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Using the Caregiver System Model to Explain the Resilience-Related Benefits Older

Adults Derive from Volunteering

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Abstract

Helping other people in general, and volunteering, in particular, is a potential resilience resource for older adults. However, researchers have not provided an integrative explanation for why volunteering has these beneficial outcomes. To address this gap, we (a) quantify the benefit of volunteering on reducing the risk of mortality, (b) present an overview of the caregiver system model of active help and stress regulation, and (c) use the caregiver system model to explain why volunteering is beneficial for older volunteers. For each of eight studies, volunteering was observed to be inversely related to mortality risk with a median odds ratio of .51. The caregiver system posits that providing care to a needy person can activate a suite of cognitions, emotions, and underlying neurophysiology that modulates the stress response. We propose a model specifying mediators and moderators of the relation between volunteering and the activation of compassionate motives, which in turn, enhances stress regulation and delays disease and death.

Resilience can be conceptualized in several different ways. One view of resilience is that it represents the capacity, in the face of stressful and traumatic circumstances, (a) to bounce-back; and (b) to sustain oneself. In the present chapter, we focus on stress regulation and risk of mortality as markers of the bounce-back and sustainability components of resilience, respectively. Our central thesis is that providing support to another person (helping behavior), whatever its effect on the recipient, can promote the resilience-related resources of the *helper* (Brown & Brown, 2006).

Providing assistance to another elevates the helper's mood, improves relationship satisfaction, and relieves negative affective states such as sadness and distress (see Post, 2007). Brown and her colleagues have shown that helping behavior is associated with accelerated recovery from depressive symptoms among older adults experiencing spousal bereavement (Brown, House, Brown, & Smith, 2008) and with reduced risk of mortality (Brown, Nesse, House, & Smith, 2003), even among caregivers (Brown, Smith, et al., 2009). Okun and his colleagues showed that volunteering reduced the risk of mortality among older adults who have functional health limitations (Okun, August, Rook, & Newsom, 2010). Thus, helping behavior in general, and volunteering, in particular, is a potential resilience resource for older adults facing stressors. However, researchers have not provided an integrative explanation for why volunteering enhances the resilience capability of older adults. To address this gap, in the current chapter, we first quantify the benefit of volunteering on reducing the risk of mortality. Second, we present an overview of the caregiver system model of active help and stress regulation. Third, we use the caregiver system model to explain why volunteering enhances the resilience of older adults and under what circumstances it is likely to do so.

Quantitative Synthesis

We focused on the bivariate association between organizational volunteering and risk of mortality among adults 55 years and older. Organizational volunteering refers to an unpaid, voluntary activity that involves “. . . taking actions within an institutional framework that potentially provides some service to one or more other people or to the community at large” (Piliavin & Siegl, 2007, p. 454). We located eight studies that estimated the association between volunteering and risk of mortality. For each study, we extracted an odds ratio (OR). The OR compared the odds of dying among volunteers with the odds of dying among non-volunteers. Values below 1 indicated that volunteering was associated with a reduced risk of dying, with values closer to “0” indicating the largest reduction in mortality risk associated with volunteering. For each odds ratio, we computed the 95% confidence interval. As can be seen in Figure 1, the ORs ranged from .29 to .66 and, for each study, the entire 95 percent confidence interval was below 1.0. Consistent with a previous review (Oman, 2007), volunteering was observed to be inversely related to mortality risk. Using the median OR of .51, we conclude that, without statistically controlling for other variables, volunteering was associated with a 49% reduction in the risk of mortality.

The Caregiver System Model of Active Help and Stress Regulation

The survival benefit of volunteering for the helper implies the existence of an underlying regulatory system (or set of interacting systems) that motivates helping behavior and has important physiological consequences for the body (Brown et al., 2003; Brown & Brown, 2006; Brown et al., 2008; Brown, Smith, et al. 2009). We have recently hypothesized that helping behavior may be organized within a *caregiving behavioral system*¹, a suite of cognitions, emotions, and underlying neurophysiology that motivates active help (Brown,

1. The “caregiving” system as used here is not specific to the context of providing care for an ill or disabled loved one. Rather, it is a behavioral system hypothesized to underlie the provision of care for any individual in need (Bowlby, 1969).

Brown, & Preston, 2011). Repeated activation of this system has been hypothesized to forge links between helping, modulation of the stress response, and health (Brown, et al., in press; Poulin, Brown, Dillard, & Smith, submitted)

With few exceptions (George & Solomon, 1999) theories of *human* caregiving systems have been uninformed by physiology and animal models that identify relevant neural circuitry. The utility of animal models for guiding research in psychology has been articulated recently by Cacioppo et al. (2007). Such models are particularly important for exploring links between volunteering and mortality because they provide neuroanatomical pathways for connecting helping behavior to physiological indicators of stress that plausibly influence health.

