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There is an urgent need to identify lifestyle activities that reduce functional decline and dementia associated with population aging. The goals of this article are to review critically the evidence on the benefits associated with formal volunteering among older adults, propose a theoretical model of how volunteering may reduce functional limitations and dementia risk, and offer recommendations for future research. Database searches identified 113 papers on volunteering benefits in older adults, of which 73 were included. Data from descriptive, cross-sectional, and prospective cohort studies, along with 1 randomized controlled trial, most consistently reveal that volunteering is associated with reduced symptoms of depression, better self-reported health, fewer functional limitations, and lower mortality. The extant evidence provides the basis for a model proposing that volunteering increases social, physical, and cognitive activity (to varying degrees depending on characteristics of the volunteer placement) which, through biological and psychological mechanisms, leads to improved functioning; we further propose that these volunteering-related functional improvements should be associated with reduced dementia risk. Recommendations for future research are that studies (a) include more objective measures of psychosocial, physical, and cognitive functioning; (b) integrate qualitative and quantitative methods in prospective study designs; (c) explore further individual differences in the benefits associated with

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volunteering; (d) include occupational analyses of volunteers' specific jobs in order to identify their social, physical, and cognitive complexity; (e) investigate the independent versus interactive health benefits associated with volunteering relative to engagement in other forms of activity; and (f) examine the relationship between volunteering and dementia risk.

Keywords: volunteering, older adults, psychosocial well-being, physical functioning, cognitive functioning

Gerontological research is undergoing a sea change. After decades of research focused on the negative consequences of aging, such as cognitive and physical decline and rising dementia rates, the last 2 decades have seen a refocus on protective factors reducing cognitive decline and dementia. Protective lifestyle factors that have been shown to modify dementia risk include adherence in late life to a Mediterranean-style diet (Scarmeas, Stern, Mayeux, & Luchsinger, 2006; Scarmeas, Stern, Tang, Mayeux, & Luchsinger, 2006) and late-life exercise or physical activity (e.g., Bowen, 2012; Buchman et al., 2012). Activities engaged prior to one's senior years have also been associated with reduced dementia risk, such as gaining higher education (Canadian Study of Health and Aging, 1994; Gatz et al., 2007; Meng & D'Arcy, 2012), holding complex paid occupations (Andel et al., 2005; Karp et al., 2009; Kröger et al., 2008), and being a lifelong bilingual (Bialystok, Craik, Binns, Ossher, & Freedman, 2014; Bialystok, Craik, & Freedman, 2007; Chertkow et al., 2010; Craik, Bialystok, & Freedman, 2010).

The focus of this article is on the benefits associated with volunteering in old age, because volunteering may be another form of lifestyle engagement that protects seniors from functional decline and dementia. We have two primary goals with this integrative and evaluative review. The first goal is to evaluate the available evidence in relation to our theoretical model, which was inspired by and extended from that of Fried et al. (2004), as shown in Figure 1. The thesis of this model is that volunteering increases social, physical, and cognitive activity (to varying degrees depending on characteristics of the volunteer placement) which, through biological and psychological mechanisms, leads to improved functioning and ultimately reduces dementia risk. As will become apparent in this review, our model is partially but not entirely supported by available published data. In recognition of the gaps in the existing literature, the second goal of this paper is to foster more interdisciplinary research on the protective benefits associated with volunteering in reducing risk of functional decline and dementia among older adults. To provide a context for these goals, we first describe volunteer rates and hours in older and younger cohorts, as well as the economic impact of volunteering. Then, to achieve our stated goal, we begin by building a case for why volunteering might protect the brain health of older adults. Next, we comprehensively and critically review the existing research on the biopsychosocial benefits of volunteering, highlighting common findings and discussing limitations of previous work. Our thesis on how volunteering can protect functional ability and reduce dementia risk is then formalized in a model and weighed against the available evidence. We conclude with a series of recommendations for future research.

Volunteering Among Seniors

Data from Statistics Canada (2012) and from the U.S. Current Population Survey, supplemented by the Corporation for National and Community Service (U.S. Bureau of Labor Statistics, 2013) are remarkably consistent in reporting that although today's seniors are less likely to volunteer than their younger counterparts, seniors who do volunteer commit more time to their volunteer activities than do all other age groups. For example, in Canada, 36.5% of people aged 65 and older volunteered in 2010, compared to 40% to 58% in the younger age bands. In 2013 in the United States, 24.1% of people aged 65 and older volunteered, compared

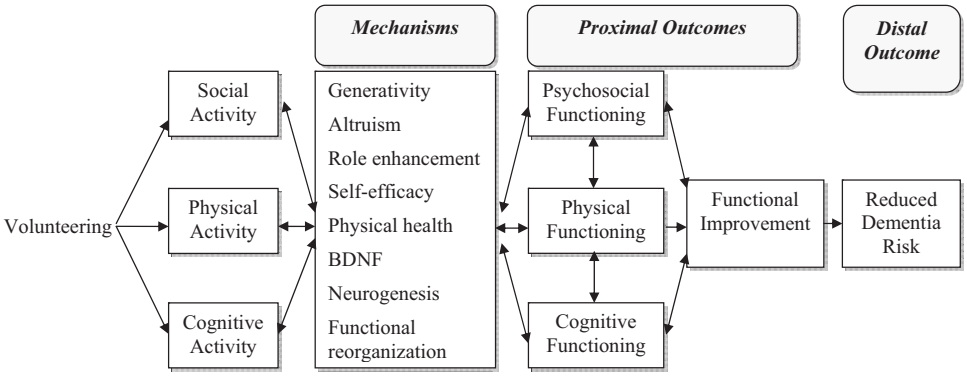


Figure 1. Theoretical model of how volunteering leads to functional improvements and decreases dementia risk among older adults. BDNF = brain derived neurotrophic factor. Adapted from "A Social Model for Health Promotion for an Aging Population: Initial Evidence on the Experience Corps Model," by L. P. Fried et al., 2004, *Journal of Urban Health: Bulletin of the New York Academy of Medicine, 81,* p. 66. Copyright 2004 by the New York Academy of Medicine.

to 30% and 28% in the Generation X and Baby Boomer generations, respectively. Seniors report health concerns as a chief reason for not volunteering. Despite being less likely to volunteer than their younger counterparts, Canadian senior (aged 65+) volunteers spent a median 100 annual hr volunteering, compared to 35 to 80 annual hr in the younger age bands. Similarly, in 2013 Americans aged 65–74 spent a median 86 annual hr volunteering, compared to 45 and 52 annual hr in the Generation X and Baby Boomer generations (Statistics Canada, 2012; U.S. Bureau of Labor Statistics, 2013).

Volunteer contribution has a tremendous economic impact. Using the Independent Sector's (2012) estimate of the average value of a volunteer hour of $22.14 in 2012, this high volume of volunteering among seniors translates into an estimated $4 billion in Canada and over $19 billion in the United States. A conservative estimate is that volunteers of all ages contribute $400 billion to the global economy (International Labour Organization, 2011). The rates, hours, and economic contributions of senior volunteering reveal a clear societal benefit to volunteering; the focus of this review, however, is on the personal benefits of volunteering.

Why Volunteering Might Protect Against Cognitive Decline and Dementia

We argue that in important ways, volunteering is similar to other pursuits that engage a person in social, physical, and/or cognitive activity, such as joining a walking group, belonging to a book club, or taking a computer class. There is growing evidence that social, physical, and cognitive activity in one's postretirement leisure pursuits protects against dementia (for a review, see Fratiglioni, Paillard-Borg, & Winblad, 2004). Many prospective cohort studies have reported that adults who engage in more social activity (Bennett, Schneider, Tang, Arnold, & Wilson, 2006; Fratiglioni, Wang, Ericsson, Maytan, & Winblad, 2000), more physical activity (Carlson, Helms, et al., 2008; Larson et al., 2006; Podewils et al., 2005; Rovio et al., 2005; Wang, Larson, Bowen, & van Belle, 2006), or more cognitive activity (Akbaraly et al., 2009; Wilson et al., 2002) have lower dementia rates, even after controlling for potentially confounding variables such as age, education, medical conditions, and apolipoprotein E genotype. For example, Karp et al. (2006) examined the social, physical, and cognitive complexity of the everyday leisure activities (e.g., reading, engaging in sports, playing music) of 766 nondemented Swedish seniors over 6 years. They found that after controlling for age, sex, education, baseline mental status, health comorbidities, and physical functioning, those who engaged in activities requiring moderate social, physical, or cognitive effort were 32%, 39%, and 29%, respectively, less likely to develop dementia, relative to those who engaged in activities requiring little or no effort. The seniors who were least likely to develop dementia—enjoying a 47% risk reduction—engaged in leisure activities demanding moderate effort in at least two of these three domains. A recent report also suggests that engaging in a greater variety of leisure activities, regardless of how cognitively challenging they are, is associated with a reduced risk of memory impairment (Carlson et al., 2012).

There are a number of candidate mechanisms through which activity may reduce dementia risk. Social mechanisms include role theory, which suggests that active engagement may substitute roles lost due to retirement, reduced parental responsibilities as children and grandchildren age, or widowhood (see Chambré, 1984; Moen, Dempster-McClain, & Williams, 1992). Social network size has been shown to modify the relationship between Alzheimer's disease brain pathology and cognition, such that even among those with severe brain pathology, older adults with larger social networks fare better cognitively (Bennett et al., 2006). Moreover, the quality of social interactions appears to moderate dementia risk, with more satisfying social interactions being more protective (Fratiglioni et al., 2000). Psychological mechanisms for the protective effects of activity have also been proposed. Fratiglioni et al. (2004) argue that physical, cognitive, and social activities reduce stress, improve self-esteem, and foster healthy mood states that in turn help reduce the neurotoxic effects of chronic cortisol elevation. Physical mechanisms for the protective effects of activity include the well-established cardiovascular benefits of physical activity, and more recent evidence shows that exercise increases neurotrophic factors associated with neurogenesis in the hippocampus (Cotman & Berchtold, 2007). Indeed, exercise has been associated with improvements in learning and memory in seniors (Colcombe & Kramer, 2003; Middleton, Mitnitski, Fallah, Kirkland, & Rockwood, 2008), as well as volumetric increases in hippocampal (Erickson et al., 2011) and prefrontal grey and white matter (Colcombe et al., 2006). Finally, in terms of cognitive mechanisms by which activity can protect against cognitive decline and dementia, the acquisition of new cognitive skills can induce functional reorganization, in which either a less extensive cortical network is required for task performance (e.g., Erickson et al., 2007) or additional brain regions are brought online to perform a task (e.g., Small, Moody, Siddarth, & Bookheimer, 2009). Increased cognitive activity has also been proposed to induce neurogenesis and synaptogenesis (Valenzuela, Breakspear, & Sachdev, 2007). All of these can be viewed as contributing to cognitive or brain reserve (see Stern, 2012; Valenzuela, 2008), allowing individuals to maintain their levels of functioning even in the presence of extensive brain damage.

Our view is that, like these other activities, volunteering increases physical, cognitive, and social activity in older adults' lives to varying degrees depending on the volunteer role; as such, it too should be protective against functional decline and dementia in old age. This view is consistent with activity theory, which postulates a positive relationship between the amount of activity in which older adults engage and life satisfaction (Lemon, Bengtson, & Peterson, 1972). As this review demonstrates, there is evidence that greater amounts of volunteer activity are associated with a broader range of salubrious health outcomes. To date, no studies have reported on the association between volunteering and dementia risk, but many have examined how volunteering relates to maintenance or improvement of physical, cognitive, and/or social functioning among older adults without dementia.

Unlike most other activities that provide social, physical, and cognitive activity and have been shown to be associated with reduced risk of functional decline and dementia, volunteering may also have added value. People typically volunteer to help other individuals. As such, volunteering has an altruistic component that is not inherent to other lifestyle activities, and there is some evidence that performing altruistic acts is related to better physical and mental health in seniors (for a review, see Post, 2005). For example, in cross-sectional studies of older adults, giving more materially (e.g., money or food) or emotionally (e.g., advice) than

one received in return was associated with better self-reported physical health (W. M. Brown, Consedine, & Magai, 2005), and providing emotional support to others was associated with better mental health (Schwartz, Meisenhelder, Ma, & Reed, 2003). Compellingly, in one study, seniors who reported providing more instrumental support to family and friends or more emotional support to their spouses had lower mortality rates; receiving support had no influence on mortality (S. L. Brown, Nesse, Vinokur, & Smith, 2003). However, as we describe later in more detail, Kahana, Bhatta, Lovegreen, Kahana, and Midlarsky (2013) found in their prospective study that volunteering and altruistic attitudes differentially predicted mental health outcomes. This suggests that although volunteering is an altruistic act, the association between volunteering and health outcomes cannot be attributed solely to the act of, or benefits from, helping others.

Existing Research on the Benefits of Volunteering Among Older Adults

This comprehensive review is qualitative (narrative), not quantitative (meta-analytic). Meta-analyses compel one to both collapse different constructs (e.g., life satisfaction, affect, depression as measures of well-being or quality of life) and omit other measures on which there have been too few studies reporting (e.g., mental status). For example, an early meta-analysis combined measures of life satisfaction, happiness, depression, isolation, client-assessed helpfulness of the volunteer, and goal attainment to form an overarching measure of well-being, and combined data from across 37 cross-sectional, quasi-experimental, and experimental study designs, eight of which were unpublished (Wheeler, Gorey, & Greenblatt, 1998). Although it is encouraging that their meta-analysis found greater well-being in older adult volunteers than their nonvolunteering counterparts, our goal is to obtain a more comprehensive view of the current state of knowledge on the benefits of volunteering among older adults, making both the common findings and the gaps in our understanding more apparent.

