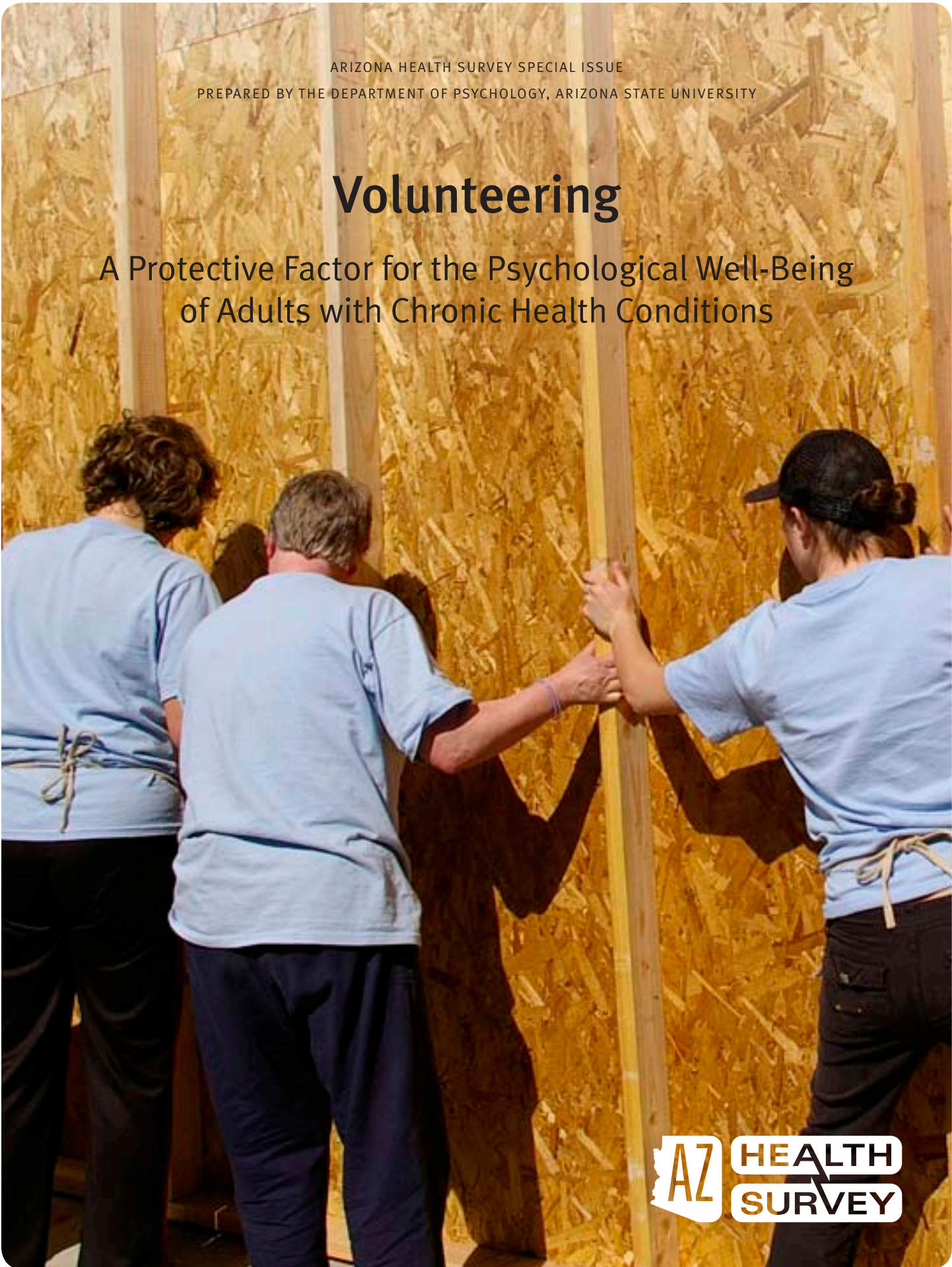


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Volunteering

A Protective Factor for the Psychological Well-Being
of Adults with Chronic Health Conditions



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Summary

Chronic health conditions can erode the psychological well-being of adults. At the same time, volunteering can enhance the psychological well-being of adults. The present study examined whether the psychological well-being of adults with chronic health conditions is protected by doing volunteer work for an organization. In addition, we investigated whether the beneficial impact of volunteering on the psychological well-being of adults with chronic health conditions is the same across age, gender, and ethnicity. We carried out a secondary data analysis on 3,673 adults who completed the Arizona Health Survey (AHS).

Multiple regression analyses indicated that number of chronic health conditions (a count of the lifetime diagnoses by a physician of six conditions – asthma, diabetes, high blood pressure, heart disease, arthritis, gout, lupus, or fibromyalgia, and a gastrointestinal, stomach, or digestive disorder – and volunteering during the past year (yes or no) exerted statistically significant ($p < .05$) *joint* effects on resilience, well-being, and psychological distress measures. Our results indicate that the association between chronic health conditions and psychological well-being is weaker among adults who volunteer relative to those who do not. Put another way, by engaging in volunteer work, the adverse effect of chronic health conditions on well-being appears to be lessened. Additional analyses revealed that the beneficial effect of volunteering in terms of reducing the relation between number of chronic health conditions and (a) well-being and (b) psychological distress was observed only among women. We proposed that the sex differences observed in the efficacy of volunteering as a buffer may reflect differences between men and women in the (a) closeness of relationships formed while doing volunteer work and (b) the positive affect associated with doing volunteer work.

One of the most surprising statistics generated in the present study was that *slightly over half* of the respondents indicated that they had volunteered during the past year. According to data provided by the Corporation for National & Community Service (2007) the rate of volunteering in the state of Arizona was less than 25%. This large discrepancy may be due to differences in the definitions of what constitutes organizational volunteering provided in the AHS and by the Corporation for National & Community Service.

Several limitations of the present study should be noted. First, causal inferences regarding the relations between chronic health conditions, volunteering, and psychological well-being are unwarranted from the cross-sectional, non-experimental design that was employed in the present study. Second, respondents who were excluded due to missing data differed on numerous study variables from respondents without missing data, indicating that our findings may not generalize to the entire population of adults in the state of Arizona. Third, we accounted for modest amounts of the variance in our measures of psychological well-being. The effect sizes associated with the joint effects of number of chronic health conditions and volunteering, in particular, were very small. Fourth, although the AHS question that assessed volunteering clearly made reference to service to organizations, it is possible that providing respondents with examples of what does *not* constitute organizational volunteering would have been useful with respect to differentiating between informal and organizational forms of volunteer work. Finally, because the AHS contained only one yes-no question about volunteering, we were unable to conduct more fine-grained analyses of the buffering effect of volunteering on the relation between chronic health conditions and psychological well-being.

