study of the FICSIT common data base static balance measures. Frailty and injuries: Cooperative studies of intervention techniques. *Journal of Gerontology: Biological Sciences*, *50*, M291–M297.

Rowe, J. W., & Kahn, R. L. (1998). *Successful aging*. New York: Pantheon.

Scherwitz, L., Graham, L. E. D., Grandits, G., Buehler, J., & Billings, J. (1986). Self-involvement and coronary heart disease incidence in the multiple risk factor intervention trial. *Psychosomatic Medicine*, *48*, 187–199.

Shedler, J., Mayman, M., & Manis, M. (1993). The illusion of mental health. *American Psychologist*, *48*, 1117–1131.

Sinha, D. (1984). Community as target: A new perspective to research on prosocial behavior. In E. Staub, D. Bar-Tal, J. Karylowski, & J. Reykowski (Eds.), *Development and maintenance of prosocial behavior: international perspectives on positive morality* (pp. 445–455). New York: Plenum.

Smith, H. (1991). *The world’s religions: Our great wisdom traditions*. San Francisco: Harper.

Sokolowski, S. W. (1996). Show me the way to the next worthy deed: Towards a microstructural theory of volunteering and giving. *Voluntas*, *7*, 259–278.

Su, Y. P., & Ferraro, K. F. (1997). Social relations and health assessments among older people: Do the effects of integration and social contributions vary cross-culturally? *Journal of Gerontology: Social Sciences*, *52*, S27–S36.

Sullivan, G. B., & Sullivan, M. J. (1997). Promoting wellness in cardiac rehabilitation: Exploring the role of altruism. *Journal of Cardiovascular Nursing*, *11*, 43–52.

Szendre, E. N., & Jose, P. E. (1996). Telephone support by elderly volunteers to inner-city children. *Journal of Community Psychology*, *24*, 87–96.

Thoresen, C. E. (1998). Spirituality, health and science: The coming revival? In S. Roth-Roemer, S. R. Kurpius, & C. Carmin (Eds.), *The emerging role of counseling psychology in health care* (pp. 409–431). New York: Norton.

Thoresen, C. E., & Powell, L. H. (1992). Type A behavior pattern: New perspectives on theory, assessment, and intervention. *Journal of Consulting and Clinical Psychology*, *60*, 595–604.

Waterman, A. S. (1997). *Service-learning: Applications from the research*. Mahwah, NJ: Erlbaum.

White, L., Tursky, B., & Schwartz, G. E. (Eds.). (1985). *Placebo: Theory, research, and mechanisms*. New York: Guilford.

Wilson, J., & Musick, M. (1997a). Who cares? Toward an integrated theory of volunteer work. *American Sociological Review*, *62*, 694–713.

Wilson, J., & Musick, M. A. (1997b). Work and volunteering: The long arm of the job. *Social Forces*, *76*, 251–272.

Wuthnow, R., & Hodgkinson, V. A. (Eds.). (1990). *Faith and philanthropy in America: Exploring the role of religion in America’s voluntary sector*. San Francisco: Jossey-Bass.

Yach, D., & Bettcher, D. (1998). The globalization of public health, I: Threats and opportunities. *American Journal of Public Health*, *88*, 735–738; discussion, 742–744.

Young, F. W., & Glasgow, N. (1998). Voluntary social participation & health. *Research on Aging*, *20*, 339–362.