Exclusion and Inclusion of Articles

The articles reviewed here were obtained by searching PsycInfo, Scopus, PubMed, and MedLine for works published prior to April 2014, using the search terms (*volunteering* OR *volunteer* OR *voluntary* OR *productive activity*) AND (*older adults* OR *aging* OR *elderly*), with and without the additional term *benefits*. The reference lists of the resulting articles were also searched for relevant papers. This review is limited to peer-reviewed evidence published in English; study results were excluded if provided in technical reports, books, or book chapters. We also restricted this review to formal volunteering, which the International Labour Organization (2011) defines as "unpaid noncompulsory work; that is, time individuals give without pay to activities performed either through an organization or directly for others outside their own household" (p. 13). Articles focusing on informal volunteering (e.g., care giving, providing social support to friends, family, and neighbors) or on membership in voluntary associations or groups (e.g., the YMCA) were excluded; although these are recognized as important and valuable activities, the existing research on the benefits of volunteering is dominated by the study of people in formal volunteer placements. After this initial culling, 113 articles describing empirical studies of benefits associated with formal volunteering among older adults were identified. From this, a total of 72 articles was selected after applying five criteria, as described below.[1]

Focus on Older Adults

Because of our focus on preventing functional decline and dementia, studies were included if they involved older adults (defined liberally as age 50+), either alone or in direct comparison with younger cohorts; thus, articles that sampled volunteers from across the adult lifespan but did not analyze the results as a function of age were excluded ($n = 5$).

Focus on Formal Volunteering

Only studies that examined the correlates of formal volunteering, distinct from or in comparison to other productive activities such as working, belonging to community groups, and so forth, were included; thus, studies that merged volunteering with other productive activities were excluded ($n = 15$).

Focus on the Benefits Associated With Volunteering

Studies that examined only demographic differences between older volunteers and nonvolunteers or older adults' motivations for or barriers to volunteering were excluded ($n = 11$). One additional study that summed survey items across different benefit types was also excluded. Importantly, this review focuses on the benefits associated with volunteering and not its potential costs. For discussion of the costs (and benefits) of volunteering for both volunteers and organizations, we refer readers to Handy and Mook (2011) and Celdrán and Villar (2007).

Control for Sociodemographic Differences

The importance of controlling for sociodemographic group differences is particularly important and requires further commentary. Early reports from the 1950s and 1960s that demonstrated higher life satisfaction among older adults who participated in voluntary associations (but did not necessarily volunteer) were soon questioned when it was realized that demographic and health variables were strongly related to participation. As Cutler (1973) stated, after finding that the relationship between older adults' participation in voluntary associations and life satisfaction was eliminated once socioeconomic status and subjective health were controlled, "It seems reasonable to conclude, then, that voluntary associations self-select as members and as participants persons who are initially more satisfied with their life situation by virtue of their health and status characteristics" (p. 99).

Similar sociodemographic and health differences have been reported in comparisons of senior volunteers with their nonvolunteering counterparts (e.g., McMunn, Nazroo, Wahrendorf, Breeze, & Zaninotto, 2009; Pilkington, Windsor, & Crisp, 2012; Shmotkin, Blumstein, & Modan, 2003; Windsor, Anstey, & Rodgers,

[1] A list of these papers and the reason for their exclusion is available upon request.

2008). Seniors who are younger, more educated, healthier, or who earn more, are more likely to volunteer. However, we are interested in whether seniors who volunteer experience benefits regardless of their health and demographic status. For this reason, we include in this review only analyses that controlled for or included in the statistical models demographic characteristics (e.g., age, gender, education, income) when it was possible for the authors to do so. This led to the exclusion of $n = 6$ additional articles.

Inclusion of a Nonvolunteering Control Group

Our fifth criterion required that studies have a nonvolunteering control group; studies that lacked this control were excluded ($n = 2$). Although we discuss some potential disadvantages of nonvolunteering control groups later in this review (e.g., social selection effects and attrition) and offer an alternate study design, without these groups it is possible that benefits reported are due to some nonvolunteering factor (e.g., social selection effects or demand characteristics).

Exceptions to Inclusion Criteria

One important exception to these final two criteria was that we included descriptive studies (both qualitative and quantitative) of the benefits of volunteering. This is the only design type that has been used in qualitative studies on the benefits associated with volunteering in older adults, and we felt it was essential that a comprehensive review of this area include seniors' views on these benefits, in their own words.

Review Structure

Ultimately, 73 articles met the inclusion criteria. These articles vary widely in their design, approach, and outcome measures reported. To structure the review, we classified the existing research in terms of three dimensions: the reported data type (qualitative, subjective, and objective), the measurement domain (psychosocial, physical, cognitive), and the study design type (descriptive, cross-sectional, prospective cohort, and randomized controlled trial). For the first dimension, qualitative data reflect common, conceptual themes that emerge across participants' interview transcripts; subjective data summarize participants' questionnaire-based responses; and objective data are measurements of actual performance or events.

The study design types included in this review were descriptive, cross-sectional, prospective cohort, and one randomized control trial. *Descriptive studies* on the benefits of volunteering assess a single group of individuals who volunteer, using qualitative, subjective, or objective measures. We include descriptive studies in this review to incorporate the qualitative studies, as mentioned above, although some descriptive studies reported subjective and/or objective data. Descriptive studies are not designed to assess causality, and indeed one cannot determine from these studies whether the benefits reported are in fact due to the participants' volunteering or to some other factors that can be controlled better in other design types, such as preexisting characteristics of those individuals that predispose them to volunteer in the first place, demand characteristics to say positive things in an interview, or some general factor, such as having attention paid to them. What qualitative studies provide, however, is the unique advantage of hearing seniors' perceptions of the benefits of volunteering in their own words. In particular, with open-ended or semistructured interviews, the results obtained are not limited by the questions asked, as they are with subjective (questionnaire) and objective data collection, but can reveal perspectives that reinforce conclusions drawn from these other measures or offer new perspectives for further study. Characteristics of the 17 descriptive studies on the benefits of volunteering among older adults included in this review are shown in Table 1.

The *cross-sectional studies* included herein compare older adults who volunteer to older adults who do not volunteer on one or more outcome measures of interest, controlling for sociodemographic differences between the two groups. It is not possible to conclude with certainty that differences between cross-sectional groups are, in fact, due to volunteering. However, controlling for factors that associate with the propensity to volunteer and with better outcomes increases our confidence that differences between groups are due to volunteering. Characteristics of the 14 cross-sectional studies that have examined the relations between volunteer status and health outcomes are reported in Table 2.

Prospective cohort (longitudinal) studies include older adult volunteers and nonvolunteers, sometimes stratified by age and other demographic variables, and follow them over a series of time points (waves). One of many regression techniques is then used to assess change in outcome measures over time or the probability of a later event, controlling for individual differences in these and other measures at baseline or in an earlier wave. The advantage of prospective cohort study designs over descriptive and cross-sectional study designs is that they are able to reduce confounding of the observed changes over time by participant characteristics at an earlier wave of data collection. Although prospective studies cannot prove causality, they provide good evidence for it, particularly if the effects are strong, replicated in independent studies, and show a dose–response function (Mann, 2003).

Descriptions of the 36 prospective cohort papers included in this review are described in Table 3 (study cohort names are bolded, and papers using data from the larger studies are not). These study cohort descriptions are provided in order to establish the context from which the reported data came. In addition, the data from most of these study cohorts are freely accessible to researchers to conduct additional analyses. There is thus great potential to capitalize on these large data sets to replicate reported associations between volunteering and functional outcomes or to explore many associations that have yet to be investigated. Note that the primarily cross-sectional study by Shmotkin et al. (2003) is included in Table 3 because the authors examined mortality risk by volunteering status.

The reader will note that a number of papers have been published from a handful of large prospective cohort studies, namely, the Americans' Changing Lives study (ACL), the Assets in Health Dynamics Among the Oldest Old study (AHEAD), the Health and Retirement Study (HRS), the Longitudinal Study on Aging (LSOA) and its successor (LSOA II), and the Wisconsin Longitudinal Study (WLS). It is not surprising that papers using the same data set tend to report converging findings. We present the results from each of the individual papers; however, to avoid false impressions about the reproducibility of findings, in the review we discuss the findings at the study (not individual paper) level.

Table 1
Characteristics of Descriptive Studies on the Benefits of Volunteering Among Older Adults

Study	Location	Volunteers (*n*)	Age range	Description
Arnstein et al. (2002)	New England	7	41–70	Graduates of a chronic pain management program volunteered to provide peer support for other chronic pain management clients, including leading small group discussions and making weekly supportive phone calls. Participants provided written and verbal (recorded) accounts of their experiences in the program.
Barron et al. (2009)	Baltimore, MD	174	60+	Volunteers with the Experience Corps study completed surveys about their physical activity, energy level, and strength, and underwent objective testing of their grip strength, chair stands, walking speed, and flight of stair walking speed. The survey and assessments were conducted when participants began the program and at the end of the academic year.
Celdrán & Villar (2007)	Barcelona, Spain	88	55+ (M = 68)	Volunteers with management, cultural, or social services organizations completed a questionnaire about their satisfaction with volunteering, and their perceptions of six volunteering benefits and six volunteering drawbacks.
Cook (2011)	Canada	214	55–75	Volunteers at various nonprofit organizations (e.g., Diabetes Society, Meals on Wheels) answered the question, "What learning goals do you have through your volunteer work?"
Cook (2013)	Canada	214	55–75	Canadian volunteers at various nonprofit organizations (e.g., Diabetes Society, Meals on Wheels) answered the questions about how they and others viewed themselves. The results reported here are those pertinent to participants' views on how volunteering affects their self-definition.
Hainsworth & Barlow (2001)	England & Wales	22	50–72 (Mdn = 58)	Volunteers with arthritis who codelivered an arthritis self-management course were interviewed before attending training, 6 weeks after training, and 6 months after training. Data summarized in Table 5 are from the last two interviews.
Jirovec & Hyduk (1998)	Detroit, MI	120	62+	Residents of Detroit who had a history of volunteering with the American Red Cross or Hospital Aid Society answered a survey about their volunteering frequency, life satisfaction, and physical health.
Kerschner & Rousseau (2008)	U.S.	714	Adult (85% 56+)	Volunteer drivers from 40 states responded to survey questions about the satisfaction they receive from volunteering.
Larkin et al. (2005)	Florida	16	55+	Volunteers with Big Brothers Big Sisters were asked "What pleases you most about your mentoring role?"
Misener et al. (2010)	Ontario, Canada	20	65+ (M = 72)	Volunteers served in community sports organizations, in leadership positions (e.g., chair, board member), as coaches or officials, or as members of subcommittees. Participants completed open-ended interviews, including the positive and negative aspects of their volunteering.
Morrow-Howell et al. (2012)	U.S.	180	50–84 (M = 65)	Volunteers in the Experience Corps program were surveyed about whether they engaged in each of 15 activities, and the frequency of engagement. The survey was administered when participants began the program and at the end of the academic year.
Morrow-Howell et al. (2009)	U.S.	401	51–90	Volunteers in one of 13 large programs answered an 11-item, closed-ended survey about perceived benefits of volunteering.
Morrow-Howell et al. (1999)	U.S.	289	55+ (M = 71)	Volunteers with OASIS (a national nonprofit organization that provides educational and volunteer opportunities for Americans aged 55+) answered an 8-item, closed-ended survey, as well as open-ended questions, including "What about OASIS has been the most beneficial to you?"
Narushima (2005)	Toronto, Canada	15	55–93	Volunteers in nonprofit organizations were interviewed with open-ended questions, including questions about what they had learned and experienced in their volunteering.
Newman et al. (1985)	U.S.	180	55–85	Volunteers at three school volunteer programs (in New York City, Los Angeles, and Pittsburgh) answered a 3-item closed-ended questionnaire about the effects of their volunteering on their well-being and an interview in which the main question was, "How has the volunteer experience affected you?"
Piercy et al. (2011)	U.S.	38	51+ (M = 65)	Volunteers who provided religious, humanitarian volunteer work away from their homes (mainly overseas) were interviewed about the challenges and benefits of their volunteer experiences.
Young & Janke (2013)	South Carolina	195	50–89	Volunteers in an intergenerational program completed a 10-item survey on two occasions (interval not indicated), asking about feelings of self, physical health, mental health, social life, life satisfaction, openness to new ideas, interest in youth education, energy levels, involvement in the community, and knowledge and skills. Data shown in Table 5 are changes in response over time.