We have shown that adults with health problems benefit more from volunteering in terms of their psychological well-being than those without health problems (particularly women). However, individuals with health problems are less likely to volunteer (Okun, 1993). Thus, somewhat paradoxically, those who may benefit the most from volunteering are least likely to do so. According to a recent estimate of the rate of volunteering by state, Arizona ranks 44th (23.9% rate of volunteering), with Nevada having the lowest rate of volunteering (17.7%) and Utah having the highest rate of volunteering (43.9%) (Corporation for National & Community Service, 2007). Our findings suggest that volunteering can enhance the well-being and reduce the psychological distress of women with chronic conditions and that volunteering can foster the resilience of women and men alike with chronic conditions.

Field research using an experimental design with a wait-list control group has demonstrated that Experience Corps volunteering (i.e., tutoring children in urban schools) can substantially improve the physical activity and strength of older adults (Fried, Carlson, Freedman, Frick, Glass, Hill, et al., 2004). The Experience Corps program has been conceptualized as a social model for health promotion. Physicians also are powerful agents of social influence with respect to changing the health behavior of their patients (O'Connor, Rush, Prochaska, Pronk, & Boyle, 2001). Building on this finding and the knowledge that personal appeals are an effective approach to recruiting volunteers (Smith, 1994), Hirschfelder and Reilly (2007) recently described a pilot project in California in which patients recruited from the Medicare practice of a large HMO received a volunteerism “prescription.” In Arizona, we could build on the *Rx: Volunteer* program by combining it with a state-wide placement center for new volunteers. Such a program could be a resilient solution (a) to fortifying the emotional and physical well-being of women in Arizona with chronic health conditions; and (b) to addressing the significant social challenges that exist in our state.

Background

The present study focuses on the interplay of volunteering, chronic health conditions, and psychological well-being (PWB). On the one hand, a greater number of chronic health conditions are related to lower levels of PWB (Jelicic & Kempen, 1999). On the other hand, volunteers have higher levels of PWB than non-volunteers (Grimm, Spring, & Dietz, 2007). Our primary aim was to investigate whether chronic health conditions and volunteering *jointly* influence PWB. In particular, we proposed the following question: “Does volunteering reduce the negative relation between chronic health conditions and well-being?” Our secondary aim was to examine whether the joint effect of chronic health conditions and volunteering on PWB varied with demographic characteristics. More specifically, we addressed the following question, “If volunteering serves as a protective resource for maintaining PWB in the face of chronic health conditions, are the benefits of volunteering the same across ages, genders, and ethnicities?”

Volunteering

Volunteering has been defined as an unpaid activity within an *institutional* framework that potentially provides some service to one or more other people or to the community at large. Volunteering has been depicted as a win-win scenario in which adults reap benefits in terms of their emotional well-being and, in turn, contribute to society (Gottlieb, 2002). Economists estimated that the value of an hour of volunteer work during 2008 was \$20.25. The total number of hours volunteered during 2008 by U. S. residents was estimated to be 3,213,600,000, for an economic impact in excess of \$65 billion dollars (Department of Labor, 2009). For the period from September 2007 through August 2008, the rate of volunteering in the United States by people 16 years old and older was 26.4 percent. Arizona ranks 44th in terms of rate of volunteering by state (Corporation for National & Community Service, 2007).

Chronic Health Conditions

Chronic health conditions refer to diagnosed physical, cognitive, and emotional ailments that are expected to be of lengthy duration or permanent (Perrin et al., 1993; van der Lee, Mokkink, Grootenhuis, Heymans, & Offringa, 2007). These conditions vary widely in nature and impact and together account for a significant share of health care utilization and expenditures (Wolff, Starfield, & Anderson, 2002). In the present study, we focused on chronic *physical* conditions that participants were told they had by their physicians. Individuals with severe cognitive problems were unlikely to be able to respond to the survey questions. We reasoned that including chronic emotional health conditions would result in contamination between our measures of chronic health conditions and PWB. Because research has shown that it is the presence of multiple chronic conditions rather than any one chronic health condition that influences PWB (Mehnert, Krauss, Nadler, & Boyd, 1990; Ubel, Jankovic, Smith, Langa, & Fagerlin, 2005), we measured the *number* of chronic (physical) health conditions.

PWB

PWB refers to the affective reactions of individuals to their life experiences along a positive-negative continuum (Okun & Stock, 1987). This definition implies that the focus is on (a) the subjective experience instead of the objective conditions of life; (b) positive affective reactions as well as the absence of negative affective reactions; and (c) the target is life as a whole as opposed to particular life domains such as work and family. Because the absence of negative affective reactions (e.g., symptoms of psychological distress) is not equivalent to the presence of positive affective reactions, many studies of PWB include measure of both positive and negative affect. Furthermore, researchers have distinguished between positive psychological well-being measures that focus on feeling good about one’s situation in life (hedonic well-being) and those that focus on feeling good about oneself and finding meaning in life (eudaimonic well-being) (Ryff, 1989). Because the effects of volunteering have been observed to vary across the dimensions of PWB (Greenfield & Marks, 2004), in the present study, we included measures of PWB that tapped into eudaimonic well-being (resilience), hedonic well-being (well-being), and ill-being (psychological distress).

The Association between Chronic Health Conditions and PWB

As the number of chronic health conditions increases, PWB is lower for children, adolescents, young adults and mature adults (Piazza, Charles, & Almeida, 2007; Waters, Davis, Nicolas, Wake, & Lo, 2008). Okun, Stock, Haring, and Witter (1984) conducted a quantitative review of studies that had examined the relation between chronic health conditions and PWB among adults. Across 42 estimates, the average proportion of variation in PWB accounted for by number of chronic health conditions was .09. This statistic indicates that there is a moderate relation between number of chronic health conditions and PWB and supports the notion that many people living with chronic health conditions are able to maintain a high level of PWB.