Figure 2 shows the basic caregiving system model, grounded in what is known about maternal caregiving neural circuitry, including extensions to human helping behavior (Brown, Brown, & Preston, 2011). Although we will not describe the underlying neural circuitry in detail here (see Numan, 2006, for a review), the circuit is under the influence of the Medial Preoptic Area (MPOA) of the Hypothalamus, which triggers motor programs for helping along two routes (a) by increasing approach motivation (i.e., via the Nucleus Accumbens—Ventral Pallidum circuit) and (b) by decreasing the competing avoidance (stress) response (i.e., inhibition of the anterior hypothalamic nucleus and periaqueductal gray). Hormones that may increase the chance of activating the MPOA include oxytocin and progesterone, both of which have been shown to predict helping behavior and stress (Brown & Brown, 2006; Brown, Fredrickson, et al., 2009; Carter, 1998). The association of helping behavior with deactivation of the stress response and downstream effects on immune function is theorized to be part of the mechanism by which volunteering influences stress-regulation and long-term physical health (Brown & Preston, 2012).

Using the Caregiver System Model to Explain the Resilience-Related Benefits of Volunteering

In applying the caregiving system model to understand the resilience-related benefits that older volunteers derive helping others, we posited four classes of mediating variables that may determine whether volunteering triggers activation of the caregiving system. Perceived usefulness (e.g., sense of competence) and social relationships (e.g., social integration/support) are both thought to trigger the caregiving system, so we hypothesize that both will trigger positive emotions and compassionate, as opposed to reward-based motives. Volunteering motivation is also hypothesized to be influenced by situational attributes such as the type of volunteer work. Compassionate helping triggered by volunteering is then expected to improve stress regulation and immune function, improving cognitive functioning, health, and well-being and delaying disease and death.

The link from volunteering to perceived usefulness and sense of competence. One of the major motives given by older adults for volunteering is their desire to feel useful. Gruenewald, Karlamangla, Greendale, Singer, and Seeman (2007) demonstrated that relative to older non-volunteers, older volunteers were 1.8 times more likely to frequently feel that they were useful to others. Piliavin and Siegl (2007) found that volunteering promotes a sense of mattering and suggested that it leads older people to feel that they have an important role in society. Volunteering in later life also has been shown to promote an agentic self-identity (Herzog, Franks, Marcus, & Holmberg, 1998). Midlarsky and Kahana (1994) observed that by helping others, older volunteers can increase their sense of competence. Because role occupancy declines with age (Van Willigen, 2000), perceived competence may be a particularly salient component of older adults' leisure repertoires. In a rare, true experimental field study, Midlarsky and Kahana (1994) found that an intervention designed to increase

volunteering increased self-esteem among participants in a dose-response fashion: i.e., greater hours volunteered led to higher levels of self-esteem.

The link from volunteering to social integration and support. Clearly, volunteering may expose the volunteer to social networks and can involve both giving and receiving social support. Data from surveys and an experiment show that volunteering is associated with more social connections (Harris & Thoresen, 2005; Midlarsky & Kahana, 1994; Oman et al., 1999). Furthermore, there is a robust association between social contact and physical health, rivaling the effect sizes of smoking, drinking, and exercise (House, Landis, & Umberson, 1988). Previous attempts to understand the health effects of social contact and social networks have focused on the presumed value of receiving social support from others. However, consistent with the forgoing discussion, increasing evidence is suggesting that providing social support to others may be more beneficial than receiving it (Brown, Nesse, Vinokur, & Smith, 2003). For example, Brown et al. (2003) found that providing emotional support to a spouse, and instrumental support to one's social network, were each independently associated with a 30-60% reduction in mortality risk (for the giver) over the 5-year study period. These giving-related benefits could not be accounted for by measures of participants' physical health, mental health, personality, other interpersonal variables, or by support participants received from their spouse. In fact, support received actually increased participants' mortality risk in some models, consistent with other studies that have shown harmful effects of receiving support (e.g., increased suicidal ideation, Brown & Vinokur, 2003). In an independent replication of the Brown et al. (2003) study, providing support, but not receiving it, predicted reduced morbidity (W. Brown² et al., 2005).