Table 2
Characteristics of Cross-Sectional Studies on the Benefits of Volunteering Among Older Adults

Study	*n* volunteers (nonvolunteers)	Participant age range	Control variables[b]	Description
Aquino et al. (1996)	91 (201)	65+	AEGM	Community-living residents of Linn County, IA, stratified such that half lived in urban and half in rural areas.
Bond (1982)	323 in total[a]	55–74	AEGMW	Residents of Winnipeg, Manitoba, Canada, recruited through employers (aged 55–64) or the community (aged 65–74).
Carp (1968)	53 (299)	65+	AEIG	Applicants for public housing for the aged.
Dulin et al. (2012)	1,028 in total[a]	57–72	AEIMR	Residents of New Zealand, sampled so that almost half (n = 441) were of Māori ethnicity, and the remainder were of European descent.
Hunter & Linn (1980–1981)	53 (49)	65+	EHW	Residents of Miami, FL. Volunteers recruited from the Veterans Administration Hospital.
Krause et al. (1992)	1,551 in total[a]	60+	AG	Data from Wave 1 of the Americans' Changing Lives study (see Table 4), from participants who were aged 60+.
McIntosh & Danigelis (1995)	1,644 in total[a]	60+	EGHMR	Data from Wave 1 of the Americans' Changing Lives study (see Table 4), from Black and White participants aged 60+.
McMunn et al. (2009)	477 (4,657)	♀ 60+ ♂ 65+	AHIM	Data from Wave 2 (2004) of the English Longitudinal Study of Ageing who were above the British pension age.
Okun et al. (2011)	2,039 (2,122)	18+	AEGHR	Data from the 2008 Arizona Health Survey, which sampled Arizona adult residents.
Pilkington et al. (2012)	275 (286)	55–94	AEGHMW	Data from the Transitions in Later Life Study, which sampled Australian residents.
Shmotkin et al. (2003)	148 (1,195)	75–94	AEGHIMR	Data from Wave 1 (1989–1992) of the Cross-Sectional and Longitudinal Aging Study of Israeli Jewish residents.
Wahrendorf et al. (2006)	2,678 (20,099)	50+	AEGHIMW	Data from the 2004 Survey of Health, Aging and Retirement in Europe of residents in 10 European countries.
Warburton & Peel (2008)	209 (167)	65+	AEGHI	Case control study of Brisbane, Australia, patients with fall-related hip fracture and sex-, age-, and postal-code-matched controls.
Windsor et al. (2008)	919 (1,217)	64–68	EGMW	Data from Wave 2 (2005–2006) of the PATH Through Life Project, sampling residents of Canberra and Queanbeyan, Australia.

[a] Breakdown between volunteers and nonvolunteers not provided. [b] Control variables: A = age; E = education; G = gender; H = health, disability, or physical ability; I = income; M = marital or partnered status; R = race or ethnicity; W = work/employment status.

The fourth type of study is a *randomized controlled trial*. The first and only published randomized controlled trial on the benefits of volunteering among older adults is called Experience Corps (Fried, Freedman, Endres, & Wasik, 1997; Fried et al., 2004; Glass et al., 2004; Rebok et al., 2004). The motivation, theoretical model, and design of this study were reported by Glass et al. (2004). In brief, older adults were randomly assigned to either a waitlist control group, or to groups of 15–30 volunteers working in public elementary schools across the country. Volunteers served an average of 15 hr a week, performing activities such as supporting literacy development in kindergarten through Grade 3, supporting library functions, teaching children conflict resolution through problem solving and play, and enhancing school attendance.

Randomized controlled trials are considered the gold standard in clinical research. In randomized controlled trials of volunteering, volunteer groups and (waitlisted) nonvolunteer groups are more likely to have similar distributions of demographic characteristics and motivations to volunteer at the study outset. In addition, differences between volunteer and nonvolunteer groups at the trial's completion are more likely to have resulted from volunteering, rather than be associated with the propensity to volunteer in the first place. The Experience Corps study in particular has propelled the field forward; it is the first study to include a wide range of objective measures of physical and cognitive functioning, as the review details. Characteristics of the six papers using data from Experience Corps that have reported on the health benefits of volunteering among older adults are provided in Table 4. As with the prospective cohort studies, to avoid false impressions about the reproducibility of findings, we are careful to note where particular outcome measures from a common sample are reported in more than one paper.

One serious threat to internal validity to which clinical randomized controlled trials are not immune is participants' preferences for one treatment arm over the others. This can affect recruitment, degree of engagement in the study, and attrition (Corrigan & Salzer, 2003; Donaldson, Christie, & Mark, 2009). In the Experience Corps data reported by Carlson, Saczynski, et al. (2008), 148 participants were randomly assigned to the volunteer intervention or waitlist control group; after attrition, 70 remained in the intervention group and 58 in the control group. These numbers imply that those assigned to the waitlist control group attrite at a significantly higher rate (~22% dropout rate) compared to those assigned to the volunteer intervention group (~5% dropout rate). Although is not surprising that individuals who are motivated to volunteer but assigned to a waitlist control group attrite at higher rates than those assigned to the volunteer group, differential attrition rates render randomized-controlled trials susceptible to selection artifacts similar to other design types. Indeed, Experience Corps participants who dropped out of the study were more likely than those who remained in the study to be older than 75 years, male, Caucasian, and working (Fried et al., 2004). Perhaps in response to attrition among the waitlist control group and its

Table 3
Characteristics of Prospective Cohort Studies From Which Data on the Benefits of Volunteering Among Older Adults Were Drawn, and Specifics of Samples Used in Prospective Studies Reviewed

Study	Sample	Wave (*n*)	Volunteering data/Control variable[a]
Americans' Changing Lives (ACL)	• Residents of continental U.S., aged 25+ • Oversampling of African Americans (2:1) and people aged 60+ (2:1)	1. 1986 (3,617) 2. 1989 (2,867) 3. 1994 (2,562) 4. 2001–2002 (1,787)	Number of hours volunteered in previous 12 months by type (religious, educational, political, senior citizen group, other)
Han & Hong (2013)	Aged 60+ at baseline	All waves (1,669)	AEGMRW
Kim & Pai (2010)	All participants	Waves 1–3 (3,617)	AEGHIMR
Li (2007)	Aged 50+ and married or widowed at baseline	Waves 1–3 (2,695)	AEGHIWR
Li & Ferraro (2005)	Aged 60+ at baseline	Waves 1–3 (1,634)	AEGHIMR
Li & Ferraro (2006)	All participants	Waves 1–3 (2,509)	AEGHIMRW
Morrow-Howell et al. (2005)	Aged 60+ at baseline	Waves 1–3 (2,739)	AGHR
Musick et al. (1999)	Aged 65+ at baseline; mortality by 1994	Wave 1 (1,211)	AEGIR
Musick & Wilson (2003)	All participants	Waves 1–3 (2,867)	AEGHIMRW
Tang (2009)	Aged 60+ at baseline	Waves 1–3 (1,209–1,669)[b]	AEGIMRW
Thoits & Hewitt (2001)	All participants	Waves 1–2 (2,681)	AEGIMR
Van Willigen (2000)	All participants	Waves 1–2 (2,867)	AEGHIM
Asset and Health Dynamics Among the Oldest Old Study (AHEAD)[c,d]	• Community-living residents of U.S., targeting people aged 70+ • Over-sampling of African Americans, Mexican Hispanics, and residents of Florida (1.8:1)	1. 1993 (7,447, plus 775 younger spouses) 2. 1995 (7,027) 3. 1998 (5,951) 4. 2000 (5,000) 5. 2002 (4,107) 6. 2004 (3,365) 7. 2006 (2,700) 8. 2008 (2,142)	Prior to 1998, >100 hr in previous 12 months Wave 3 on, number of hours in previous 12 months
Fonda & Herzog (2001)	Aged 70+ at baseline	Waves 1–2 (5,082)	AEGHR
Lum & Lightfoot (2005)	Aged 70+ at baseline	Waves 1 & 4 (7,322)	AEGHIMR
Luoh & Herzog (2002)	All participants; mortality by 2000	Waves 1–4 (4,860)	AEGHIMR
Health and Retirement Study (HRS)[c,d]	• Residents of the U.S., targeting people aged 50+	1. 1992 (12,652) 2. 1994 (11,420) 3. 1996 (10,964) 4. 1998 (10584) 5. 2000 (10,044) 6. 2002 (9,724) 7. 2004 (9,362) 8. 2006 (9,879) 9. 2008 (8,493)	Volunteering (yes/no) and number of hours volunteered in previous 12 months
Burr et al. (2007)	Self-identified as White or Black	Waves 7–8 (5,654)	AEGIR
McDonnall (2011)	With versus without dual-sensory loss	All AHEAD and HRS to 2006 (2,688)	AEGHI
Choi & Bohman (2007)	Aged 65+ at baseline	Waves 4–5 (8,030)	AEIR
Hao (2008)	Born 1931–1941	Waves 3–6 (7,830)	AEGRW
Lee et al. (2011)	Aged 65+; mortality by 2006	Waves 5–6 (6,408)	AEGHMR
Tavares et al. (2013)	Self-identified as White or Black	Waves 7–8 (5,666)	AEGHIR
Longitudinal Study of Aging (LSOA)	Community-living residents of U.S., aged 70+	1. 1984 (7,541) 2. 1986 (5,151) 3. 1988 (7,527) 4. 1990 (5,151)	Volunteering (yes/no) and frequency in past 12 months: *never, rarely, sometimes, frequently*
Harris & Thoresen (2005)	All participants; mortality by 1991	Waves 1–4: (7,496)	AEGHIRW
Sabin (1993)	All participants; mortality by 1988	Waves 1–3: (7,502)	AEGHR
Longitudinal Study of Aging (LSOA II)	Community-living residents of the U.S., aged 70+	1. 1994 (9,447) 2. 1997–1998 (7,998) 3. 1999–2000 (6,465)	Volunteering (yes/no) and frequency (user specified)
Hong et al. (2009)	All participants with depression data	Waves 1–3 (5,294)	AEGHIMR

(*table continues*)

Table 3 (*continued*)

Study	Sample	Wave (*n*)	Volunteering data/Control variable[a]
Wisconsin Longitudinal Study (WLS)	Persons who graduated from Wisconsin high schools in 1957	1. 1957 (10,317) 2. 1964 (8,922) 3. 1975 (9,138) 4. 1992–1993 (8,493) 5. 2004 (7,732)	Type and frequency of volunteering
Konrath et al. (2012)	All participants; mortality by 2008	Waves 4–5 (3,376 or 5,512)[b]	AEGHIMW
Piliavin & Siegl (2007)	All participants	Waves 1–5 (>6,000)	EGIMW
Israeli Central Bureau of Statistics	Residents of Israel aged 60+	1. Seven-year mortality follow-up from people interviewed in 1997–1998 (5,005)	Volunteering (yes/no) and hours of volunteering per week at interview time
Ayalon (2008)	All participants	Wave 1 (5,005); mortality by 2004	AEGHMW
Midlife Development in United States (MIDUS)	English-speaking, community-living residents of U.S., aged 20–74 at Wave I. Oversampling in select metropolitan areas, siblings of main sample, and twins	1. 1995–1996 (3,032) 2. 2004–2006 (1,805)	Hours per month volunteering by type
Choi & Kim (2011)	Aged 55–84 at Wave 2 with complete data	Waves 1–2 (917)	AGR (with the influence of EHI modeled)
The Survey of Health and Living Status of the Elderly in Taiwan	Taiwanese individuals aged 60+	1. 1989 (4,049) 2. 1993 (3,155) 3. 1996 (2,669) 4. 1999 (2,310)	Volunteering (yes/no) collected at Wave I only
Hsu (2007)	All participants	Waves 2–4 (3,155); mortality by 1999	AEGHIMR
MacArthur Study of Successful Aging	Community-living residents from three sites in U.S., aged 70–79 in 1988	1. 1988 (1,189) 2. 1991 (1,103) 3. 1995 (853)	Volunteered in past 12 months (yes/no), and if so, number of hours
Jung et al. (2010)	Participants with complete productivity and frailty data	Waves 1–2 (1,072)	AH
Florida Retirement Study	Residents of the west coast of Florida, aged 72+	1. 1988 (1,000) 2. 1989 (889) 3. 1990 (n/a) 4. 1991 (n/a) 5. 1992 (n/a) 6. 1993 (n/a) 7. 1994 (n/a) 8. 1995 (n/a) 9. 1996 (n/a)	Hours volunteered per week
Kahana et al. (2013)	Participants with complete predictor and outcome data	Waves 2 & 5 (585)	AGHM
Aging in Manitoba Study	Manitoba, Canada, residents aged 65+	Three cross-sectional samples: 1. 1971 (4,803) 2. 1976 (1,302) 3. 1983 (2,873) Longitudinal surveying of survivors of the three cross-sectional samples: 1. 1983 (2,399) 2. 1990 (3,218) 3. 1996 (1,868) 4. 2001 (1,012)	Volunteered within last week (yes/no)
Menec (2003)	All participants with complete data for the specific analyses	Longitudinal Waves 2–3 (1,208–2,291)[b]	AEGH
Later Life Study of Social Exchanges	Community-living residents of U.S. mainland aged 65–91	Five waves collected between 2000 and 2002 (916)	Volunteered within last month, with six options: *never or almost never, once a month or less, several times a month, about once a week, several times a week,* or *daily*
Okun et al. (2010)	All participants with complete data on study variables	All waves (868); mortality to 2006	AEGHMW

(*table continues*)

Table 3 (*continued*)