The Association between Volunteering and PWB

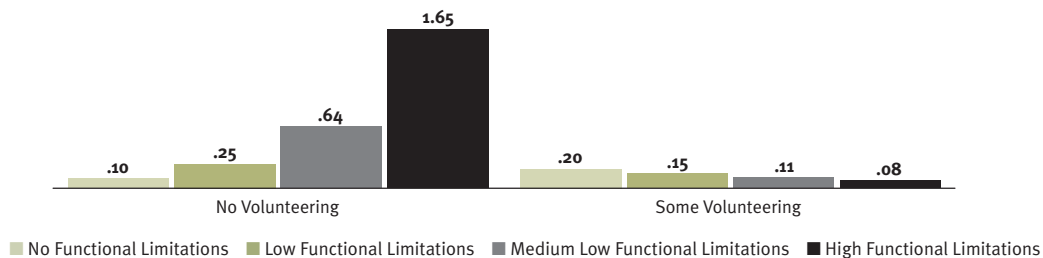
Volunteering has been shown to be positively associated with better emotional health (Dulin & Hill, 2003; Harlow & Cantor, 1996; Herzog, Franks, Markus, & Holmberg, 1998; Li & Ferraro, 2005; Lum & Lightfoot, 2005; McIntosh & Danigelis, 1995; Morrow-Howell, Hinterlong, Rozario, & Tang, 2003; Musick & Wilson, 2003; Schwartz, Meisenhelder, Ma, & Reed, 2003; Van Willigen, 2000). In addition, volunteering has been linked to better physical health (Arnstein, Vidal, Well-Federman, Morgan, & Caudill, 2002; Brown, Consedine, & Magai, 2005; Fried et al., 2004; Lum & Lightfoot, 2005; Luoh & Herzog, 2002; Lum & Lightfoot, 2005; Moen, Dempster-McClain, & Williams, 1992; Morrow-Howell et al., 2003; Sullivan & Sullivan, 1997; Thoits, & Hewitt, 2001), and postponing death (Harris & Thoresen, 2005; Lum & Lightfoot, 2005; Luoh & Herzog, 2002; Musick, Herzog, & House, 1999; Oman, Thoresen, & McMahon, 1999; Rogers, 1996; Sabin, 1993; Shmotkin, Blumstein, & Modan, 2003). Wheeler, Gorey, and Greenblatt (1998) carried out a quantitative review of the impact of volunteering on the mental health of older adults. Based on 29 studies, they found that the average older adult volunteer was located at the 70th percentile in the distribution of quality of life scores for non-volunteering older adults.

The Joint Effect of Health and Volunteering on PWB

In a study that followed older adults over time, Greenfield and Marks (2007) examined whether the association between the onset of functional limitations due to health problems (yes or no) and PWB was weaker among participants who volunteered as compared to those who did not. They found that the group that experienced the onset of functional limitations had lower PWB than the group that did not experience the onset of functional limitations only among older adults who were non-volunteers. For older adults who were volunteering, there was no association between functional limitations and PWB. In other words, volunteering was a protective resource that *buffered* the adverse effect of the onset of functional limitations on PWB.

More recently, Okun, August, Rook, and Newsom (2009) investigated in a sample of older adults whether the relation between functional limitations and mortality varies with volunteering. Controlling for a number of variables, they found that the risk of dying depended jointly on functional limitations and volunteering. As can be seen in Figure 1, the risk of dying increased as functional limitations increased among the sample who volunteered “never or almost never.” In contrast, there was no reliable statistical association between functional limitations and the risk of dying among adults who were volunteering some or many hours. This finding, in conjunction with the findings from the study by Greenfield and Marks (2007), suggests that volunteering may be particularly beneficial for adults with poor health.

Figure 1. The Buffering Effect of Volunteering on the Association between Functional Limitations and The Risk of Dying (from Okun, August, Rook, and Newsom, 2009)

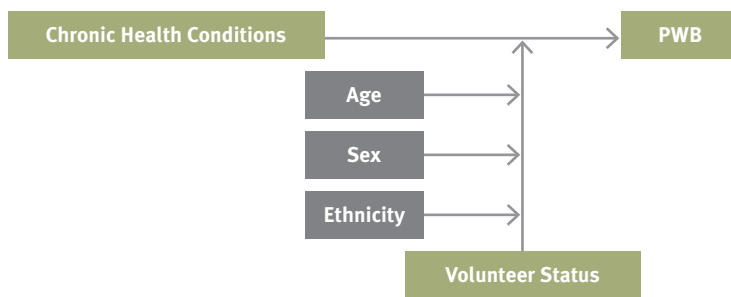


Study Hypotheses

The conceptual framework that guided the present study is depicted in Figure 2. As can be seen there, our primary hypothesis is that the association between chronic health conditions and PWB varies with volunteer status. More specifically, we proposed that volunteering would buffer the association between chronic health conditions and PWB.

Figure 2 also conveys the notion that the benefit of volunteering in terms of weakening the association between chronic health conditions and PWB may depend on demographic variables such as age, sex, and ethnicity. Relative to younger adults, older adults are more likely to experience the loss of roles and thus volunteering appears to be a role that fosters PWB to a greater extent among older than younger adults (Van Willigen, 2000). Perhaps because of their greater investment in caring about others (Keyes & Ryff, 1998), volunteering has been shown to have a larger effect on postponing the mortality of women than men (Carmel, Baron-Epel, & Shemy, 2007). Relative to non-Hispanic Caucasians, ethnic minorities prefer to engage in helping behaviors via informal rather than organizational modes (Brown, Consedine, & Magai, 2005). Therefore, our secondary hypothesis is that the joint effect of chronic health conditions and volunteering on PWB is stronger among (a) younger than older adults; (b) women than men; and (c) non-Hispanics than Hispanics.

Figure 2. Conceptual Framework for the Proposed Study



Method

Participants

The sample consisted of 4,196 adult residents of Arizona who participated in the 2008 Arizona Health Survey (AHS). The sample was intended to be representative of the adult residential population of Arizona aged 18 and older. Participants were administered telephone surveys by trained staff. Approximately 75 percent of the adult interviews were completed by residents of Maricopa County. Roughly 6.5 percent of the interviews were conducted in Spanish. The percentage of interviews conducted in Spanish was slightly higher for residents living outside of, rather than within, Maricopa County. The mean interview times differed by language. The adult interview was about 29 minutes in English, and 42 minutes in Spanish. Replace with “More information on the Arizona Health Survey can be found at arizonahealthsurvey.org.”

Measures

As part of this analysis, data for the following measures from the Arizona Health Survey were reviewed.

Age. Participants were asked, “What is your age, please?” Responses were recorded to the next year. The age of the participants ranged from 18 to 96 years old.

Gender. Participants were asked, “Are you male or female?” Male respondents were assigned a code of zero and female respondents were assigned a code of one.

Race and Ethnicity. The AHS survey items concerning Hispanic ethnicity and race were consistent with those in the 2000 U.S. Census Bureau Decennial Census. First, Hispanic ethnicity was assessed by asking respondents to report whether or not they were “Latino or Hispanic.” For respondents who indicated that they were not Hispanic, a second item asked them to choose one or more of the following racial categories: of 1) White, 2) Black or African American, 3) American Indian, 4) Asian, 5) Native Hawaiian/Alaska Native, or 6) two or more races. For the purposes of the current study, only responses to the Hispanic ethnicity item will be used as a variable in the statistical analyses. Non-Hispanics were coded zero and Hispanics were coded one.

Marital Status. An AHS survey item asked participants whether they were married or living with a partner in a marriage-like relationship, divorced, separated, widowed, or never married. A dummy variable was created in which participants who were not married or living in a marriage-like relationship were coded zero and participants who were married or living in a marriage-like relationship were coded one.