Possible moderators of the links from volunteering to sense of competence and social integration. In this section, we speculate about how the relations between

² No relation

volunteering and sense of competence and social integration may vary with person and situation attributes. For example, assuming that the volunteer environment affords people with high levels of education opportunities to utilize their occupation-related expertise, it can be posited that the relation between volunteering and sense of competence increases as education increases. Indeed, in a study of individuals applying to volunteer in an ombudsman program, Keith (2003) found that education was positively related to interest in volunteering due to opportunities to use occupational skills.

The relation between volunteering and social integration may increase with religiosity. In a study of adults living in retirement communities, Omoto and Schlehofer (2007) reported that religious individuals were more likely to volunteer through church-related activities than non-religious individuals, and, in turn, volunteering in church-related activities was positively related to life satisfaction. Involvement in volunteering via church-related activities is also likely to promote social integration (Omoto & Schlehofer, 2007). Among older volunteers, retirement communities (12% of volunteering) and political organizations (9% of volunteering) constitute two of the top ten sponsors of volunteer services (Marriott Senior Living Services, 1991). Relative to politically-sponsored volunteering, retirement community-sponsored volunteering may afford a greater opportunity to foster social integration. Thus, it can be posited that the relation between volunteering and social integration is greater among volunteers who provide services for retirement communities as compared to political organizations.

The link from perceived usefulness and sense of competence to positive emotions.

A sense of perceived usefulness and competence can be considered personal resources that trigger, and are triggered by, positive emotions. Growing research in positive psychology notes the bi-directional influence between personal resources and positive emotions

(Lyubomirsky, King, & Diener, 2005). Known as the broaden-and-build theory of positive emotions (Fredrickson, 2001), positive emotions are hypothesized to broaden the thought-action repertoire, which builds resources (e.g., maintaining a sense of mastery, social support), which, in turn, increase positive emotions. This by-directional relationship causes an upward spiral in positive emotions, which have been shown to be predictive of better health (Doyle, Gentile, & Cohen, 2006) and longevity (Danner, Snowdon, & Friesen, 2001). Increases in positive emotions may also reflect activation of the caregiving system because it relies on the neurotransmitter dopamine, a reward-based hormone (i.e., released in response to the anticipation of reward) to trigger approach behaviors involved in helping. Positive emotions may be especially sensitive to a feeling of usefulness because learned helplessness interferes with dopamine production (and therefore caregiving system activation) via increased activation of the habenula (Christoph et al., 1986).

The link from social integration and support to positive emotions. Because social integration and support reflect social resources that are built by positive emotions (Fredrickson, 2001), we speculate that increases in these social resources also play a role in triggering positive emotions among volunteers. In addition to the rewarding properties of receiving social support from others, the provision of support has been shown to directly influence well-being, positive mood, and happiness (Post, 2007). For example, in a study of multiple sclerosis (MS) patients exposed to either an intervention that taught coping flexibility versus a control group that received monthly phone calls from peer support volunteers, the individuals who exhibited the largest increases in well-being (e.g., depression, anxiety, satisfaction, happiness) were the group of peer supporters—patients with the disease who provided telephone support to patients in both conditions (Schwartz & Sendor, 1999).

A beneficial association of the provision of social support and positive emotions has also been shown among spousal caregivers of individuals with cognitive impairment (Poulin, et al., 2010). In their study, Poulin and his colleagues used ecological momentary assessment with 73 caregivers who reported on the amount of time they spent helping their spouse, their actual caretaking tasks, and their emotions. These reports were collected at 3-hour intervals during waking hours for a period of 7 days. The results of multi-level modeling indicated that active help was associated with increases in reports of positive emotions, especially for caregivers who felt interdependent with their spouse. Among caregivers who felt interdependent, active help was also protective against negative emotions.

The association between providing social support and positive emotions may be explained in part by the role of the mesolimbic reward system in mediating acts of helping or charitable donation. In a neuroimaging study of charitable donation, for example, Moll and colleagues (2006) demonstrated that the act of donating to charity activated the same brain regions that are active when individuals receive monetary reward. In their study, the medial orbitofrontal--subgenual area of the anterior cingulate, which mediates emotional attachment and is part of the basis of the caregiving system model shown in Figure 2, also distinguished between donating to and opposing social causes.

The link from social integration and support to compassionate versus reward-seeking motives. The forgoing discussion implies that routes mediating the beneficial effects of social support are linked with the act of giving as opposed to receiving support. Because of this, we speculate that “other-focused” motivational states may have more to do with the beneficial health and resilience effects of volunteering—relative to “self-focused” motivational states that compel individuals to deliberately seek support or resources from others. Indeed, the beneficial effects of volunteerism on mortality risk have been shown to

differ as a function of underlying motivation. Among volunteers with “self-focused” reasons for volunteering, there was no benefit of volunteerism with respect to mortality risk (Konrath et al., 2011).