Study	Sample	Wave (*n*)	Volunteering data/Control variable[a]
No specific name provided	Community-living residents of Marin County, CA, aged 55+, with those aged 75+ oversampled	1. 4-year mortality follow-up on people interviewed in 1990–1991 (2,025)	Volunteering (yes/no), number of hours volunteered per week, and number of organizations
Oman et al. (1999)	All participants with volunteering data	Wave 1 (2,021); mortality to November 1995	AEGHIMRW
Changing Lives of Older Couples (CLOC) study	Community-living married couples of the Detroit, MI, area, where the husband was aged 65+	1. 6-year mortality follow-up on people interviewed in 1987–1988 (1,532)	Volunteering hours over the past year
Poulin (2014; Study 1)	All participants in which mortality data were available for both members of the couple	Wave 1 (846); mortality to 1994	AEGHR
National Health Interview Survey, Supplement on Aging (SOA)	Community-living residents of U.S., aged 55+	1. 7-year mortality follow-up on people interviewed in 1984 (16,148)	Volunteering (yes/no)
Rogers (1997)	All participants who consented to being followed via the National Death Index	Wave 1 (15,938); mortality to 1991	AEGHMR
Cross-Sectional and Longitudinal Aging Study (CALAS)	Jewish Israeli residents aged 75–94	1. 5- to 8-year mortality follow-up on people interviewed between 1989 and 1992 (1,633)	Volunteering (yes/no)
Shmotkin et al. (2003)	All participants with individual (not proxy) responses and with volunteering data	Wave 1 (1,343); mortality by 1997	AEGIR
Survey of Health, Ageing, and Retirement in Europe (SHARE)[d]	European (and Israeli) residents aged 50+	1. 2004–2005 (30,037) 2. 2006–2007 (33,536) 3. 2008–2009 (26,415) 4. 2010 (not available)	Volunteer or charity work within previous 4 weeks
Wahrendorf & Siegrist (2010)	All participants with complete data	Waves 1–2 (10,309)	AEGHIMW

Note. Bold font indicates prospective cohort studies from which data were drawn.
[a] Control variables: A = age; E = education; G = gender; H = health, disability, or physical ability; I = income; M = marital or partnered status; R = race or ethnicity; W = work/employment status. [b] Sample size varied depending on the analysis. [c] The AHEAD and HRS studies were merged in 1998. [d] Information about the sample sizes in the AHEAD and HRS studies obtained from http://hrsonline.isr.umich.edu, and for the SHARE study from http://www.share-project.org

possible magnification of group differences in change over time, some more recent Experience Corps papers by Tan et al. (2009) and Hong and Morrow-Howell (2010) compared changes in Experience Corps volunteers' outcome measures to those of participants in other prospective cohort studies, rather than to the Experience Corps waitlist control participants.

This review is organized by study design type within measurement domain (psychosocial, physical, and cognitive). We review the associations between volunteering among older adults and psychosocial measures first, then physical measures, and then cognitive measures, separately considering the evidence from descriptive, cross-sectional, prospective cohort, and randomized controlled trials. These results are summarized in Tables 5, 6, and 7, where columns represent specific measures or outcomes within each measurement domain. The rows represent the studies, organized by study design type. The cell symbols represent the data type (triangles represent qualitative data, squares represent subjective data, and circles represent objective data) as well as the outcome as reported. Filled symbols represent a significant benefit associated with volunteering; open symbols represent a nonsignificant relationship with volunteering.

Null qualitative data (open triangles) are not to be expected, because it is not the nature of qualitative research to report on themes that no one endorsed. Nevertheless, the relatively high ratio of positive to null subjective and objective outcomes hints at a degree of publication bias, where positive outcomes are more likely to be reported and null effects are more likely to be underreported (cf. Francis, 2012). There is no way to assess in a valid manner the degree to which null results have gone underreported; even if we were to contact each of the listed authors for a complete set of null results, this would not reveal all of the analyses that were not submitted or accepted for publication in other studies or by other authors. Instead, we encourage researchers to report all results examined, regardless of outcome, toward the goal of a complete and accurate understanding of the benefits of volunteering among older adults.

Psychosocial Benefits Associated With Volunteering Among Older Adults

Results of the psychosocial benefits of volunteering are shown in Table 5. The majority of studies on the benefits associated with volunteering among older adults have reported psychosocial outcomes. A number of cross-sectional and prospective cohort studies, together with the Experience Corps study, have reported positive associations between volunteering and reduced symptoms

Table 4
Characteristics of Experience Corps Studies on the Benefits of Volunteering Among Older Adults

Study	*n* volunteers (nonvolunteers)	Age range	Control variables[a]
Carlson et al. (2009)	8 (9)	$M = 68$	n/a[b]
Carlson et al. (2008)	62 (48)	$M = 69$	AE
Fried et al. (2004)	70 (48)	60–86 ($M = 69$)	n/a[c]
Hong & Morrow-Howell (2010)	EC: 167 (0) HRS: 77 (90)	EC: 51–83 HRS: 51–84	AEGHIMRW
Tan et al. (2009)	EC: 71 (WHAS: 150)	65–86	AEHIM
Tan et al. (2006)	59 (54)	59–86	AEGHR

Note. EC = Experience Corps; HRS = Health & Retirement Study; WHAS = Women's Health and Aging Studies.
[a] Control variables: A = age; E = education; G = gender; H = health, disability, or physical ability; I = income; M = marital or partnered status; R = race or ethnicity; W = work/employment status. [b] Volunteer and nonvolunteer groups did not differ in AEMR. [c] Volunteer and nonvolunteer groups did not differ in AEIGMRW.

of depression (cross-sectional: Hunter & Linn, 1980–1981; Krause, Herzog, & Baker, 1992; McMunn et al., 2009; Wahrendorf, von dem Knesebeck, & Siegrist, 2006; prospective cohort: ACL: Kim & Pai, 2010; Li, 2007; Li & Ferraro, 2005, 2006; Morrow-Howell, Hinterlong, Rozario, & Tang, 2003; Musick & Wilson, 2003; Thoits & Hewitt, 2001; AHEAD: Fonda & Herzog, 2001; Lum & Lightfoot, 2005; HRS: McDonnall, 2011; Choi & Bohman, 2007; Hao, 2008; LSOA–II: Hong, Hasche, & Bowland, 2009; Florida Retirement Study: Kahana et al. 2013; Experience Corps: Hong & Morrow-Howell, 2010). The one exception to this association between volunteering and lower levels of depression is a cross-sectional study reported by Shmotkin et al. (2003), who found that although their participants who volunteered reported less depression than those who did not volunteer, this difference was reversed after controlling for sociodemographic variables, the self-reported amount of physical and other everyday activity in participants' lives, and other functional markers including subjective health, social support, and life satisfaction.

Many studies have also found volunteering to be associated with higher levels and improvements in seniors' positive affect or happiness (descriptive: Larkin, Sadler, & Mahler, 2005; cross-sectional: Dulin, Gavala, Stephens, Kostick, & McDonald, 2012; McIntosh & Danigelis, 1995; Okun, Rios, Crawford, & Levy, 2011; Pilkington et al., 2012; Windsor et al., 2008; but see Carp, 1968; prospective cohort: ACL: Thoits & Hewitt, 2001; AHEAD: Fonda & Herzog, 2001; other: Kahana et al., 2013; but see Menec, 2003). Likewise, volunteering has been associated with greater life satisfaction (descriptive: Jirovec & Hyduk, 1998; Newman, Vasudev, & Onawola, 1985; but see Young & Janke, 2013; cross-sectional: Aquino, Russell, Cutrona, & Altmaier, 1996; Bond, 1982; Hunter & Linn, 1980-81; McMunn et al., 2009; Pilkington et al., 2012; Windsor et al., 2008; but see Shmotkin et al., 2003; prospective cohort: ACL: Thoits & Hewitt, 2001; Van Willigen, 2000; other: Kahana et al., 2013; but see Menec, 2003). However, it should be noted that the bulk of the evidence in favor of an association between senior volunteering and both positive affect and life satisfaction comes from cross-sectional rather than prospective cohort or randomized controlled trials.

While improvements in self-esteem or a sense of mastery associated with volunteering in seniors have not been found in the two cross-sectional studies that have included these measures (Hunter & Linn, 1980–1981; Krause et al., 1992), these associations have been identified in both descriptive and prospective cohort studies (descriptive: Arnstein, Vidal, Wells-Federman, Morgan, & Caudill, 2002; Hainsworth & Barlow, 2001; Morrow-Howell, Hong, & Tang, 2009; Newman et al., 1985; prospective cohort: ACL: Li, 2007; Thoits & Hewitt, 2001; but see Han & Hong, 2013). We included two other studies in Table 5 under this umbrella of self-esteem or mastery, as they measured other closely related concepts. In the descriptive study by Celdrán and Villar (2007), only seniors volunteering for social services or cultural organizations, and not for a management organization, endorsed feeling useful and self-fulfilled as benefits of their volunteering. Similarly, in the cross-sectional study by Okun et al. (2011), seniors who volunteered reported greater resilience than did their nonvolunteering counterparts.

It is difficult to say whether the exceptions noted above associating volunteering with depression, positive affect, life satisfaction, and self-esteem or mastery are due to sampling issues (or some other design feature) or simply represent Type II error, but aspects of two studies are worth noting. Menec (2003) did not find that volunteering at baseline predicted happiness or life satisfaction 6 years later. However, in that study volunteering status was determined by whether participants reported having volunteered within the week prior to assessment; 1 week may be too short a time frame in which to validly capture whether one volunteers or not, as a number of factors could have prevented otherwise regular volunteers from fulfilling their role in the prior week. It is also possible that the 6-year follow-up period was too long; perhaps an association between volunteering and happiness and/or life satisfaction would have been present earlier. Young and Janke (2013) surveyed 195 volunteering seniors at two time points (of an unspecified interval), using a 3-point scale (*not at all, some,* and *a great deal*) to assess the extent the volunteers anticipated they would gain (and then had gained) on 10 items assessing psychosocial, physical, and cognitive issues. The fact that they reported no changes on any item may be due either to the fact that the baseline measures reflected not the participants' current state but their anticipated gains or to the use of a potentially insensitive 3-point scale.

Improvements in composite measures of psychological well-being have been reported in prospective cohort studies of volun-

Table 5
Summary of Results on the Effects of Volunteering Associated With Psychosocial Functioning

Study	Psychosocial							
	Depression	Affect/ happiness	Life satisfaction	Self-esteem/ mastery	Psychological well-being	Quality of life	Self-definition	Social support/ network
Descriptive								
Arnstein et al. (2002)				▲				▲
Barron et al. (2009)								
Celdrán & Villar (2009)				■				
Cook (2011)								
Cook (2013)							▲	
Hainsworth & Barlow (2001)				▲				▲
Jirovec & Hyduk (1998)			■					
Kerschner & Rousseau (2008)								■
Larkin et al. (2005)		▲						
Misener et al. (2010)								▲
Morrow-Howell et al. (2012)								
Morrow-Howell et al. (2009)				■		■		▲
Morrow-Howell et al. (1999)								■
Narushima (2005)							▲	▲
Newman et al. (1985)			■	▲				
Piercy et al. (2011)							▲	▲
Young & Janke (2013)			□					□
Cross-sectional								
Aquino et al. (1996)			■					■
Bond (1982)			■					
Carp (1968)		□						□
Dulin et al. (2012)		■						
Hunter & Linn (1980–1981)	■		■	□				
Krause et al. (1992)	■			□				
McIntosh & Danigelis (1995)		■						
McMunn et al. (2009)	■		■			■		
Okun et al. (2011)		■		■				
Pilkington et al. (2012)		■	■					
Shmotkin et al. (2003)	□		□					■
Wahrendorf et al. (2006)	■					■		
Warburton & Peel (2008)								
Windsor et al. (2008)		■	■					
Prospective cohort								
ACL								
Han & Hong (2013)				□				
Kim & Pai (2010)	■							
Li (2007)	■			■				
Li & Ferraro (2005)	■							
Li & Ferraro (2006)	■							
Morrow-Howell et al. (2003)	■							
Musick et al. (1999)								
Musick & Wilson (2003)	■							
Tang (2009)								
Thoits & Hewitt (2001)	■	■	■	■				
Van Willigen (2000)			■					
AHEAD								
Fonda & Herzog (2001)	■	■						
Lum & Lightfoot (2005)	■							
Luoh & Herzog (2002)								
HRS								
Burr et al. (2011)								
Choi & Bohman (2007)	■							
Hao (2008)	■							
Lee et al. (2011)								
McDonnall (2011)	■							
Tavares et al. (2013)								

(*table continues*)

Table 5 (*continued*)

Study	Psychosocial							
	Depression	Affect/ happiness	Life satisfaction	Self-esteem/ mastery	Psychological well-being	Quality of life	Self-definition	Social support/ network
LSOA/LSOA II								
Harris & Thoresen (2005)								
Hong et al. (2009)	■							
Sabin (1993)								
WLS								
Konrath et al. (2012)								
Piliavin & Siegl (2007)					■			
Other								
Ayalon (2008)								
Choi & Kim (2011)					■			
Hsu (2007)								
Jung et al. (2010)								
Kahana et al. (2013)	■	■	■					
Menec (2003)		□	□					
Okun et al. (2010)								
Oman et al. (1999)								
Poulin (2014)								
Rogers (1996)								
Wahrendorf & Siegrist (2010)						■		
Randomized controlled								
Experience Corps								
Carlson et al. (2009)								
Carlson et al. (2008)								
Fried et al. (2004)								■
Hong & Morrow-Howell (2010)	■							
Tan et al. (2009)								
Tan et al. (2006)								

Note. Triangles = qualitative data; squares = subjective data; circles = objective data; filled shapes = positive relationship with volunteering; unfilled shapes = nonsignificant relationship with volunteering. ACL = Americans' Changing Lives; AHEAD = Assets and Health Dynamics Among the Oldest Old; HRS = Health and Retirement Study; LSOA = Longitudinal Study of Aging; WLS = Wisconsin Longitudinal Study.

teering (Choi & Kim, 2011; WLS: Piliavin & Siegl, 2007), and a number of studies have reported an association between volunteering and better maintenance of quality of life (descriptive: Morrow-Howell et al., 2009; cross-sectional: McMunn et al., 2009; Wahrendorf et al., 2006; prospective cohort: Wahrendorf & Siegrist, 2010). In three descriptive qualitative studies, seniors reported existential benefits of volunteering; participants reported that their volunteering gave them the opportunity to refine their self-definition and reexamine what was important in their lives (Cook, 2013; Narushima, 2005; Piercy, Cheek, & Teemant, 2011).