Educational Attainment. Educational attainment was assessed by asking respondents “What is the highest grade of education you have completed and received credit for?” Responses were assigned one of 30 codes characterizing each grade through high school, and sets of codes for graduate or professional school, junior or community college, and vocation, business or trade school. These responses were re-coded into 11 categories coded 0 to 10, such as “no formal education,” “high school degree,” “some trade school,” “college degree” to “doctoral or professional degree.”

Hours Working per Week. Respondents were asked, “How many hours per week do you usually work at all jobs or businesses?” Responses ranged from 0 to 95 hours per week.

Frequency of Vigorous Exercise. Participants were asked to think about vigorous activities they do that take hard physical effort, such as aerobics, running, soccer, fast bicycling, or fast swimming. Then, they were asked whether, in a typical week, they do any vigorous physical activities. If respondents answered in the affirmative, they were asked the number of days per week that they typically engage in vigorous exercise. Responses ranged from 0 to 7.

Neighborhood Social Cohesion. Neighborhood social cohesion was assessed with five items from the Collective Efficacy Scale (Sampson & Raudenbush, 1997). Sample items included “people in this neighborhood can be trusted” and “people in this neighborhood do NOT share the same values,” Respondents rated the items on a 4-point scale (1 = strongly agree, 4 = strongly disagree). After recoding positively worded statements, item mean scores were created. The internal consistency reliability for the Neighborhood Cohesion scale, as estimated by coefficient alpha, was .77.

Number of Chronic Health Conditions. Participants were asked whether a doctor had ever told them that they had each of the following conditions: asthma, diabetes, high blood pressure, heart disease, arthritis, gout, lupus, or fibromyalgia, and a gastrointestinal, stomach, or digestive disorder. For each chronic health condition, responses of “no” were coded zero and responses of “yes” were coded one. A (lifetime) chronic health conditions score was created by summing across the six binary variables, with possible values ranging from 0 to 6.

Organizational Volunteering. Respondents were asked, “In the past 12 months have you performed any volunteer services, such as with a church, school, or civic groups, an arts, health, or social service agency, or similar organization?” A dummy variable was created in which participants who did not volunteer during the past year were coded zero and participants who volunteered during the past year were coded one.

Resilience. Resilience was assessed with six items from the Connor-Davidson Resilience Scale (CD-RISC) (Connor & Davidson, 2003). Participants responded to the statements using a time frame of 30 days. Sample items included “you tended to bounce back after illness, injury or other hardships” and “you had a strong sense of purpose in life.” Respondents rated the items on a 5-point scale (1 = all of the time, 5 = none of the time). After recoding each item, item mean scores were created. The internal consistency reliability for the Resilience scale, as estimated by coefficient alpha, was .82.

Well-Being. Well-being was assessed with the 5-item World Health Organization’s Well-Being Index (WHO-5) (Bech, 2004). Using a time frame of 30 days, respondents were asked how often they felt “cheerful and in good spirits,” “active and vigorous,” “calm and relaxed,” “awakened feeling fresh and rested,” and “daily life was full of things that interest you.” Respondents rated the items on a 5-point scale (1 = all of the time, 5 = none of the time). After recoding each item, item mean scores were created. The internal consistency reliability for the Well-Being scale, as estimated by coefficient alpha, was .79.

Psychological Distress. Psychological distress was assessed with the 6-items from the Kessler Psychological Distress Scale (K10) (Kessler, Andrews, & Colpe, 2002). Using a time frame of 30 days, respondents were asked how often they felt “nervous,” “hopeless,” “restless or fidgety”, “so depressed so that nothing could cheer you up,” “that everything was an effort,” and “worthless.” Respondents rated the items on a 5-point scale (1 = all of the time, 5 = none of the time). After recoding each item, item mean scores were created. The internal consistency reliability for the Psychological Distress scale, as estimated by coefficient alpha, was .80.

Overview of Statistical Analysis Plan

Descriptive statistics were presented for respondents who did not have any missing data on the main study variables and those who had missing data on one or more of the main study variables. These two groups were compared to ascertain whether cases with and without missing data differed on the main study variables. Then we examined the interrelations among the main study variables. Next, we investigated the predictors of organizational volunteering using logistic regression. Finally, we tested the hypotheses of the present study using hierarchical multiple regression.

Results

Descriptive Analyses

Missing data. Table 1 presents the number of participants out of 4,161 who had missing data on each of the 13 main study variables. The number of participants with missing data ranged from zero for age, gender, and ethnicity to 306 for neighborhood social cohesion. Approximately 10 percent of the participants (n = 398) were missing data on at least one variable and were excluded from the statistical analyses used to test our hypotheses.

Table 1. Number Missing Data for Each Variable and At Least One Variable	
Variable	Number Missing
Age	0
Gender	0
Hispanic	0
Married or Living with Partner	12
Educational Attainment	16
Hours Working per Week	9
Frequency of Vigorous Exercise	5
Neighborhood Social Cohesion	306
Number of Chronic Health Conditions	49
Organizational Volunteering	26
Resilience	26
Well-Being	5
Psychological Distress	12
At Least One Variable	398

Table 2 compares participants with and without missing data on the main study variables that were binary. There it can be seen that (a) Hispanic participants were less likely to be in the no missing data group (18%) than in the missing data group (13%), $X^2 [1, 4,161] = 5.97, p < .05$; (b) participants married or living with a partner were more likely to be in the no missing data group (58%) than the missing data group (46%), $X^2 [1, 4,149] = 20.17, p < .001$; and (c) participants engaged in organized volunteering were more likely to be in the no missing data group (51%) than the missing data group (35%), $X^2 [1, 4,135] = 31.27, p < .001$.

Table 2. Comparison of Participants with and without Missing Data on Binary Study Variables		
Variable	Group	
	No Missing Data	Missing Data
Percent Female	63	65
Percent Hispanic*	13	18
Percent Married or Living with Partner*	58	46
Percent Doing Organizational Volunteer Work*	51	35

Note. *Reliable statistical difference between the groups at $p < .05$.

Table 3. Comparison of Participants with and without Missing Data on Continuous Study Variables

Variable	Group					
	No Missing Data			Missing Data		
	M	SD	N	M	SD	N
Age*	55.98	17.33	3763	60.90	17.73	398
Educational Attainment*	5.00	2.07	3763	4.27	2.01	382
Hours Working Per Week*	21.21	22.59	3763	16.82	21.50	389
Frequency of Vigorous Exercise*	1.30	1.96	3763	0.99	1.84	393
Neighborhood Social Cohesion	3.09	0.47	3763	3.01	0.51	92
Number of Chronic Health Conditions	1.32	1.27	3763	1.46	1.31	349
Resilience*	4.28	0.59	3763	4.13	0.75	372
Well-Being*	3.70	0.68	3763	3.59	0.78	393
Psychological Distress	1.57	0.58	3763	1.63	0.70	386

Note. *Reliable statistical difference between the groups at $p < .05$.