Tests of the link between compassion or empathy-based responding and physical health are just beginning to emerge, however studies show that compassion is predictive of well-being (Sheldon & Cooper, 2008), and at least one study has demonstrated that compassion directed toward a spouse (communicating feelings of love and concern) predicts reduced mortality risk (Brown, et al., 2003). A recent addition to this literature demonstrated that trait compassion increases the stress-buffering effects of receiving social support (Cosley, McCoy, Saslow, & Epel, 2010). We describe the association between compassion and stress regulation in more detail following the discussion below of how situational attributes of volunteering influence compassionate motives.

The link from situational attributes to compassionate motives. It is important to note that volunteers and non-volunteers differ markedly with respect to altruistic motivation to volunteer. Based on data from a national sample reported by Clary, Snyder, and Stukas (1996), it can be estimated that the average volunteer is located approximately seven standard deviations above the mean in the non-volunteer distribution of altruistic motivation to volunteer. This finding is consistent with the notion that volunteering, with its focus on helping others less fortunate than oneself, may activate and provide opportunities to act on, compassionate motives.

Altruistic motives for volunteering have been shown to vary with the sponsor (type of organization), type of volunteer job, the motivational appeal, and the recipient’s health. Controlling for other motives, volunteers serving in human services organizations exhibited greater altruistic motivation to volunteer than volunteers serving in other types of

organizations (Clary et al., 1996). Among hospice volunteers, Black and Kovacs (1996) demonstrated that those engaged in direct patient care services rated altruistic motives for volunteering higher than those providing non-direct patient care services whereas volunteers providing non-direct patient care services rated social motives for volunteering higher than volunteers engaged in direct patient care services. Taking a different tact, Millette and Gagne (2008) examined the relation between a composite measure of five job attributes (skill variety, task identity, task significance, autonomy, and feedback) and intrinsic motivation to volunteer. They found that volunteers who reported higher scores on the composite measure of job attributes also reported higher scores on intrinsic motivation to volunteer.

Volunteer organizations provide a context in which volunteer efforts occur. For example, organizations can influence volunteer motivation through their expectations of the benefits that will accrue to volunteers. In a study of hospice volunteers, Omoto, Snyder, and Martino (2000) observed that volunteers that had higher expectations for the impact of volunteering on their feelings of giving back to others and their sense of being helpful to others reported higher compassionate motivation for volunteering.

Houle, Sagarin, and Kaplan (2005) tested the hypothesis that tasks vary in the extent to which they satisfy motives for volunteering. In support of this hypothesis, they showed that two tasks--reading to the blind and making holiday greeting cards for residents of nursing homes--were rated by participants as more likely to satisfy altruistic motivation for volunteering than six other tasks such as typing letters and data entry. Satisfaction with volunteering is conceptualized to be a function of the match between the salience of an individual's motives for volunteering and the opportunities afforded in the volunteer environment to meet these motives. For instance, for individuals high in altruistic motivation, volunteer satisfaction is maximized when they perceive that their volunteer service is

enabling them to meet their humanitarian obligations (Stukas, Worth, Clary, & Snyder, 2009).

Omoto and Snyder (2002) examined whether compassionate motivation for volunteering varied among individuals doing AIDS volunteer work as a function of membership in a community which was at risk for the disease. As expected, they found that ratings of compassionate motivation were higher among new gay volunteers relative to new non-gay volunteers.

Implications for Stress-Regulation

Our model points to an intimate connection between the motivational states associated with the caregiving system and the requirement of regulating the helper's stress. There are many possible sources of helper stress antecedent to, concurrent with, or consequent to helping, including lost opportunities to help oneself, conflicts over whether to help, whom to help, and how much assistance to render, exposure to distress signals (e.g., cues for another individual's pain, another's suffering), and a whole host of perceived or actual threats to well-being, such as energy depletion, loss of status, illness, separation from family or friends, accidental injury, or even death. Of course, there are other possible sources of stress, many of which are not associated with helping behavior. Our model suggests that activation of the caregiving system modulates the volunteer's stress response, *whatever the source of stress may be*.