Volunteerism among seniors has been related to improvements in social support and social networks. Descriptive studies have consistently found senior volunteers to report that their volunteering allowed them to meet new people, make friends, and develop a sense of community (Arnstein et al., 2002; Hainsworth & Barlow, 2001; Kerschner & Rousseau, 2008; Misener, Doherty, & Hamm-Kerwin, 2010; Morrow-Howell, Kinnevy, & Mann, 1999; Narushima, 2005; Piercy et al., 2011; but see Young & Janke, 2013). This same association between seniors' volunteering and improved social networks or support has been reported in cross-sectional studies (Aquino et al., 1996; Shmotkin et al., 2003; but see Carp, 1968). Moreover, measures of the quantity and quality of social support completely mediated the above-mentioned greater life satisfaction among seniors who volunteered compared to seniors who did not volunteer reported by Aquino et al. (1996) and Pilkington et al. (2012). These results suggest that there may be a select group of seniors who enjoy a healthy level of social support, leading to greater life satisfaction, thereby giving them the foundation needed to go out and seek volunteer positions. Although cross-sectional studies cannot address these questions of causal direction, the Experience Corps study results showed that compared to waitlist controls, volunteers reported that over the course of their volunteering they experienced a significant increase in the number of people they could turn to for help (Fried et al., 2004). This suggests a potential causal effect of volunteering on the quality of social relations. Nevertheless, the attrition in the control group may mitigate firm conclusions about the effects of volunteering on feelings of social support. We return to the more general issue of whether particular variables cause one to volunteer or change as a function of volunteering (or both) later in this review.

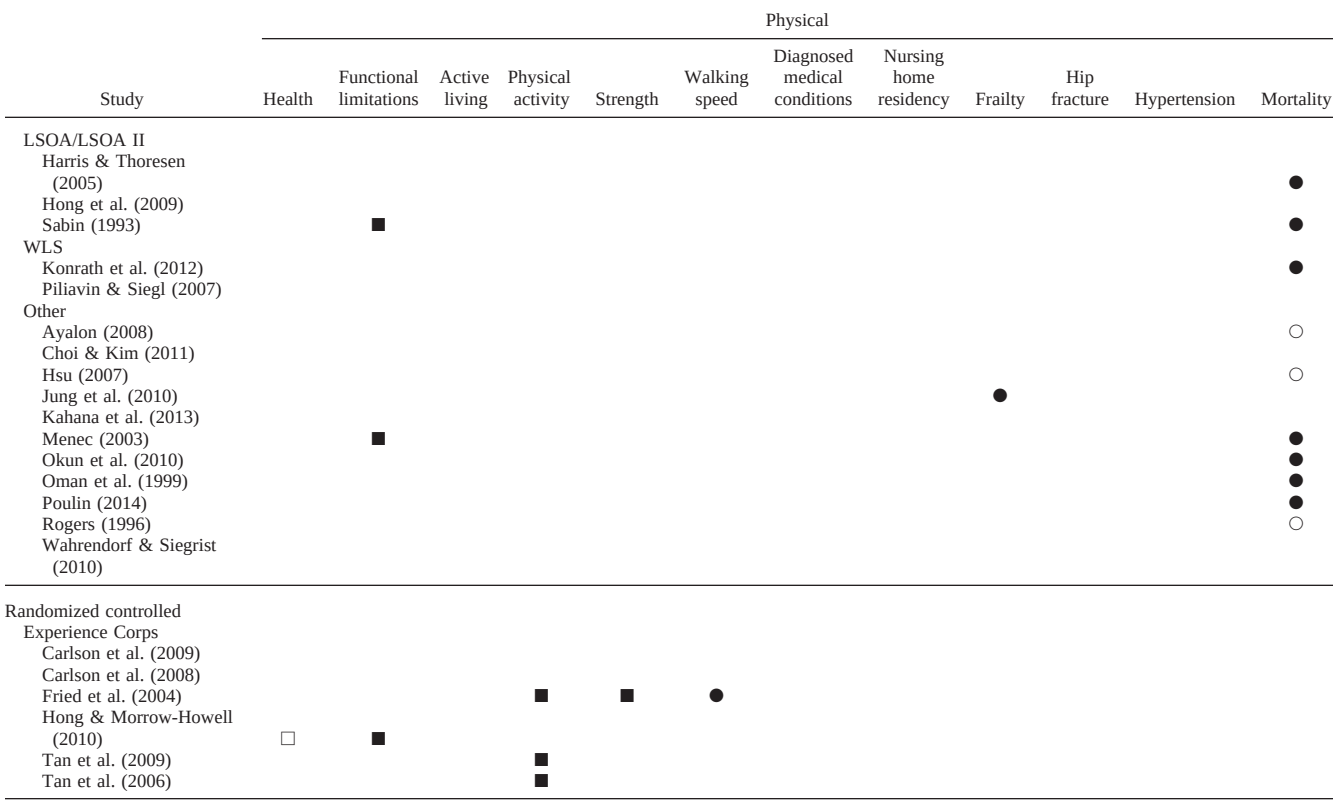
In addition to these common findings on the psychosocial benefits of seniors' volunteering, a number of additional features of these results are worth noting. First, evidence from the prospective cohort study of Kahana et al. (2013) suggests that the positive associations between seniors' volunteering and reductions in symptoms of depression, along with improvements in positive affect and life satisfaction are independent of participants' altruistic attitudes. Those authors entered simultaneously into an ordinal logistic regression analysis (a) hours spent volunteering per week, (b) a measure of altruistic attitudes, (c) the amount of informal help one provided to others in the last year, along with (d) sociodemographic control variables. The results showed that more

Table 6
Summary of Results on the Effects of Volunteering Associated With Physical Functioning

Study	Health	Physical: Functional limitations	Physical: Active living	Physical: Physical activity	Physical: Strength	Physical: Walking speed	Physical: Diagnosed medical conditions	Physical: Nursing home residency	Physical: Frailty	Physical: Hip fracture	Physical: Hypertension	Physical: Mortality
Descriptive												
Arnstein et al. (2002)												
Barron et al. (2009)					■	●						
Celdrán & Villar (2009)												
Cook (2011)												
Cook (2013)												
Hainsworth & Barlow (2001)												
Jirovec & Hyduk (1998)	□											
Kerschner & Rousseau (2008)												
Larkin et al. (2005)												
Misener et al. (2010)	▲		▲									
Morrow-Howell et al. (2012)			■									
Morrow-Howell et al. (2009)	▲		▲									
Morrow-Howell et al. (1999)	▲		■									
Narushima (2005)												
Newman et al. (1985)												
Piercy et al. (2011)												
Young & Janke (2013)	□											
Cross-sectional												
Aquino et al. (1996)												
Bond (1982)												
Carp (1968)												
Dulin et al. (2012)												
Hunter & Linn (1980–1981)	■											
Krause et al. (1992)												
McIntosh & Danigelis (1995)												
McMunn et al. (2009)												
Okun et al. (2011)												
Pilkington et al. (2012)												
Shmotkin et al. (2003)	■						□					●
Wahrendorf et al. (2006)												
Warburton & Peel (2008)										●		
Windsor et al. (2008)												
Prospective cohort												
ACL												
Han & Hong (2013)												
Kim & Pai (2010)												
Li (2007)												
Li & Ferraro (2005)												
Li & Ferraro (2006)		■										
Morrow-Howell et al. (2003)	■	■										
Musick et al. (1999)												●
Musick & Wilson (2003)												
Tang (2009)	■	■					□					
Thoits & Hewitt (2001)	■											
Van Willigen (2000)	■											
AHEAD												
Fonda & Herzog (2001)												
Lum & Lightfoot (2005)	■	■					□	○				●
Luoh & Herzog (2002)	■											●
HRS												
Burr et al. (2011)											●	
Choi & Bohman (2007)												
Hao (2008)												
Lee et al. (2011)												●
McDonnall (2011)												
Tavares et al. (2013)											●	

(*table continues*)

Table 6 (*continued*)



Note. Triangles = qualitative data; squares = subjective data; circles = objective data; filled shapes = positive relationship with volunteering; unfilled shapes = nonsignificant relationship with volunteering. ACL = Americans' Changing Lives; AHEAD = Assets and Health Dynamics Among the Oldest Old; HRS = Health and Retirement Study; LSOA = Longitudinal Study of Aging; WLS = Wisconsin Longitudinal Study.

hours spent volunteering was significantly predictive of less depressive symptomatology, greater positive affect, and better life satisfaction levels. Altruistic attitudes, on the other hand, were only predictive of greater positive affect levels. These results suggest that the link between seniors' volunteering and their mental health outcomes is at least partly independent from their prosocial attitudes.

Second, a number of studies have identified individual differences in the psychosocial benefits associated with volunteering. One prospective cohort study found a positive association between volunteering and mood in women, but not in men (Choi & Bohman, 2007). McDonnall (2011) found that elevations in depressive symptoms among seniors with dual sensory loss (vision and hearing) were mitigated among those who volunteered. Okun et al. (2011) found that the greater positive affect and resilience among senior volunteers compared to their nonvolunteering counterparts was even larger among those with more chronic health conditions. Together, these last two results support the notion that more vulnerable individuals may benefit the most from volunteering.

Third, feeling appreciated or needed as a volunteer appears to amplify the relationship between volunteering and psychosocial well-being. This has been shown for the relationship between volunteering and depression (Wahrendorf et al., 2006), life satisfaction (McMunn et al., 2009), psychological well-being (Piliavin & Siegl, 2007), and quality of life (McMunn et al., 2009; Wahrendorf et al., 2006). In line with these results is the theme reported in the qualitative study by Larkin et al. (2005), regarding the importance of being appreciated and valued as a volunteer.

Fourth, another trend emerging from these studies (and one that will be recapitulated when we discuss the association between volunteering and physical outcomes) is a nonlinear relationship between number of volunteer hours and psychosocial outcome. Depression (Morrow-Howell et al., 2003), positive affect (Windsor et al., 2008), and life satisfaction (Pilkington et al., 2012; Windsor et al., 2008) have been found to improve with increasing number of volunteer hours, but only up to a point, after which the benefits diminish. Van Willigen (2000) reported a linear relationship between the number of volunteer hours and seniors' life satisfaction, but that study used an ordinal scale of volunteer hours in which the highest level was 160 annual hr or more, which is considerably lower than the ranges captured in other studies. While most of this evidence comes from cross-sectional rather than prospective cohort study designs (with the exception of Morrow-Howell et al., 2003), these studies suggest a threshold effect in which there is some optimal level of volunteering beyond which the benefits no longer accrue. On average, these papers suggest that the optimal level of volunteering at which to enjoy these psychosocial benefits is approximately 100 annual hr (2 to 3 hr per week).

