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Volunteering and Depression in Later Life: Social Benefit or Selection Processes?*

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Does volunteer participation reduce depressive symptoms among older people? Does depression influence whether older people will volunteer? Might nonrandom attrition in a longitudinal study bias the relationship between volunteering and depression? This research addresses these questions with three-wave data from the Americans' Changing Lives study. Multigroup structural equation models for complete and incomplete data are used to estimate the joint causal relationship between volunteer work and depression. The results reveal a beneficial effect of formal volunteering on depression, but not for informal helping. Depression was shown to be associated with a subsequent increase in formal volunteering, suggesting voluntarism as a means of compensation. Functional health problems, not depression, emerged as the important barrier to volunteering. In addition, a sample selection effect—depressed persons and nonvolunteers were less likely to complete the panel study—was detected and accounted for in the analysis. The results are discussed in light of the legitimacy of formal social integration.

Social life requires fulfillment of roles with contractual responsibilities as well as participation in less formalized roles. Indeed, some argue that the less obligatory roles make a special contribution to the development of social capital (Coleman 1990). Volunteer work is one such activity that has been identified as beneficial for social life (Fischer, Mueller, and Cooper 1991; Herzog and House 1991) as well as for the persons who allocate time to “help others” (Musick and Wilson 2003; Rietschlin

1998; Thoits and Hewitt 2001; Van Willigen 2000; Wheeler, Gorey, and Greenblatt 1998). Volunteerism offers the opportunity for people to remain socially engaged throughout the life course. Volunteer work in later life is an important expression of active social engagement and one of the essential components of Rowe and Kahn's (1998) concept of successful aging.

Volunteer work includes both voluntary participation in formal organizations and informal help that people contribute to others in their social networks. Distinguished by levels of formality, “formal volunteer work represents the provision of assistance to a generalized other” (Krause, Herzog, and Baker 1992:P301) whereas informal helping characterizes private and unorganized assistance to friends, neighbors, and kin living outside the household (Wilson and Musick 1997).¹As productive activities, formal and informal volunteer work compete for personal resources. Informal helping usually carries more obligations and receives less recognition than formal volun-

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teering. It has been shown that participation in formal volunteering may encourage participation in informal helping and vice versa (Gallagher 1994; Wilson and Musick 1997).

A growing number of studies have investigated the association between volunteering and psychological characteristics such as life satisfaction, depressive symptoms, and self-esteem (Chambré 1987; Hunter and Linn 1981; Krause et al. 1992; Krause and Shaw 2000; Morrow-Howell et al. 2003; Musick and Wilson 2003; Thoits and Hewitt 2001; Van Willigen 2000; Wheeler et al. 1998). The bulk of the literature points to volunteer participation enhancing well-being. Although this is a reasonable outcome from altruistic activities, many of these studies are cross-sectional analyses and have not systematically considered the opposite causal order: Might persons with high levels of well-being be more likely to volunteer? Other studies have raised the issue (e.g., Chambré 1987; Thoits and Hewitt 2001; Wuthnow 1991), but the present study seeks to extend the literature by systematically examining social benefit, social selection, and other underlying processes. We address the following questions in light of social integration theory. Does volunteer work reduce depression? Or, are older people who are not depressed more likely to self-select into volunteer work? Might older people volunteer as a way to compensate for depressive symptoms?

SOCIAL BENEFIT MECHANISM

Building on Durkheim's ([1897] 1951) analysis of social integration and suicide, scores of studies have identified how social integration may have a *beneficial effect* on health and well-being (House, Umberson, and Landis 1988; Musick and Wilson 2003). Although social integration theory focuses on social linkages and engagement, this frequently entails occupying multiple social roles in modern societies (Sieber 1974). People occupying multiple roles typically experience higher levels of physical and emotional health than those with fewer roles, regardless of age (Moen, Dempster-McClain, and Williams 1992; Wethington et al. 2000). For older people, volunteering also facilitates social integration by providing new, meaningful roles when previous roles are being lost (Pillemer and Glasgow 2000).