Mediating neural circuitry. Based on studies conducted on mammalian social and maternal behavior (e.g., Numan, 2006), activation of the caregiving system triggers helping behavior in two ways. First, it activates an approach circuit that is coordinated by hypothalamic processes that triggers motor programs for helping behavior (i.e., ventral pallidum). Second, it interferes with avoidance motivation (the stress response) by down-regulating signals from

the amygdala to the periaqueductal gray (PAG). The PAG is the command center for mobilizing resources associated with the fight-or-flight response. The fight-or-flight response, including the stress hormone cortisol, is thought to be harmful to health with prolonged exposure (Sapolsky, 1996). Effectively, whether helping behavior occurs is thought to depend on whether the signal strength in the medial preoptic area of the hypothalamus (MPOA) is strong enough to compete successfully with the avoidance response. To the extent that these neural circuits underlie some types of helping in humans (i.e., when the caregiving system is engaged), then stress-regulation becomes an essential prerequisite to helping behavior.

Hormonal mediators. Ultimately the signal strength of the MPOA is determined by hormones that can prime the area. The MPOA has receptors for pregnancy hormones and oxytocin, that are thought to act on the MPOA in ways that bias the response to need in favor of helping behavior, as opposed to avoidance. Indeed, numerous studies demonstrate causal relationships between oxytocin and the onset of helping behavior (Brown & Brown, 2006), and between oxytocin and stress-regulation (Carter, 1998). For example, oxytocin down-regulates HPA (stress) axis activity, and it is associated with restorative physiological processes such as cellular repair, storage of cell nutrients, and cell growth (Heaphy & Dutton, 2008).

Progesterone, a hormone that declines rapidly with age (Genazzani et al., 1998) and with social isolation (Serra et al., 2003), may also underlie helping-induced stress-buffering. Progesterone has been shown to increase with social closeness in humans, and to be associated with helping behavior (Brown, Fredrickson, et al., 2009). Progesterone has also been shown to play a role in stress, and progesterone administration causes reductions in anxiety in humans and other animals via its metabolite, the hormone allopregnanolone

(ALLO) (Soderpalm, Lindsey, Purdy, Hauger, & de Wit, 2004). In addition to its stress-reducing properties, progesterone may also confer neuroprotection (Liao et al., 2009). During times of elevated stress, cortisol is produced from progesterone and pregnenolone (Parker & Baxter, 1985), so elevated cortisol production may reduce overall levels of progesterone, consistent with studies indicating that although progesterone and cortisol are positively correlated, social isolation decreases progesterone but increases cortisol (Serra et al., 2003).

The role of positive emotions. The model we have described thus far views help-related stress recovery in terms of compassionate motives and consequent inhibition of the stress response. However, our model is also compatible with the possibility that active help produces *positive* emotions in the helper, independent of (or in conjunction with) compassionate motives, which in turn regulates stress. Certainly, feedback from helping may also produce positive emotions in the helper, consistent with evidence indicating that helping elevates mood (Yinon & Landau 1987). Indeed, positive emotions directly accelerate recovery from stress-induced cardiovascular arousal (Fredrickson, Mancuso, Branigan, & Tugade, 2000). Thus, there are sufficient empirical reasons for predicting that helping behavior regardless of the trigger (e.g., perceptions of target need, interdependence, normative concerns, sense of obligation) evokes positive emotions. By engendering positive affect, volunteering may decrease distress-related wear and tear on the body (i.e., allostatic load), which contributes to the onset of diseases via psychoneuroimmunological and psychoendocrinologic pathways (McEwen, 1998).

Adverse effects of helping behavior on stress-regulation. Although we emphasize stress-buffering effects of a caregiving system (e.g., helping based on compassionate motives), our model accommodates other scenarios, such as the possibility that obligatory (coerced) helping has *adverse* effects on stress regulation, and the possibility that grief

associated with helping someone who is suffering has *adverse* effects on stress responding, consistent with evidence that links bereavement to worsened health, depression, and increased mortality risk (Vitaliano, Zhang, & Scanlan, 2003). In a systematic review of the spousal bereavement literature, Stroebe and Stroebe (2007) reported that nearly all well-controlled longitudinal studies suggest that there is a heightened mortality risk for bereaved individuals as well as increases in vulnerability to disease. In an effort to distinguish grief-related processes involved in helping a suffering spouse from potential benefits associated with active help, Brown, Smith, et al. (2009) examined the separate influences of these variables on mortality risk among caregivers. Using data from the Health and Retirement Study, (HRS) Brown et al. (2008) demonstrated that hours spent helping a spouse was protective of a caregiver's mortality risk, even after adjusting for baseline health and disability, SES, demographics, and depression. The extent of spousal impairment, on the other hand, was positively related to mortality risk in the unadjusted model, consistent with the possibility that grief-related processes can be detrimental in the context of caregiving.