In summary, there is now considerable evidence from varying study designs that volunteering among older adults is associated with benefits to a range of psychosocial health measures, but these benefits may depend on a moderate level of volunteering and the

Table 7
Summary of Results on the Effects of Volunteering Associated With Cognitive Functioning

Study	Cognitive				
	New learning	Mental status	Memory	Executive functioning	Frontal lobe activity
Descriptive					
Arnstein et al. (2002)					
Barron et al. (2009)					
Celdrán & Villar (2009)					
Cook (2011)	▲				
Cook (2013)					
Hainsworth & Barlow (2001)					
Jirovec & Hyduk (1998)					
Kerschner & Rousseau (2008)					
Larkin et al. (2005)					
Misener et al. (2010)					
Morrow-Howell et al. (2012)					
Morrow-Howell et al. (2009)					
Morrow-Howell et al. (1999)	▲				
Narushima (2005)	▲				
Newman et al. (1985)					
Piercy et al. (2011)					
Young & Janke (2013)	□				
Cross-sectional					
Aquino et al. (1996)					
Bond (1982)					
Carp (1968)					
Dulin et al. (2012)					
Hunter & Linn (1980–1981)					
Krause et al. (1992)					
McIntosh& Danigelis (1995)					
McMunn et al. (2009)					
Okun et al. (2011)					
Pilkington et al. (2012)					
Shmotkin et al. (2003)		●			
Wahrendorf et al. (2006)					
Warburton & Peel (2008)					
Windsor et al. (2008)					
Prospective cohort					
ACL					
Han & Hong (2013)					
Kim & Pai (2010)					
Li (2007)					
Li & Ferraro (2005)					
Li & Ferraro (2006)					
Morrow-Howell et al. (2003)					
Musick et al. (1999)					
Musick & Wilson (2003)					
Tang (2009)					
Thoits & Hewitt (2001)					
Van Willigen (2000)					
AHEAD					
Fonda & Herzog (2001)					
Lum & Lightfoot (2005)					
Luoh & Herzog (2002)					
HRS					
Burr et al. (2011)					
Choi & Bohman (2007)					
Hao (2008)					
Lee et al. (2011)					
McDonnall (2011)					
Tavares et al. (2013)					
LSOA/LSOA II					
Harris & Thoresen (2005)					
Hong et al. (2009)					
Sabin (1993)					

(*table continues*)

Table 7 (*continued*)

Study	Cognitive				
	New learning	Mental status	Memory	Executive functioning	Frontal lobe activity
WLS					
Konrath et al. (2012)					
Piliavin & Siegl (2007)					
Other					
Ayalon (2008)					
Choi & Kim (2011)					
Hsu (2007)		○			
Jung et al. (2010)					
Kahana et al. (2013)					
Menec (2003)					
Okun et al. (2010)					
Oman et al. (1999)					
Poulin (2014)					
Rogers (1996)					
Wahrendorf & Siegrist (2010)					
Randomized controlled					
Experience Corps					
Carlson et al. (2009)				●	●
Carlson et al. (2008)			●	●	
Fried et al. (2004)					
Hong & Morrow-Howell (2010)					
Tan et al. (2009)					
Tan et al. (2006)					

Note. Triangles = qualitative data; squares = subjective data; circles = objective data; filled shapes = positive relationship with volunteering; unfilled shapes = nonsignificant relationship with volunteering. ACL = Americans' Changing Lives; AHEAD = Assets and Health Dynamics Among the Oldest Old; HRS = Health and Retirement Study; LSOA = Longitudinal Study of Aging; WLS = Wisconsin Longitudinal Study.

feeling that one's efforts are appreciated. More work is needed to examine individual differences in the benefits associated with volunteering, psychosocial and otherwise. The available evidence points to possible differences between the benefits enjoyed by women and men, and by those with and without sensory loss, but there is a host of other potentially important variables that also deserve further research attention, including urban versus rural seniors and seniors with intact versus impaired cognitive status.

Physical Benefits Associated With Volunteering Among Older Adults

Results of the physical benefits of volunteering are shown in Table 6. Evidence about the physical benefits of volunteering experienced by seniors comes from both self-report (qualitative and subjective) and objective evidence. In the most general terms, cross-sectional studies have reported that older adults who volunteer report better physical health than do their nonvolunteering counterparts (Hunter & Linn, 1980–1981; Shmotkin et al., 2003). Moreover, improvements in self-reported physical health associated with volunteering have been identified in both descriptive (Misener et al., 2010; Morrow-Howell et al., 1999, 2009; but see Jirovec & Hyduk, 1998; Young & Janke, 2013) and prospective studies (ACL: Morrow-Howell et al., 2003; Tang, 2009; Thoits & Hewitt, 2001; Van Willigen, 2000; AHEAD: Lum & Lightfoot, 2005; Luoh & Herzog, 2002). Using data from the ACL study, Van Willigen (2000) reported that improvements in physical health over time were more than 2.5 times greater among volunteers over the age of 60 than they were in their younger volunteering counterparts. The prospective studies have also identified increasing improvements in physical health ratings with increasing volunteer hours (ACL: Tang, 2009), up to a point, beyond which the benefit tapers off (ACL: Morrow-Howell et al., 2003; Thoits & Hewitt, 2001; Van Willigen, 2000; AHEAD: Luoh & Herzog, 2002; Lum & Lightfoot, 2005). There are three exceptions to this pattern of volunteering being associated with better self-reported health. The descriptive studies by Jirovec and Hyduk (1998) and Young and Janke (2013) combined questions about number of days of illness and functional capacity and used a gross 3-point scale, respectively, and one could argue that neither is a particularly sensitive measure of overall health. In addition, in one report of the Experience Corps data, participants in that study showed smaller declines in physical health than a matched comparison sample from the HRS study, but these differences were not significant (Hong & Morrow-Howell, 2010). However, associations between volunteering and maintenance of physical health may have been underestimated in that comparison, as the researchers did not exclude participants who volunteered from the HRS comparison sample. Overall, these results point toward a positive association between volunteering and the overall physical health of older adults.

Similar benefits of volunteering have been reported for maintenance of functional independence (basic and instrumental activities of daily living). Prospective cohort studies (ACL: Li & Ferraro, 2006; Morrow-Howell et al., 2003; Tang, 2009; AHEAD: Lum & Lightfoot, 2005; LSOA: Sabin, 1993; Aging in Manitoba: Menec, 2003; MacArthur Study of Successful Aging: Jung, Gruenewald, Seeman, & Sarkisian, 2010), and the Experience Corps study (Hong & Morrow-Howell, 2010) have all reported associations between volunteering and reductions in functional limita-

tions. Indeed, in the ACL study, this relationship was magnified with increased volunteer hours (Tang, 2009), and the prototypical relationship between increasing age and increasing functional dependency was found to be weaker among volunteers than nonvolunteers (Morrow-Howell et al., 2003).

In a descriptive study, 10% of senior volunteers endorsed notions such as active living as the most beneficial aspect of their volunteering, and 95% agreed that volunteering enabled them to participate in meaningful activities (Morrow-Howell et al., 1999). Likewise, seniors who volunteer report increases in the amount of activity in which they engage in their everyday lives (Misener et al., 2010; Morrow-Howell et al., 2009; Morrow-Howell, Hong, McCrary, & Blinne, 2012). Correspondingly, the Experience Corps study has shown that volunteering is associated with increases in the estimated amount of physical activity in which seniors engage in their everyday lives (Fried et al., 2004; Tan, Xue, Li, Carlson, & Fried, 2006), and that these gains are maintained 3 years later (Tan et al., 2009). Likely associated with this volunteering-related increase in physical activity are the findings from the Experience Corps study of improved self-reported strength (Barron et al., 2009; Fried et al., 2004) and objectively measured walking speed (Barron et al., 2009; Fried et al., 2004) among volunteers over time. However, relationships between volunteering and grip strength from this study were mixed (Barron et al., 2009; Fried et al., 2004).

Taken together, these results suggest that volunteering is associated with health improvements and increased physical activity and fitness, changes that one would expect to offer protection against a variety of health conditions. Indeed, a moderate amount of volunteering has been shown to be related to less hypertension (Burr, Tavares, & Mutchler, 2011)—at least among Caucasian volunteers (Tavares, Burr, & Mutchler, 2013)—over time in the HRS prospective cohort study, and fewer hip fractures among seniors who volunteer than among their matched nonvolunteering peers (Warburton & Peel, 2008). Neither the number of self-reported physician-diagnosed medical conditions (Shmotkin et al., 2003; Tang, 2009; Lum & Lightfoot, 2005) nor rates of admission to a nursing home (Lum & Lightfoot, 2005) have been found to associate with volunteering. Nevertheless, other studies have repeatedly (with a few exceptions) found volunteering to be inversely associated with the final arbiter of health—mortality—within the period of time prospectively observed (ACL: Musick, Herzog, & House, 1999; AHEAD: Lum & Lightfoot, 2005; Luoh & Herzog, 2002; HRS: Lee, Steinman, & Tan, 2011; LSOA/LSOA II: Harris & Thoresen, 2005; Sabin, 1993; WLS: Konrath, Fuhrel-Forbis, Lou, & Brown, 2012; other: Ayalon, 2008; Okun, August, Rook, & Newsom, 2010; Oman, Thoresen, & McMahon, 1999; Poulin, 2014; Rogers, 1996; Shmotkin et al., 2003). Konrath et al. (2012) reported that the protective effect of volunteering on mortality was evident only for those who volunteered for other-oriented reasons (e.g., for social connections and for altruistic purposes) and not self-oriented reasons (e.g., to escape one's troubles, to feel better about oneself). In a somewhat similar vein, Poulin (2014) found that volunteering buffered the relationship between stressful life events and mortality over a 6-year period, but only among those older adults who volunteered a below-median number of hours and had positive views of others. Two studies failed to find an association between volunteering and mortality. In the study by Hsu (2007), only 4.4% of the participants volunteered, so this study may have lacked the power to detect the association. In the other exception (Menec, 2003), participants indicated whether they had volunteered in the last week, which we have already suggested may not be a sufficient window in which to ascertain volunteering status. Indeed, in a recent meta-analysis Okun, Yeung, and Brown (2013) reported that volunteering is associated with a 24% (95% CI [16%, 31%]) reduction in mortality risk among older adults, after adjusting for age, sex, physical health, and 11 other relevant variables, leading the authors to conclude, "It is no longer a question of whether volunteering is predictive of reduced mortality risk; rather, our results suggest that the volunteering-mortality association is reliable, and that the magnitude of the relationship is sizeable" (p. 13).

In summary, the evidence is mounting that volunteering is associated with positive health benefits for seniors and reduced mortality risk. Moreover, the threshold effect that was seen for psychosocial outcomes appears to be at play for physical health as well, with beneficial effects evident at a moderate but not necessarily high-intensity commitment to volunteering. The research landscape linking volunteering and health is still largely unexplored. Most notably, not a single study has examined the association between volunteering and risk of dementia or the association between volunteering and a host of other health conditions that put seniors at higher risk for dementia such as diabetes and stroke.

Cognitive Benefits Associated With Volunteering Among Older Adults

Results of the cognitive benefits of volunteering are shown in Table 7, where the most obvious feature is that very few studies have examined the benefits of volunteering on cognitive functioning in older adults, despite the fact that older adults report new learning as one of the primary benefits they experience as a function of their volunteer work (Cook, 2011; Morrow-Howell et al., 1999; Narushima, 2005; but see Young & Janke, 2013). In a prospective cohort study, Hsu (2007) reported no significant effect of volunteering on 6-year changes in mental status after controlling for sociodemographic and health factors, but we remind readers that only 4.4% of that sample volunteered. In a cross-sectional study Shmotkin et al. (2003) reported worse mental status among senior volunteers than their nonvolunteering counterparts, after controlling for sociodemographic variables and indicators of degree of physical and leisure activity in participants' lives. In contrast to this perplexing finding is the evidence from the Experience Corps study: When Carlson, Saczynski, et al. (2008) restricted their analysis to those participants with executive dysfunction in the first assessment, they found that improvements from the first to second assessment in executive functioning—specifically on the ability to switch between two task sets (Trail Making Test Part B)—and in verbal (but not visual) learning and memory, were greater in the group assigned to volunteer compared to the waitlist control group. Moreover, in a small functional neuroimaging study, the beneficial effects of volunteering on executive functioning were replicated, in this case on a flanker task sensitive to cognitive control, and were accompanied by significantly greater increases from the first to second scanning session in activation of the prefrontal cortex compared to changes in the group of waitlist control participants (Carlson et al., 2009).

Although investigation into the effects of volunteering on cognitive aging is still in its infancy, these initial reports provide cautious support for the proposition that volunteering may have positive effects on cognitive functioning among older adults. We encourage investigators to include more objective measures of cognitive functioning in future studies. Particularly interesting would be the inclusion of a more comprehensive battery of neuropsychological tests, so that the association of volunteering with the risks of various forms of dementia and its precursor, mild cognitive impairment, could be ascertained. Findings that volunteering could delay or prevent diagnosis of such neurocognitive disorders would have tremendous implications for the economic and psychological costs of these devastating disorders.

Summary of the Benefits Associated With Volunteering Among Older Adults

The reviewed evidence demonstrates that volunteering among older adults is related to better psychosocial, physical, and cognitive health, as well as better functional performance. The majority of investigations to date have focused on psychosocial outcomes, where reliable associations have been reported between volunteering and amelioration of depressive symptoms, improved life satisfaction, and enhanced social support. Of note, with the exception of the association between volunteering and depression, where there is support from all study design types, the evidence of senior volunteering being related to broader psychosocial health has come primarily from descriptive and cross-sectional study designs. In the physical domain, volunteering has most consistently been associated with better overall health and fewer functional limitations; these results are supported by respected prospective cohort studies and, in the case of functional limitations, the Experience Corps randomized control trial. Moreover, the evidence that volunteering is associated with delayed mortality is strong. Investigations into the effects of volunteering on specific health conditions are beginning to emerge and provide promising leads for future research. Finally, relatively little research has focused on the cognitive effects of volunteering, although the evidence from the Experience Corps study suggests that seniors may experience improvements in memory and executive functioning. Common themes indicate that the protective benefits associated with volunteering are amplified if volunteers feel reciprocity (i.e., their work is appreciated and "matters"), contribute their time for prosocial reasons, and make a moderate but not excessive commitment to volunteering.

A Model of the Protective Effects of Volunteering Among Older Adults Against Functional Decline and Dementia

At this point, we return to our theoretical model and discuss where the existing evidence supports our model, and where evidence is lacking and more research is needed. As a reminder, the thesis of our model is that volunteering increases social, physical, and cognitive activity (to varying degrees depending on characteristics of the volunteer placement) which, through biological and psychological mechanisms, leads to improved functioning and ultimately reduces functional decline and dementia. What is the evidence for this model?