Table 3 compares participants with and without missing data on the main study variables that were continuous or quasi-continuous. There it can be seen that relative to participants without missing data, participants with missing data were older, $t(4,159) = 5.38$, $p < .001$, had less educational attainment, $t(4,143) = -6.59$, $p < .001$, worked fewer hours, $t(4,150) = -3.66$, $p < .001$, exercised vigorously less frequently, $t(4,154) = -3.01$, $p < .01$, had lower resilience scores, $t(4,133) = -4.53$, $p < .001$, and had lower well-being scores, $t(4,154) = -2.87$, $p < .01$, $t(4143) = -6.59$, $p < .001$. Thus, compared to the total sample, the sample used to test our hypotheses had an over-representation of younger, more educated, non-Hispanic adults who were married or living with partner, worked more hours, were more likely to volunteer, exercised vigorously more frequently, and had higher resilience and well-being scores. All subsequent analyses were carried out on the sample without any missing data on the key study variables ($n = 3,763$).

Table 4. Correlations among Study Variables (N=3,763)

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Age		.04*	-.26**	-.13*	.04*	-.48**	-.18**	.16**	.41**	-.04**	.05**	.11**	-.10**
2. Gender ^a			.01	-.12**	-.08**	-.18**	-.12**	.04*	.07**	.04*	-.09**	-.05**	.05**
3. Ethnicity ^b				.03	-.29**	.08**	.01	-.17**	-.11**	-.09**	-.03	.06**	.08**
4. Marital Status ^c					.09**	.10**	.02	.08**	-.10**	.10**	.09**	.06**	-.08**
5. Educational						.15**	.09**	.19**	-.06**	.22**	.15**	.06**	-.18**
6. Hours Working							.14**	-.04*	-.28**	.06**	.10**	.01	-.00
7. Vigorous Exercise								.04*	-.19**	.09**	.13**	.18**	-.06**
8. Neighborhood Social Cohesion									-.01	.14**	.21**	.19**	-.23**
9. Number of Chronic Conditions										-.06**	-.12**	-.17**	.12**
10. Organizational Volunteering ^d											.12**	.13**	-.14**
11. Resilience												.60**	-.52**
12. Well-Being													-.62**
13. Psychological Distress													

Notes. ^a1=female, 0=male; ^b1=Hispanic, 0=non-Hispanic; ^cmarried or living with partner, 0=not married or living with partner, ^d1=volunteer, 0=non-volunteer. * $p < .05$, ** $p < .01$.

Correlations among study variables. Table 4 presents the bivariate associations among the study variables. We focused on the correlates of the PWB measures, number of chronic health conditions, and organizational volunteering. As expected there were strong relations among the PWB measures. However, the maximum amount of variance shared by pairs of PWB measures was 36 percent, indicating that these measures are not equivalent to each other. Neighborhood social cohesion exhibited the strongest association with each of the PWB measures (correlations range from .19 to -.23). The association between number of chronic health conditions and the PWB measures were statistically significant ($p < .01$), but modest in magnitude (correlations range from .12 to -.17). Similarly, the relations between organizational volunteering and the PWB measures were statistically significant ($p < .01$), but modest in magnitude (correlations range from .12 to -.14). There was a small but statistically significant ($p < .01$) inverse relation between number of chronic health conditions and organizational volunteering (-.06).

Predictors of organizational volunteering. To examine the predictors of organizational volunteering (a binary variable) we used logistic regression. We excluded the three PWB measures because our conceptual framework (see Figure 2) treats organizational volunteering as a determinant of PWB. The prediction model (see Table 5) accounted for 10 percent of the variance in organizational volunteering and was a significant improvement over the null model which simply classifies all participants as organizational volunteers, $X^2(9, 3763) = 305.61, p < .001$. By using the prediction model instead of the null model, the accuracy rate for classifying participants as volunteers or non-volunteers increased by 10.5% (from 50.7% to 61.2%). As can be seen in Table 5, relative to non-volunteers, volunteers were more likely to be female, married or living with a partner, had more education, worked more hours, exercised vigorously more frequently, and had greater neighborhood social cohesion.

Predictor	Odds Ratio
Age	1.00
Gender (Female=1)	1.40**
Ethnicity (Hispanic=1)	0.77*
Marital Status (Married or Living with Partner=1)	1.42**
Educational Attainment	1.22**
Hours Working	1.00
Vigorous Exercise	1.08**
Neighborhood Social Cohesion	1.49**
Number of Chronic Health Conditions	0.97

Note. * $p < .05$, ** $p < .001$.

Inferential Analyses

We used hierarchical multiple regression to test the hypotheses of the present study. In the first step of each model, we entered a set of control variables, the main effect term for number of chronic health conditions, and the main effect term for organizational volunteering. In step two (and sometimes step 3), we included interaction terms. This set of analyses tested our hypotheses by examining the following interaction effects: (1) number of chronic conditions by organizational volunteering; (2) number of chronic conditions by organizational volunteering by age, (3) number of chronic conditions by organizational volunteering by ethnicity, and (4) number of chronic conditions by organizational volunteering by gender. For each participant, we subtracted (a) the mean for age from his or her raw score for age; and (b) the mean for number of chronic health conditions from his or her raw score for number of chronic health conditions. This was done to improve our ability to detect interaction effects that involved age and number of chronic health conditions. Separate regression analyses were carried out for each measure of PWB.

Table 6. Test of the Chronic Conditions by Volunteering Interaction Effect on PWB (N=3763)

Predictors	Dependent Variables								
	Resilience			Well-Being			Psychological Distress		
Step 1	b	SE	β	b	SE	β	b	SE	β
Age	.006	.001	.162***	.010	.001	.267***	-.009	.001	-.273***
Gender (female=1)	-.006	.020	-.054**	-.041	.022	-.029	.032	.019	.027
Ethnicity (Hispanic=1)	.078	.029	.045**	.261	.033	.131**	-.047	.028	-.027
Marital Status (1= Married or Living with Partner)	.063	.019	.051**	.048	.021	.035*	-.073	.018	-.061***
Educational Attainment	.019	.005	.067***	.000	.005	.001	-.026	.005	-.094***
Hours Working	.033	.000	.105***	.001	.001	.044*	-.001	.000	-.053**
Vigorous Exercise	.028	.005	.092***	.056	.005	.162***	-.012	.005	-.042**
Neighborhood Social Cohesion	.202	.020	.164***	.215	.023	.150***	-.195	.020	-.159***
Number of Chronic Conditions	-.070	.011	-.150***	-.140	.012	-.262***	.102	.010	.222***
Organizational Volunteering	.085	.019	.072***	.133	.021	.097***	-.096	.018	-.082***
Step 2									
Number of Chronic Conditions by Organizational Volunteering	.034	.014	.050*	.062	.016	.079***	-.040	.014	-.060**

Note. *p<.05, **p<.01, ***p<.001.