Consequences of stress regulation for well-being, cognitive functioning and health. A large literature attests to the harmful effects of stress on well-being and health (Schneiderman, Ironson, & Siegel, 2005). As described above, this association may be due to elevated levels of cortisol, which can be harmful with prolonged exposure (Sapolsky, 1996). A recent study examining the effect of exposure to stressful life events on mortality risk demonstrated that the effect of stress on health may be even more toxic than previously assumed (Poulin et al., under review). In their study, which used data from 423 married couples in the Changing Lives of Older Couples sample, the effect of exposure to stressful life events was found to interact with helping behavior to predict 5-year mortality risk. Results showed that individuals who reported not helping others over the past year doubled

their risk of mortality with each additional stressful life event encountered. Among those who reported helping someone in the past year, there was no harmful association of stressful life events and mortality risk. These findings could not be explained by main effects or interactive effects (with stress) of related variables such as received social support or social contact.

Conceivably, hormones associated with close relationships and helping behavior improve health and well-being by reducing exposure to harmful levels of stress, and by being neuroprotective (progesterone) or promoting healthy immune regulation (oxytocin), as described above. In addition, low DHEA to cortisol ratios have been linked directly to morbidity and mortality. For example, low levels of DHEA predict obesity, diabetes, hypertension, coronary heart disease, HIV-related disease, cancer, and Alzheimer's Disease (McCraty, Barrios-Choplin, Rozman, Atkinson, & Watkins 1998). Interestingly, DHEA levels have been shown to increase after exposure to a psychosocial intervention that requires participants to focus on their caring feelings for others (McCraty et al., 1998).

The link from volunteering to health and cognitive functioning. Self-rated health and self-report measures of functional limitations have been shown to predict mortality (Idler & Benyamini, 1997; Wosinski, Johnson, & Stump, 1995). Several longitudinal studies (Luoh & Herzog, 2002; Omoto & Schlehofer, 2007; Piliavin & Siegl, 2007; Thoits & Hewitt, 2001; Van Willigen, 2000) have demonstrated that volunteering is associated with better health although some researchers have also found that health is an antecedent of volunteering (Thoits & Hewitt, 2001). In a study employing a true experimental design, Fried et al. (2004) examined the benefits among older, mostly African American females of volunteering to help children in schools. Control group subjects were on a wait list to participate in the program. All participants were pretested and evaluated 8 months later. Whereas the

percentage of control group participants who rated their strength very good or excellent declined by 16%, the percentage of intervention group participants who rated their strength as very good or excellent increased by 17%.

Baseline levels and changes in cognitive functioning also have been linked to risk of mortality (McGuire, Ford, & Umed, 2006). In a more recent study, researchers targeted older adult volunteers in the Experience Corps program who were cognitively at-risk (Carlson et al., 2009). The intervention group and the wait-listed control group were pretested using a selective attention task with recordings of neuro-imaging data. Participants in the intervention group received training in general literacy support, library support, and conflict resolution via a multimodal activity program. Six months later all participants performed the same task and neuro-imaging data were again collected. The neuro-imaging data revealed that during task performance participants in the intervention group exhibited more cognitive activity in the left pre-frontal cortex and anterior cingulated cortex than participants in the control group. The behavioral data showed that the intervention group improved on the selective attention task but the control group did not.

The link from volunteering to positive affect. Danner et al. (2001) demonstrated that the amount of positive affect expressed in brief autobiographical statements made by nuns at the time of entry into the sisterhood predicted longevity. Several longitudinal studies (Omoto & Schlehofer, 2007; Piliavin & Siegl, 2007; Thoits & Hewitt, 2001; Van Willigen, 2000) have demonstrated that volunteering is associated with higher subjective well-being although the relation may be reciprocal (Thoits & Hewitt, 2001). One possibility is that volunteering fosters positive affect by reducing self-absorption.

Conclusion

Providing opportunities for older adults to help others via volunteering can promote resources (e.g., positive emotions and cognitive functioning) that facilitate stress regulation, the bouncing back component of resilience, and that foster longevity, the sustainability component of resilience. Insights gleaned from the present model of volunteering and related models of caregiving (e.g., Brown et al., in press) could lead to the design of a new generation of psychosocial interventions that leverage the benefits of providing opportunities for prosocial behavior. The effectiveness of these interventions can be tested in a variety of health-related settings, across a variety of stressful and traumatic circumstances.