Supposition 1: Volunteering Increases Social, Physical, and Cognitive Activity to Varying Degrees Depending on Requirements of the Volunteer Placement

Our first supposition is that a key factor modulating the association between volunteering and positive health outcomes is the extent to which volunteers' specific placements require social, physical, and cognitive activity. However, thus far, investigations have been limited to fairly rudimentary analyses of health outcomes as a function of the number of hours participants commit to volunteering, the number of volunteer roles participants hold, and the general type of volunteering. For the first type of analysis, the results generally show increases in benefits with volunteer hours, often with a threshold effect beyond which benefits no longer accrue, as reviewed earlier. Results from analyses of the benefits of volunteering as a function of the number of volunteer roles are mixed. Role theory (Chambré, 1984; Moen et al., 1992) suggests that multiple roles would be more beneficial, a position that is supported by the results of Oman et al. (1999) and Piliavin and Siegl (2007), but not by those of Morrow-Howell et al. (2003) or Musick et al. (1999). For the third type of analysis, Windsor et al. (2008) categorized their participants' volunteering into 11 different types (e.g., fundraising, teaching, coaching, preparing food) but found that only one type differentially related to psychosocial outcome: Volunteering in management or committee roles was related to greater positive affect, but only for women. In contrast to that finding were the results from the descriptive study by Celdrán and Villar (2007), who found that volunteering was associated with an increased sense of self-esteem and mastery, but only for those volunteering in social services or cultural organizations, not in management organizations. Some investigators have reported greater beneficial effects for those seniors volunteering for religious than nonreligious causes (McIntosh & Danigelis, 1995; Musick & Wilson, 2003; Oman et al., 1999), but these results were not replicated by Morrow-Howell et al. (2003).

Although volunteer hours, the number of volunteer roles, and the type of volunteering all likely modulate the amount of activity added to participants' lives, they are indirect measures of activity. Knowing that someone volunteers 150 annual hr, or that she volunteers in two roles, or that she volunteers for religious causes provides no specific information about how much social, physical, or cognitive activity her volunteer roles provide. The fact that the benefits of volunteering have not been investigated as a function of the specific type (i.e., social, physical, cognitive) and degree of activity is surprising, because researchers have promoted consideration of such variability in analyses of the effects of volunteering on health outcomes (Gottlieb & Gillespie, 2008; Morrow-Howell, 2010).

There is a parallel literature that can be drawn on to inform how researchers might approach incorporating the type and amount of volunteering activity into analyses of its effects on health outcomes. Specifically, there is now substantial evidence that the complexity of one's paid occupational work relates to cognitive functioning and dementia risk in later life (Andel, Kåreholt, Parker, Thorslund, & Gatz, 2007; Andel et al., 2005; Bickel & Kurz, 2009; Bosma et al., 2003; Finkel, Andel, Gatz, & Pedersen, 2009; Jorm et al., 1998; Karp et al., 2009; Kröger et al., 2008; Potter, Helms, & Plassman, 2008; Potter, Plassman, Helms, Foster, & Edwards, 2006; Qiu et al., 2003; Schooler, Mulata, & Oates,

1999; Singh-Manoux et al., 2011; Smyth et al., 2004; Wight, Aneshensel, & Seeman, 2002).

A common current approach to relating occupation to neurocognitive health is to match participants' prior occupations to a standard occupational code in the U.S. Department of Labor's (1977) *Dictionary of Occupational Titles* (DOT), which, among other things, contains specific ratings made by means of extensive on-site job analyses. Three key ratings are the complexity of each occupation with respect to data, people, and things, based on work by Fine (1955; Fine & Cronshaw, 1999). The first two complexity ratings map nicely on to the cognitive and social complexity of the job, but it should be noted that jobs with high social complexity, involving abilities such as mentoring and negotiating, also require higher cognitive skills, and indeed these two complexity ratings are positively correlated (Andel et al., 2005; Finkel et al., 2009; Kröger et al., 2008). Complexity with things refers to the use of equipment, which often requires motor skills. To capture the physical complexity of occupations, some have used other occupation measures in the DOT, such as the strength required by a worker to perform a job (Potter et al., 2006; Potter et al. 2008; Smyth et al., 2004).[2]

The modal result of papers using the DOT or comparable approaches is that high complexity of work with data and with people are both protective against cognitive decline or impairment, Alzheimer's disease, and all-cause dementia (Andel et al., 2005, 2007; Bosma et al., 2003; Karp et al., 2009; Kröger et al., 2008; Smyth et al., 2004). By contrast, in the majority of studies, the complexity of work with things is unrelated to these neurocognitive outcomes (Andel et al., 2005, 2007; Karp et al., 2009; Potter et al., 2006; Smyth et al., 2004; but see Kröger et al., 2008; Potter et al., 2008). Although less studied in these papers, work requiring high physical demand has been found to increase risk of cognitive impairment in old age and Alzheimer's disease (Potter et al., 2006, 2008; Smyth et al., 2004). This latter finding is consistent with earlier reports that categorized or ranked occupations along a single continuum (e.g., Dartigues et al., 1992; Fratiglioni, Ahlbom, Viitanen, & Winblad, 1993), and it has been suggested that work that is more physically demanding exposes individuals to risks (e.g., neurotoxins in farming and other occupations, cf. Dartigues et al., 1992) for cognitive decline and dementia.

To our knowledge, this occupational complexity perspective has never been applied in research on the benefits of volunteering in particular, although it has been shown that the cognitive complexity of seniors' general leisure activities shares a reciprocal relationship with intellectual flexibility (Schooler & Maluta, 2001). More relevant to our current point is the fact that occupational therapists view volunteering as an occupation; albeit part-time and unpaid, volunteering is a way of spending time in meaningful activity (Black & Living, 2004). Furthermore, formal volunteer roles often have a formal occupational counterpart. For example, a volunteer cashier in a hospital gift shop is performing the occupational work activities of a cashier. A hospital "friendly visitor" is performing many of the duties of a companion. Therefore, the occupational complexity of volunteer roles can be ascertained from the same databases used to analyze paid occupations. Indeed, the International Labour Organization guidelines encourage all United Nations (UN) member states to use the *Manual on the Measurement of Volunteer Work* (International Labour Organization, 2011) to match their volunteers' roles to occupations in order to "build up a knowledge base" (p. i) about volunteer work and to "establish the economic value of volunteering" (p. i). Although the goal of the UN is more economically focused, a fortuitous by-product of these efforts to match volunteer roles to occupations is that the occupational complexity data can be easily derived and used in research to relate the cognitive, social, and physical complexity of volunteer work to health outcomes.

In some ways, however, it is not so surprising that in-depth job analysis of volunteer roles has not been undertaken in research efforts to understand the protective benefits of volunteering. Compared to the relative ease with which one can analyze dichotomous variables (e.g., volunteering yes/no; volunteering for religious or nonreligious causes), or ordinal or continuous variables (number of volunteer hours or roles), we acknowledge that taking the steps necessary to determine the occupational complexity of volunteer roles in a reliable and valid manner is much more labor intensive.

It is also likely that the relationship between volunteer occupational complexity and health outcomes is not linear, but that there is an optimal level of physical, cognitive, and social complexity, beyond which health benefits may dissipate. Moreover, these points of inflection probably differ between individuals, depending on their capabilities in these domains. The key to optimal health benefits, then, may be to find or construct volunteer positions that provide what occupational therapists call the "just right challenge" (see Rebeiro & Polgar, 1999).

Supposition 2: Increases in Social, Physical, and Cognitive Activity Improve Functioning Through a Host of Biological and Psychological Mechanisms

Support for an aspect of our second supposition—that increases in social, physical, and cognitive activity improve psychosocial, physical, and cognitive functioning—can be inferred both from the volunteering literature reviewed herein as well as from the broader literature examining activity in other contexts that was discussed early in this review. We do not recapitulate this information here, except to say that both literatures provide evidence that increased activity, including that associated (indirectly thus far) with volunteering, has salubrious effects on social, physical, and cognitive functioning (see Tables 5–7). Efforts have also been made identify the biological (e.g., brain-derived neurotrophic factor) and psychological mechanisms (e.g., self-efficacy) of these associations between increased activity and improved functioning, although the bulk of this work has occurred outside the volunteering literature. Moreover, there is evidence from the broader gerontological literature that better functioning in one domain is associated with better functioning in another domain. An example of such findings is that reduced symptoms of depression (e.g., Blake, Mo, Malik, & Thomas, 2009) and improved cognition and brain health (for review, see Erickson, Gildengers, & Butters, 2013) occur with improvements in physical fitness among seniors. Functional limitations among seniors are also associated with restricted life-space mobility, referring to the size of the spatial

[2] Unfortunately, the DOT has now been replaced by the Occupational Information Network (http://www.onetonline.org/). The rather straightforward data–people–things categories are now spread across 41 different "work activities," and are thus less easy to apply to research.

area a person explores in daily life (Portegijs, Rantakokko, Mikkola, Viljanen, & Rantanen, 2014), suggesting that functional improvements may be associated with greater and more varied activity. Corresponding to this idea is the fact that seniors who volunteer report becoming more active in their everyday lives (Misener et al., 2010; Morrow-Howell et al., 1999, 2009, 2012). Hence, the arrows in our model are bidirectional between increased activity as a function of volunteering and improved functioning, mediated by biological and psychological mechanisms, but whether these links are confirmed by research on volunteering remains to be determined.

Supposition 3: Improvements in Social, Physical, and Cognitive Functioning Reduce Functional Impairments and Dementia Risk

The existing literature reveals that volunteering is associated with both improvements in social, physical, and cognitive functioning and reduced functional impairment, as reviewed previously (ACL: Li & Ferraro, 2006; Morrow-Howell et al., 2003; Tang, 2009; AHEAD: Lum & Lightfoot, 2005; LSOA: Sabin, 1993; Aging in Manitoba: Menec, 2003; and the Experience Corps study, Hong & Morrow-Howell, 2010). However, no attempt has been made yet to ascertain whether the psychosocial, physical, or cognitive changes associated with volunteering cause the functional changes seen. Moreover, the diagnosis of many forms of dementia (e.g., due to Alzheimer's disease, vascular causes, Lewy body disease) requires that criteria for both cognitive dysfunction and functional impairments be met; thus, this evidence provides optimism for the hypothesis that volunteering will also be associated with reduced dementia risk. However, this aspect of our third and final supposition has never been tested.

Recommendations for Future Research

An important body of evidence has emerged on the psychosocial, physical, and cognitive benefits associated with volunteering among older adults. Nevertheless, as this review details, there are many questions left unanswered. In this final section of the review, we provide some recommended approaches for future research to help answer these important questions.

Recommendation 1: Design More Studies With Objective Outcome Measures

An exciting new trend in research on the benefits of volunteering among older adults is the inclusion of objective measures of health and cognition. Mortality risk has long been a focus of research, and it is encouraging that that the association of volunteering with delayed mortality is no longer questioned (Okun et al., 2013). Thus far, there is emerging evidence that volunteering is associated with less hypertension (Burr et al., 2011; Tavares et al., 2013) and with fewer fall-related hip fractures (Warburton & Peel, 2008). Nevertheless, it would still be useful to determine whether volunteering is associated with a reduced risk of specific conditions that in turn predispose one to premature death or dementia, such as stroke and diabetes.

If volunteering is to reduce dementia risk, then it must first have positive effects on cognition. The initial evidence is encouraging, with Carlson, Saczynski, et al. (2008) and Carlson et al. (2009) reporting improved memory and executive functioning associated with seniors' volunteering. It will be essential to replicate these findings in other study populations, and it would be useful to see how volunteering affects other cognitive domains such as attention, working memory, prospective memory, and autobiographical memory. Finally, the increase in prefrontal lobe activity during an executive task seen in Experience Corps volunteers (Carlson et al., 2009) is an exciting first step in exploring the effects of volunteering on the brain. We hope that this field follows in the footsteps of the exercise literature and further explores the benefits of volunteering on brain function, structure (e.g., protecting against atrophy and white matter pathology), and metabolism.

Objective measurement of psychosocial functioning is trickier to achieve, but not impossible. There are now a handful of experimental paradigms that measure the implicit effects of psychosocial well-being, ranging from tasks such as the emotional Stroop task (Williams, Mathews, & MacLeod, 1996) that can be sensitive to symptoms of depression or anxiety, to lexical decision or category judgment tasks that are sensitive to self-esteem or stereotypes, including age stereotypes (see Chasteen, Schwarz, & Park, 2002; Greenwald & Farnham, 2000; Hummert, Garstka, O'Brien, Greenwald, & Mellott, 2002). Such implicit measures of psychosocial well-being can complement subjective (questionnaire) or qualitative data, as there is evidence that these functions operate at least in part outside our conscious awareness (see Greenwald & Banaji, 1995).

Recommendation 2: Integrate Mixed Methods Evidence in Prospective Studies on the Benefits of Volunteering

One result of this review that surprised us was that the vast majority of studies employ a single type of measure, be it qualitative, subjective, or objective. A handful of studies included both subjective and objective measures (e.g., Lum & Lightfoot, 2005, in their examination of the effects of volunteering on self-reported depression, health, diagnosed medical conditions, and functional limitations, and on objective measures of nursing home admissions and mortality). However, no study has attempted to assess the degree to which volunteers' personal experiences of volunteering, as assessed by qualitative interviews, change over time, and how these changes correlate with objective changes. A very powerful message about the salubrious benefits associated with volunteering would be communicated if self-reported health benefits were confirmed with objective measures of health.