The main effects of the predictors. The main effect predictors accounted for 10.5% of the variance in resilience scores, $F(10, 3752) = 44.03, p < .001$, 14.7% of the variance in well-being scores, $F(10, 3752) = 64.88, p < .001$, and 14.0% of the variance in psychological distress scores, $F(10, 3752) = 61.25, p < .001$. Table 6 presents the results of the regression analysis for predicting resilience, well-being, and psychological distress.

Age was positively ($p < .001$) related to resilience and well-being scores and inversely ($p < .001$) related to psychological distress scores. Females had lower resilience scores than males ($p < .01$). Hispanics had higher resilience and well-being scores than non-Hispanics ($p < .01$). Adults who were married or living with a partner had higher resilience and well-being scores and lower psychological distress scores ($p < .05$) than adults who were not married or living with a partner. As educational attainment increased, resilience increased and psychological distress decreased ($p < .001$). As hours working, frequency of vigorous exercise, and neighborhood social cohesion increased, resilience and well-being scores increased and psychological distress scores decreased ($p < .05$). In contrast, as number of chronic health conditions increased, resilience and well-being scores decreased and psychological distress increased ($p < .001$). Finally, volunteers had higher resilience and well-being scores and lower psychological distress scores than non-volunteers ($p < .05$).

Does organizational volunteering moderate the association between number of chronic health conditions and PWB? As can be seen in Table 6, the number of chronic conditions by organizational volunteering interaction term was a significant ($p < .05$) predictor of all three PWB measures. Though statistically significant, the magnitude of these effects was very small. More specifically, the increment in variance explained in the PWB measures ranged from .1% to .4%.

Figure 3. The joint effect of chronic health conditions and volunteer status on predicted resilience scores

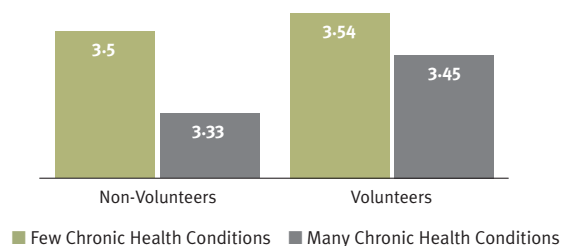


Figure 4. The joint effect of chronic health conditions and volunteer status on predicted well-being scores

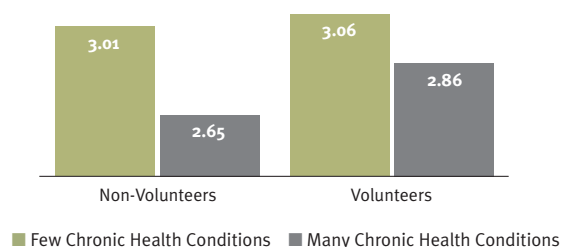
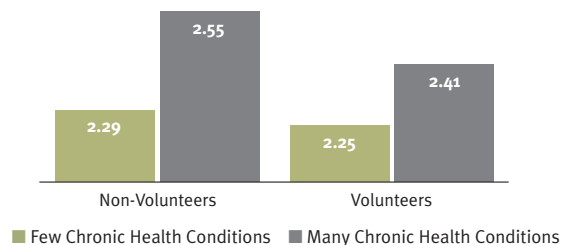


Figure 5. The joint effect of chronic health conditions and volunteer status on predicted psychological distress scores



The significant interaction terms were probed and graphed using procedures outline in Aiken and West (1991). As can be seen in Figures 3, 4, and 5, the difference between adults with many versus few chronic health conditions in resilience, well-being, and psychological distress scores is less pronounced for volunteers as compared to non-volunteers. Having established that there was a significant interaction between number of chronic health conditions and organizational volunteering on the PWB measures, we next sought to determine whether this effect varied by age, ethnicity, and gender.

Does the number of chronic health conditions by organizational volunteering interaction effect on PWB vary by age? The same predictors were entered in step 1 of this model. In step 2, three two-way interaction terms were entered (number of chronic health conditions by organizational volunteering, number of chronic health conditions by age, and organizational volunteering by age). In step 3, the three-way interaction term was entered. This term represents the interactive effect of number of chronic health conditions by organizational volunteering by age. Our primary interest was in the three-way interaction effect. The number of chronic health conditions by organizational volunteering by age interaction effect did not contribute uniquely to the prediction of resilience, conditional $F(1, 3748) = 3.04$, increment in $R^2 = .1\%$ ($p = .08$), well-being, conditional $F(1, 3748) = 3.62$, increment in $R^2 = .1\%$ ($p = .06$), or psychological distress, conditional $F(1, 3748) = 0.14$, increment in $R^2 = .0\%$ ($p = .71$). These findings indicate that the joint effect of number of chronic health conditions by organizational volunteering did not vary by age.

Does the number of chronic health conditions by organizational volunteering interaction effect on PWB vary for Hispanics and Non-Hispanics? The same predictors were entered in step 1 of this model. In step 2, three two-way interaction terms were entered (number of chronic health conditions by organizational volunteering, number of chronic health conditions by ethnicity (Hispanic versus non-Hispanic), and organizational volunteering by ethnicity). In step 3, the three-way interaction term was entered. This term, represents the interactive effect of number of chronic health conditions by organizational volunteering by ethnicity. The number of chronic health conditions by organizational volunteering by ethnicity interaction effect did not contribute uniquely to the prediction of resilience, conditional $F(1, 3748) = 0.10$, increment in $R^2 = .0\%$ ($p = .76$), well-being, conditional $F(1, 3748) = 0.15$, increment in $R^2 = .0\%$ ($p = .70$), or psychological distress, conditional $F(1, 3748) = 0.50$, increment in $R^2 = .0\%$ ($p = .48$). These findings indicate that the joint effect of number of chronic health conditions by organizational volunteering did not vary for Hispanics and non-Hispanics.

Does the number of chronic health conditions by organizational volunteering interaction effect on PWB vary for Men and Women? The same predictors were entered in step 1 of this model. In step 2, three two-way interaction terms were entered (number of chronic health conditions by organizational volunteering, number of chronic health conditions by sex (female versus male), and organizational volunteering by sex). In step 3, the three-way interaction term was entered. This term represents the interactive effect of number of chronic health conditions by organizational volunteering by sex. Table 7 summarizes the results from these analyses. The number of chronic health conditions by organizational volunteering by sex interaction effect did not contribute uniquely to the prediction of resilience, conditional $F(1, 3748) = 0.37$, increment in $R^2 = .0\%$ ($p = .54$). However the three-way interaction did contribute significantly to the prediction of both well-being, conditional $F(1, 3748) = 4.88$, increment in $R^2 = .1\%$ ($p < .05$), and psychological distress, conditional $F(1, 3748) = 4.51$, increment in $R^2 = .1\%$ ($p < .05$). These findings indicate that the joint effect of number of chronic health conditions by organizational volunteering on well-being and on psychological distress is different for women and men.