One type of volunteering that is particularly intriguing in the context of stress and trauma involves peer assistance programs. For example, “expert” caregivers can volunteer to serve as mentors for novice caregivers. Our model suggests the caveat that not all people and organizations will benefit equally from such programs. Individual differences in the types of motives evoked by engaging in prosocial behavior (e.g., feeling compassion for novice caregivers versus feeling better about oneself) are posited to alter the resilience-related consequences of volunteering. The impact of prosocial behavior such as volunteering may also vary with organizational factors. For example, the resilience-related benefits of volunteering may depend, in part, on the extent to which the organization sponsoring the helping behavior creates attachment to its mission and fosters a sense of collective efficacy.

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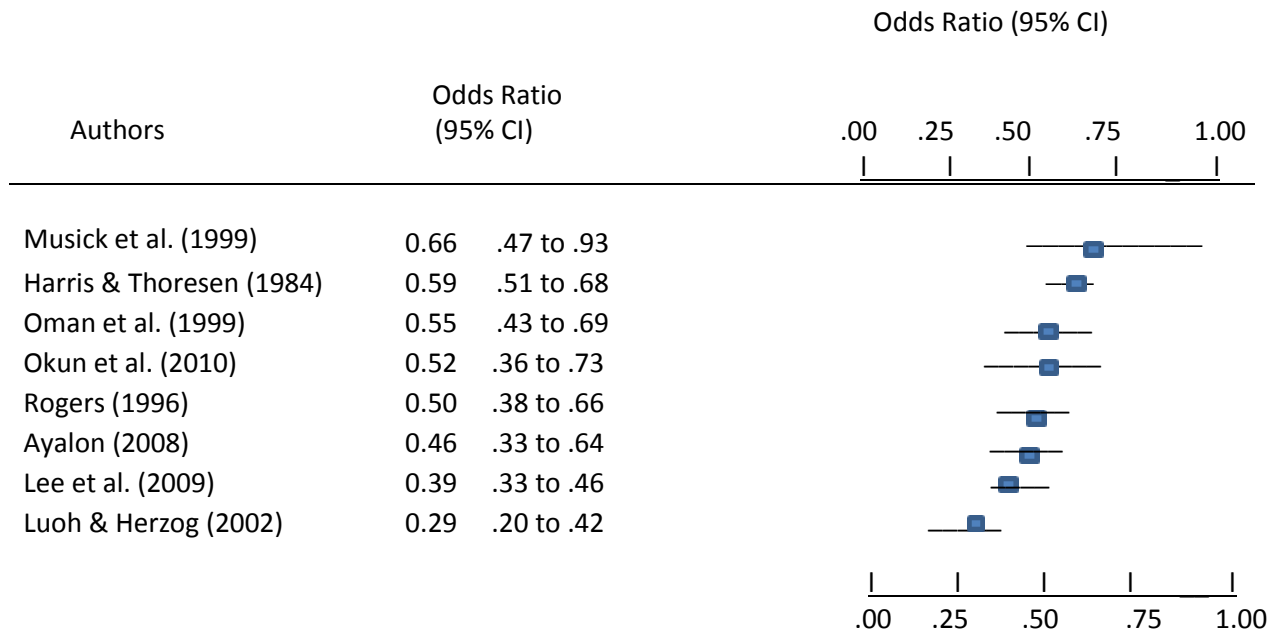


Figure 1. Plot of odds ratios from individual studies investigating the association between volunteering and mortality. 95% CI=95% confidence interval.

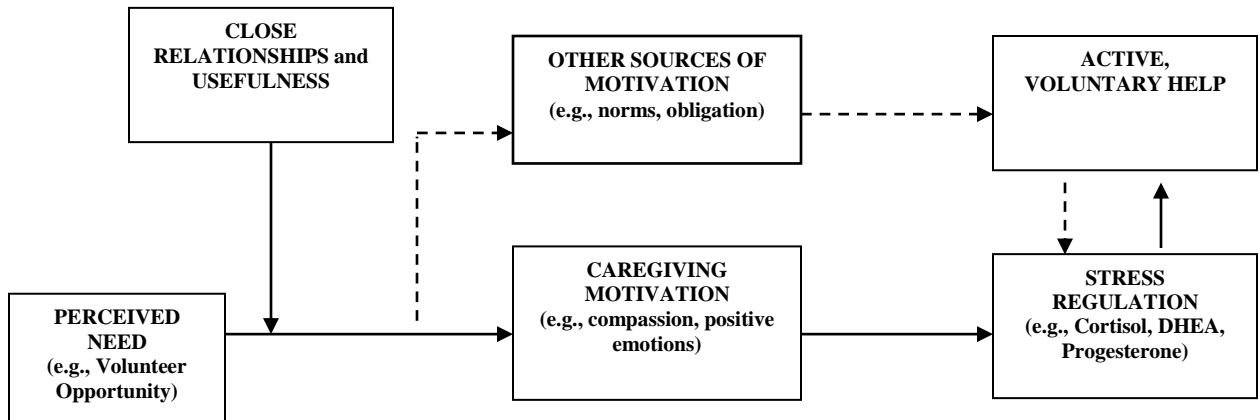


Figure 2. Caregiving system model of active help and stress regulation.