Recommendation 3: Gain a Better Understanding of the Individual Differences in the Benefits Associated With Volunteering

A number of papers have explored individual differences in the benefits associated with volunteering. Starting with the question of whether the benefits enjoyed by seniors who volunteer would be expected from volunteers of any age, it appears that volunteering is especially beneficial for seniors. Although Okun et al. (2011), in their cross-sectional comparison of volunteers aged 18+, found no interaction between volunteer status and age on positive affect, negative affect, or resilience,

the bulk of the evidence suggests otherwise. Four papers have reported preferential benefits associated with volunteering among older but not middle-aged or younger adults, in terms of depression (Kim & Pai, 2010; Li & Ferraro, 2005; Musick & Wilson, 2003), life satisfaction and perceived health (especially at high rates of volunteering; Van Willigen, 2000), and functional limitations (Li & Ferraro, 2005). All of these reports come from the ACL study cohort, although they do coincide with the report by Omoto, Snyder, and Martino (2000) of greater overall perceived benefits from volunteering among older than younger adults. Nevertheless, these effects should be replicated in different samples before we can safely conclude that seniors are especially likely to benefit from volunteering.

Evidence regarding other individual differences among older adults in the benefits associated with volunteering is mixed. A couple of studies suggest that it is the less vulnerable seniors who benefit most. This includes Sabin (1993), who showed that volunteering was associated with a reduced mortality risk in healthy seniors but not in those with fair health or functional limitations, and the cross-sectional study of Windsor et al. (2008), who reported that high levels of volunteering ($\geq$ 800 annual hr) was associated with greater negative affect among those who were not married or in a common-law relationship (and had a moderate level of education, i.e., 13–15 years), compared to those who were in a partnered relationship. However, the bulk of the evidence suggests that it is actually the more vulnerable seniors who demonstrate volunteering-related benefits the most. Dulin et al. (2012) reported a stronger cross-sectional association between volunteering and happiness among seniors with lower socioeconomic status. Okun et al. (2011) reported that the cross-sectional association between volunteering and both positive affect and resilience was greater among seniors with more chronic health conditions. These cross-sectional findings have been echoed in two prospective cohort studies. Analyzing data from the HRS cohort, McDonnall (2011) reported that volunteering was associated with reduced symptoms of depression among seniors with dual sensory loss, and Lee, Steinman, and Tan (2001) demonstrated that the association between volunteering and reduced mortality risk was greater among nondrivers than drivers, especially those from rural areas. Finally, Musick et al. (1999) analyzed data from the ACL cohort, and reported that the association between volunteering for one organization and reduced mortality risk was greater among seniors with low levels of social interaction. Together, this evidence provides impetus for exploring further how seniors' vulnerability modulates the relationship between volunteering and health outcomes, and whether this varies as a function of vulnerability type (e.g., social vs. health-related).

One important issue is that any variable that moderates volunteering benefits has the potential to also moderate the propensity to volunteer in the first place. Indeed, there is no doubt that social selection and social causation both influence the effects of volunteering on seniors' health outcomes. As already reviewed, there is evidence that seniors with higher levels of well-being (e.g., younger, more educated) are more likely to volunteer (social selection effects) and that volunteering is associated with elevated levels of well-being (social causation effects). Although most studies examined only social selection effects (not reviewed in depth here) or only social causation effects, papers from two prospective cohort studies have measured and verified both effects (ACL: Li, 2007; Li & Ferraro, 2005, 2006; Thoits & Hewitt, 2001; HRS: Hao, 2008). For example, Thoits and Hewitt (2001) reported that the links between older adults' tendency to volunteer at baseline and their happiness, better health, lower depression, greater satisfaction with life, and/or higher self-esteem were fully accounted for by their degree of social integration (measured by frequency of church and organization attendance); however, volunteering over time was still associated with increased well-being in these areas, even when the level of social integration was controlled. Similarly, Hao (2008) found that older volunteers reported fewer symptoms of depression at baseline, and volunteering protected against depression symptoms over time. Other studies identified compensatory social selection effects that combine with social causation effects. Those who had lost a spouse within the prior 4 years were more likely to start volunteering than their married counterparts and experience greater reductions in the number of depressive symptoms (Li, 2007). Furthermore, contrary to the findings of Thoits and Hewitt (2001), Li and Ferraro (2005, 2006) reported that seniors with more symptoms of depression were more likely to begin volunteering and that their volunteering was associated with lower numbers of depressive symptoms. These results point to volunteering as a possible prescription to allay depressive symptoms.

Overall, the existing evidence suggests that seniors do enjoy greater benefits associated with their volunteering than do their younger counterparts, that more vulnerable seniors may benefit the most, and that social selection and social causation effects are both at play, at least in terms of the association between volunteering and depression. Much more work is needed to determine (a) whether the benefits associated with volunteering differ between senior and younger volunteers, (b) what individual difference factors moderate changes associated with volunteering, and (c) how social selection and social causation effects interplay across a wide range of outcome measures.

Recommendation 4: Relate Benefits of Volunteering to Specific Volunteering Activities

Perhaps the biggest revolution in research on the benefits of volunteering would occur if the calls to relate specific volunteering activities to health outcomes were heeded. Above, we discussed the approach taken in research linking occupational complexity to cognitive health and dementia risk. Assessing the occupational complexity of volunteer roles would allow researchers to examine how different levels of complexity within different types of complexity (psychosocial, physical, and cognitive) relate to health outcomes. The study design then becomes essentially a dose–response design, with outcomes examined as a function of the social, physical, and cognitive complexity of the volunteer roles. Of course, when volunteers choose their own roles, an attempt would have to be made to accommodate in the analysis a selection bias whereby more capable seniors might select more complex roles. How volunteer occupational complexity relates to health outcomes likely also depends on how much time one puts into the role, the fit between the complexity of the volunteer role and the volunteers' capabilities, as well as on important personal characteristics such as one's motivation to perform that role, the satis-

faction gained from it, and the supports present in that individual's personal environment. These are important questions for researchers aiming to understand what it is specifically about volunteering that contributes to positive psychosocial, physical, and cognitive outcomes.

Intriguingly, analysis of how the benefits associated with volunteering covary with the occupational complexity of seniors' volunteer roles could occur in any design type. Descriptive qualitative studies could ascertain whether themes about active living or new learning, for example, derive more from seniors in complex than simple roles. Cross-sectional studies could examine whether volunteer occupational complexity modulates the magnitude of the differences between volunteering and nonvolunteering seniors. Prospective cohort studies and randomized control trials could assess whether salubrious health changes over time are greater among volunteers in more complex roles. To avoid the issue of potentially high attrition among control groups in randomized control trials, participants could be randomized to high or low complexity volunteer roles (and not to a waitlist control group) and allowed to select from role options within that level of complexity. Together, these study design options allow researchers to capitalize both on the advantages of the particular study designs, and on the potential utility of examining how the health benefits associated with volunteering among older adults can be amplified by complex social, physical, and/or cognitive volunteer activity.

Recommendation 5: Investigate the Independent and Interactive Effects of Volunteering and Other Engaging Activities

At the start of this review, we discussed our belief that volunteering is similar to other activities that provide social, physical, and cognitive activity to seniors' lives (such as belonging to community or exercise groups), but that volunteering has the added feature of involving altruism that these other activities do not necessarily share. This then raises the question—is volunteering special? More specifically, three questions can be asked:

1. Is volunteering associated with unique health benefits when engagement in other activities is controlled?

2. Is volunteering associated with greater health benefits than these other activities?

3. Are the health benefits associated with volunteering amplified when one also engages in other activities?

In response to the first question, some studies have employed multivariable analyses to address the unique contribution of volunteering, controlling for engagement in other activities. These studies have found that volunteering, compared to not volunteering, is associated in seniors with

- less decline over time in quality of life when controlling for work status and informal care giving (Wahrendorf & Siegrist, 2010) and predicting quality of life when controlling for work status (Bond, 1982);
- reduced mortality risk when controlling for engagement in community activities such as attending concerts or religious services (Rogers, 1996);
- reduced symptoms of depression over time when controlling for informal care giving (Kahana et al., 2013) or work status (Hao, 2008);
- less increase in functional limitations associated with frailty over time when controlling for attending religious services or work status (Jung et al., 2010); and
- better subjective health and cognitive functioning (but not depression) and reduced mortality risk, when controlling for engagement in physical activities, everyday activities, and hobbies (Shmotkin et al., 2003).

These results suggest that volunteering does have unique associations with positive health outcomes, over and above those associated with other activities, but admittedly the scope of other activities examined has been rather limited. More research focused on identifying the unique benefits associated with volunteering on a broader range of everyday life activities is needed.

In response to the second question, a handful of studies have directly compared the association between formal volunteering and other activities with health outcomes. In a prospective cohort study, Li and Ferraro (2005) found that volunteering, but not informal care giving, was associated with reduced severity of symptoms of depression over time. However, in the cross-sectional study reported by Krause et al. (1992), seniors who provided informal support, but not formal volunteering, showed a greater sense of personal control, while only those in formal volunteer roles had fewer somatic symptoms of depression. Choi and Kim (2011) reported that later psychological well-being was more strongly predicted by earlier charitable giving than it was by earlier volunteering, controlling for income and other demographic variables. These few reports suggest that different forms of altruistic acts (donating money, informal care giving, and formal volunteering) may have differential associations with health outcomes, but more research is clearly needed. In addition, three studies have directly compared formal volunteering and other activities on health outcomes. In a descriptive study by Morrow-Howell et al. (1999), volunteers endorsed more benefits than did seniors attending classes. In the cross-sectional study by Carp (1968), older workers endorsed greater happiness, self-efficacy, and social support than did older adult nonworking volunteers, even though these two groups did not differ in age, income, gender, education, job level during career, or health complaints. Finally, in another cross-sectional study by Aquino et al. (1996), working was directly associated with life satisfaction among seniors, but the relationship between volunteering and life satisfaction was mediated by social support. Again, more research is needed to compare how the health benefits associated with volunteering differ from those of other activities. Prospective data on this issue are notably lacking; it would be valuable to compare the health benefits associated with volunteering head-to-head with those of other formal activities such as exercise programs and late-life learning programs.

There are no data that speak to the third question of whether the health benefits associated with volunteering are greater when one also engages in other activities. Testing for interactive effects of this nature requires massive sample sizes, and it would be difficult to usefully categorize across individuals the type and amount of engagement in other activities. Nevertheless, the recent report by

Carlson et al. (2012) suggests that variety may be the spice of life: Women who engaged in more forms of activity, regardless of the cognitive complexity of those activities, had less risk of cognitive decline over a 9.5-year interval. This result, along with common sense, suggests that it is better to volunteer and exercise and attend classes than it is to only volunteer one's time.

Recommendation 6: Examine the Association Between Volunteering and Dementia Risk

Society is in dire need of preventative measures to delay or prevent dementia onset. Dementia prevalence is projected to double over 20 years, from over 30 million people worldwide today to more than 65 million people in 2030 (Alzheimer's Disease International and World Health Organization, 2012). Delaying dementia onset by just a few years would tremendously cut prevalence rates and would have enormous benefits to the economy (Brookmeyer, Johnson, Ziegler-Graham, & Arrighi, 2007), not to mention to the psychological well-being of patients and their loved ones.

The studies reviewed herein provide a sufficient base of evidence to justify research into the effects of volunteering on dementia risk, particularly when one considers the fact that dementia-related neuropathology is often present years prior to diagnosis (see Mortimer, Borenstein, Gosche, & Snowden, 2005, for a review). There are a number of ongoing prospective studies in which physician-diagnosed dementia is one of the primary outcome measures (e.g., Canadian Longitudinal Study on Aging, Betula Project in Sweden, Alzheimer's Disease Neuroimaging Initiative). At the very least, we encourage investigators in these studies to include questions about volunteering in their surveys so that the basic link between volunteering and dementia risk can be made.

Conclusions

Gerontological research is discovering protective lifestyle factors that help maintain the level of functioning of older adults and offset functional decline and dementia risk. The focus of this review was on the protective benefits associated with volunteering among older adults. Volunteers of all ages contribute at least $400 billion to the global economy (International Labour Organization, 2011), with older adults contributing significantly more hours of volunteer service per person than their younger counterparts. The results of this review show that volunteering in later life is associated with significant psychosocial, physical, cognitive, and functional benefits for healthy older adults. There is some evidence to suggest that more hours of volunteering (up to a point), feeling that one's efforts matter, and volunteering for prosocial reasons are associated with greater benefits. The mechanisms by which volunteering may confer biopsychosocial health benefits may or may not differ from those of other engaging activities, but unlike the relatively voluminous literature exploring the psychological, occupational, cognitive, biological, and neural mechanisms by which other activities improve functioning, very little research has focused on how volunteering contributes to enhanced biopsychosocial health. We advocate that future research involve more objective measures of functioning, integration of qualitative and quantitative methods in prospective study designs, further explorations of individual differences in the health benefits associated with volunteering, analyses to determine how volunteer job complexity relates to health benefits, and investigation of how volunteering-related health benefits are independent of, or interactive with, engagement in other protective activities.

A final, more startling, omission in this field of inquiry is research investigating the capacity of volunteering to reduce the risk and delay the onset of dementia. It is already clear that volunteering is a win–win for seniors; it would be an even bigger triumph if volunteering also reduced dementia risk. Given the emerging evidence that seniors engaged in formal volunteering develop fewer functional limitations and improved memory and executive functioning, it is a reasonable and important hypothesis that giving of one's time and skills in productive activity will also help reduce risk of dementia. The time to test this hypothesis is now.

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