Table 7. Test of the Chronic Conditions by Volunteering By Gender Interaction Effect on PWB (N=3763)

Predictors	Dependent Variables								
	Resilience			Well-Being			Psychological Distress		
Step 1	b	SE	β	b	SE	β	b	SE	β
Age	.006	.001	.162***	.010	.001	.267***	-.009	.001	-.272***
Gender (female=1)	-.090	.027	-.074**	-.056	.030	-.040	.040	.026	.033
Ethnicity (Hispanic=1)	.078	.029	.045**	.261	.033	.131***	-.046	.028	-.027
Marital Status (1= Married or Living with Partner)	.062	.019	.052**	-.046	.021	.033*	-.070	.018	-.059***
Educational Attainment	.019	.005	.067***	.000	.005	.000	-.026	.005	-.093***
Hours Working	.003	.000	.106***	.001	.001	.045*	-.001	.000	-.055**
Vigorous Exercise	.028	.005	.093***	.057	.005	.164***	-.013	.005	-.044**
Neighborhood Social Cohesion	.202	.020	.162***	.215	.023	.149***	-.195	.020	-.159***
Number of Chronic Conditions	-.058	.016	-.123***	-.106	.018	-.198***	.068	.016	.149***
Organizational Volunteering	.053	.031	.045	.107	.034	.079**	-.082	.030	-.070**
Step 2									
Number of Chronic Conditions by Organizational Volunteering	.022	.025	.032	.013	.028	.016	-.001	.024	-.001
Number of Chronic Conditions by Gender	-.019	.020	-.033	-.055	.023	-.082*	.055	.020	.096**
Organizational Volunteering by Gender	.050	.038	.039	.036	.043	.024	-.020	.037	-.016
Step 3									
Number of Chronic Conditions by Organizational Volunteering by Gender	.019	.031	.023	.076	.034	.081*	-.063	.030	-.078*

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 8. Test of the Chronic Conditions by Volunteering Interaction Effect on PWB for Men (N=1,403)

Predictors	Dependent Variables					
	Well-Being			Psychological Distress		
Step 1	b	SE	β	b	SE	β
Age	.009	.001	.222***	-.009	.001	-.264***
Ethnicity (Hispanic=1)	.302	.054	.149***	-.018	.045	-.010
Marital Status (1=Married or Living with Partner)	.081	.038	.056*	-.086	.031	-.071**
Educational Attainment	-.005	.009	-.017	-.022	.007	-.086**
Hours Working	.001	.001	.043	-.002	.001	-.063*
Vigorous Exercise	.054	.008	.168***	-.009	.007	-.035
Neighborhood Social Cohesion	.271	.041	.175***	-.217	.034	-.169***
Number of Chronic Conditions	-.097	.020	-.173***	.067	.016	.145***
Organizational Volunteering	.105	.036	.076**	-.080	.029	-.070**
Step 2						
Number of Chronic Conditions by Organizational Volunteering	.012	.029	.014	-.022	.024	-.002

Note. *p<.05, **p<.01, ***p<.001.

To further explore the two significant three-way interaction effects, we carried out analyses separately for men and women. On the one hand, for men (see Table 8), the number of chronic conditions by organizational volunteering interaction effect was not significant for either well-being, conditional $F(1, 1392) = 0.18$, increment in $R^2 = .0\%$ ($p = .67$), or for psychological distress, conditional $F(1, 1392) = 0.01$, increment in $R^2 = .0\%$ ($p = .95$). On the other hand, for women (see Table 9), the number of chronic conditions by organizational volunteering interaction effect was significant for both well-being, conditional $F(1, 2349) = 20.29$, increment in $R^2 = .7\%$ ($p < .001$), and psychological distress, conditional $F(1, 2349) = 13.30$, increment in $R^2 = .5\%$ ($p < .001$).

Table 9. Test of the Chronic Conditions by Volunteering Interaction Effect on PWB for Women (N=2,360)

Predictors	Dependent Variables					
	Well-Being			Psychological Distress		
Step 1	b	SE	β	b	SE	β
Age	.011	.001	.287***	-.009	.001	-.276***
Ethnicity (Hispanic=1)	.243	.041	.123***	-.065	.036	-.037
Marital Status (1=Married or Living with Partner)	.033	.027	.025	-.063	.024	-.053**
Educational Attainment	.006	.007	.016	-.029	.006	-.098***
Hours Working	.001	.001	.031	-.001	.001	-.045*
Vigorous Exercise	.058	.007	.158***	-.016	.006	-.049*
Neighborhood Social Cohesion	.186	.027	.135***	-.184	.024	-.153***
Number of Chronic Conditions	-.168	.015	-.319***	.124	.013	.271***
Organizational Volunteering	.142	.027	.105***	-.101	.024	-.085***
Step 2						
Number of Chronic Conditions by Organizational Volunteering	.090	.020	.121***	-.064	.018	-.099***

Note. *p<.05, **p<.01, ***p<.001.

To provide a visual depiction of the significant interaction effects on well-being and psychological distress for women and the non-significant interaction effects on well-being and psychological distress for men, we used procedures outlined in Aiken and West (1991). As can be seen in Figures 7 and 9, the difference between men with many versus few chronic health conditions in well-being and psychological distress scores is comparable for volunteers and non-volunteers. In contrast, as can be seen in Figures 6 and 8, the difference between women with many versus few chronic health conditions in well-being and psychological distress scores is less pronounced for volunteers as compared to non-volunteers. These findings indicate that the benefit of volunteering in terms of reducing the impact of number of chronic health conditions on well-being and psychological distress scores was observed among women but not men.

Figure 6. The joint effect of chronic health conditions and volunteer status on predicted well-being scores for women.

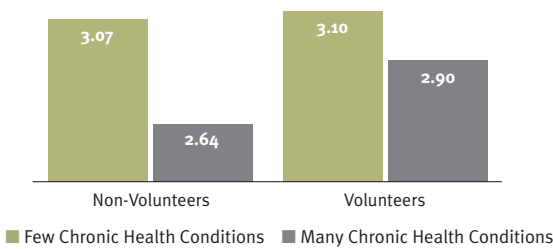


Figure 8. The joint effect of chronic health conditions and volunteer status on predicted psychological distress scores for women.

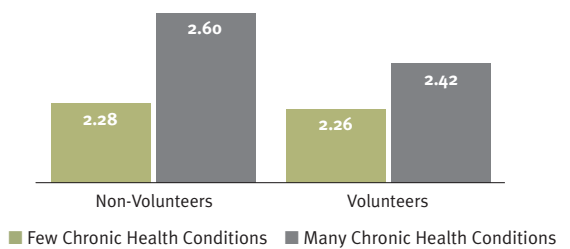


Figure 7. The joint effect of chronic health conditions and volunteer status on predicted well-being scores for men.