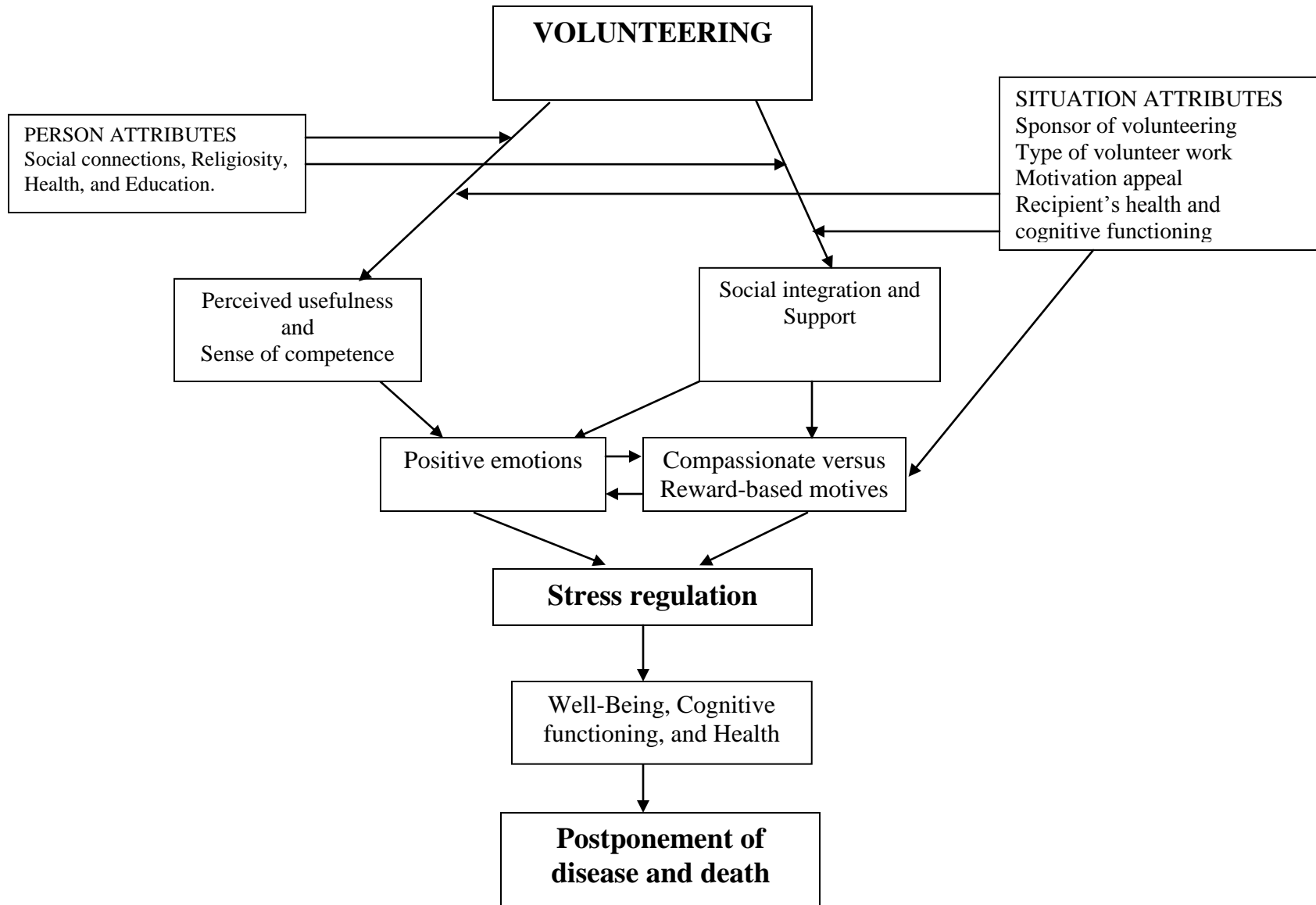


Figure 3. Using the caregiver system model to explain the resilience-related benefits of volunteering.