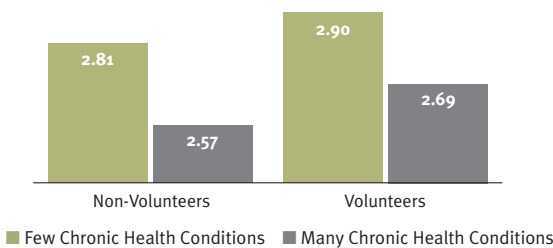
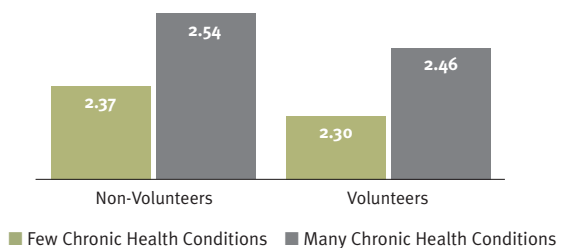


Figure 9. The joint effect of chronic health conditions and volunteer status on predicted psychological distress scores for men.



Discussion

The purpose of the present study was to examine whether being a volunteer is associated with a reduction in the inverse relation between chronic health conditions and PWB and further to pinpoint the socio-demographic groups that benefited the most from volunteering. Previous studies have demonstrated that volunteering is associated higher levels of PWB (Grimm, Spring, & Dietz, 2007). Fewer studies have addressed the circumstances under which volunteering is most strongly related to PWB.

Two opposing hypotheses have been previously formulated. According to the *complementary* hypothesis, the association between volunteering and PWB increases as psychosocial resources increase. In other words, those who are more advantaged in terms of psychosocial resources benefit the most from volunteering. For example, Harris and Thoreson (2005) found that the relation between volunteering and mortality was stronger for older adults who visited friends frequently as opposed to infrequently. In contrast, according to the *compensatory* hypothesis, the association between volunteering and PWB increases as psychosocial resources decrease. In other words, those who are disadvantaged in terms of psychosocial resources benefit the most from volunteering. For example, Greenfield and Marks (2007) reported that the relation between volunteering and personal growth was stronger among older adults who experienced the onset of a functional limitation as opposed to those who did not.

The findings of the present study are consistent with the compensatory hypothesis. We showed that the differences in psychological well-being between volunteers and non-volunteers were more pronounced when the number of chronic health conditions was high as opposed to low (see Figures 3-5). Alternatively, our findings indicate that volunteering was a protective resource that appears to buffer the impact of chronic health conditions on PWB.

The benefit of volunteering in terms of buffering the association between number of chronic health conditions and PWB did not vary by age or ethnicity. Furthermore, for resilience, the buffering effect of volunteering did not vary with gender. However, for our measures of well-being and psychological distress, the buffering effect of volunteering was observed only for women. Perhaps, the benefit associated with volunteering in terms of reducing the relation between number of chronic health conditions and resilience is comparable for men and women because volunteering fosters a sense of purpose for men and women alike and a sense of purpose, in turn, is a key component of resilience.

With respect to psychological distress, Pennebaker and Roberts (1992) proposed that the experience of emotions and symptoms is more tightly bound to external cues among women than men. In line with this possibility, the positive affect associated with volunteering may be more likely to provide cues to women than men that the symptoms they are experiencing due to their chronic physical health conditions are less severe, and, in turn, this may weaken the association between chronic health conditions and psychological distress more for women than men. In terms of psychological well-being, relative to men, women are more invested in their interpersonal relationships and are more likely to feel close to individuals in their social networks (Antonucci & Akiyama, 1987). Thus the expansion of the social network that often occurs with volunteering (Fischer & Schaffer, 1993) may be more beneficial to women than men with respect to mitigating the inverse relation between chronic health conditions and well-being.

One of the most surprising statistics generated in the present study was that *slightly over half* of the respondents indicated that they had volunteered during the past year. According to data provided by the Corporation for National & Community Service (2007) the rate of volunteering in the state of Arizona was less than 25%. This large discrepancy may be due to differences in the definitions of what constitutes organizational volunteering provided in the AHS and by the Corporation for National & Community Service. For example, it is possible that in the AHS survey, participants who engaged in informal types of helping behavior that were outside of service to organizations responded that they had volunteered.

Limitations

The present study has several limitations. First, causal inferences are unwarranted in light of the cross-sectional, non-experimental design employed in the present study. For example, PWB may be an antecedent as well as a consequent of volunteering. Second, respondents who were excluded due to missing data differed on numerous study variables from respondents without missing data, indicating that our findings may not generalize to the entire population of adults in the state of Arizona. Third, we accounted for

modest amounts of the variance in our measures of PWB and the effect sizes associated with the interaction effects, in particular, were very small. Fourth, although the question that assessed volunteering (“In the past 12 months have you performed any volunteer services, such as with a church, school, or civic groups, an arts, health, or social service agency, or similar organization?”) clearly made reference to service to organizations, it is possible that providing respondents with examples of what does *not* constitute organizational volunteering would have been useful. Finally, by asking only one yes-no question about volunteering, it was not possible to probe more fine-grained questions regarding the buffering effect of volunteering on the relation between chronic health conditions and PWB. For example, does the buffering effect of organizational volunteering vary with (a) frequency of volunteering, (b) type of volunteer work; and (c) satisfaction with the volunteer experience?

Public Policy Implications

We have shown that adults with health problems benefit more from volunteering in terms of their PWB than those without health problems (particularly women). However, individuals with health problems are less likely to volunteer (Okun, 1993). Thus, somewhat paradoxically, those who may benefit the most from volunteering are least likely to do so. According to estimate of rate of volunteering by state, Arizona ranks 44th (23.9% rate of volunteering), with Nevada having the lowest rate of volunteering (17.7%) and Utah having the highest rate of volunteering (43.9%) (Corporation for National & Community Service, 2007). Our findings suggest that the well-being of women with chronic conditions can be enhanced by volunteering and that the resilience of women and men alike with chronic conditions can be fostered by volunteering.

Field research using an experimental design with a wait-list control group has demonstrated that Experience Corps volunteering (tutoring children in urban schools) can substantially improve the physical activity and strength of older adults (Fried et al., 2004). The Experience Corps program has been conceptualized as a social model for health promotion. Physicians also are powerful social influence agents with respect to changing the health behavior of their patients (O’Connor, Rush, Prochaska, Pronk, & Boyle, 2001). Building on this finding and the knowledge that personal appeals are an effective approach to recruiting volunteers (Smith, 1994), Hirschfelder and Reilly (2007) recently described a pilot project in California in which patients recruited from the Medicare practice of a large HMO receive a volunteerism “prescription.” In Arizona, we could build on the *Rx: Volunteer* program by combining it with a state-wide placement center for new volunteers. Such a program could be a resilient solution (a) to fortifying the emotional and physical well-being of women in Arizona with chronic health conditions; and (b) to addressing the significant social challenges that exist in our state.

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