Social integration theory suggests that volun-

teering may enhance well-being through three mechanisms. First, volunteer participation benefits mental health by providing a sense of meaning and purpose in life (Su and Ferraro 1997; Wethington et al. 2000). Volunteer work helps to offset role losses such as retirement and widowhood, and can even relieve stress in times of personal crisis (Hunter and Linn 1981; Krause et al. 1992; Rietschlin 1998; Van Willigen 2000). In some cases, volunteer participation has been used as a coping device for bereavement (Gallagher 1994). In the act of helping others, volunteers serve a greater social good, construct meaningful social roles, and succeed in meeting the cultural expectation of staying active (Ekerdt 1986). The meaning assigned to the volunteer work has been suggested as one reason that older volunteers have higher life satisfaction than younger volunteers (Van Willigen 2000).

Second, volunteer work may lead to better mental well-being because it facilitates social support and social interactions (House et al. 1988; Musick and Wilson 2003). Social engagement and multiple social roles provide access to social support, which protects people against disordered functioning in times of uncertainty and despair. One study (Krause 1987) showed that helping others contributed to greater satisfaction with social support and less depression in older adults. In addition, volunteer work has been shown to enhance social interaction (Wilson and Musick 1997) and strengthen existing friendships (Gallagher 1994). Formal interactions offer legitimacy for altruism and can reduce depressive symptoms among older people (Musick and Wilson 2003). Volunteer work may also promote feelings of psychological well-being of older adults by means of fostering new friendship ties among fellow volunteers (Krause et al. 1992).

Finally, volunteer work can be "a fulfilling and self-validating experience" that bolsters feelings of psychological well-being (Krause et al. 1992:P300). It has been shown that providing informal help to others affected personal control and subsequently decreased depressive symptoms (Krause et al. 1992). Providing emotional support to others can bolster the self-esteem of older support providers (Krause and Shaw 2000). Indeed, volunteers often report fewer somatic complaints, fewer symptoms of anxiety and depression, a stronger will to live, and stronger life satisfaction (Hunter and Linn 1981).

Each of these is a reasonable pathway in the relationship between volunteering and mental

health, but the outcome may not always be beneficial. Although multiple roles can be salubrious, they can also be taxing to the person. Excessive involvement in some roles may even lead to role strain and diminish the health benefits of volunteer activities. Some studies show a nonlinear effect of formal volunteer hours on indicators of well-being (Morrow-Howell et al. 2003; Van Willigen 2000) and on mortality (Musick, Herzog, and House 1999), suggesting that a moderate amount of volunteering is optimal. In addition, engagement in different volunteer activities such as formal volunteering and informal helping may lead to differential health outcomes.

Informal helping roles usually occur within close social network and are associated with stronger social responsibilities and less social recognition compared with formal volunteer work. Informal help providers are thus more likely to experience volunteering fatigue and burnout that may offset the salubrious effect of volunteering on depression. Although formal volunteering and informal helping are closely related, little research has compared their effects on depression. Krause and colleagues (1992) conducted the only study of which we are aware that examined the relative impacts of formal volunteering and informal helping on the psychological well-being of older adults. They used the first wave of data from the Americans' Changing Lives study and found that formal volunteering and informal helping exert differential benefits on depression. To our knowledge, no previous study has compared the impact of formal volunteering and informal helping on depression using longitudinal data. We consider this an important step in extending the literature, especially because social selection processes may be at work in the relationship between volunteering and depression, but may go undetected with cross-sectional data.

SOCIAL SELECTION MECHANISMS

Although volunteering may influence one's mental health, there may also be one or more selection processes that would give the appearance of a benefit mechanism. Most previous research has focused on the salubrious effects of volunteer work on mental health, but many researchers have advocated the value of studying a possible reciprocal relationship using longitudinal data (Herzog, Ofstedal, and Wheeler

2002; Krause and Shaw 2000; Morrow-Howell et al. 2003; Musick et al. 1999; Putnam 2000; Thoits and Hewitt 2001). Indeed, Rietschlin (1998) found that members in these voluntary groups enjoy better psychological well-being, but wondered whether people who were less depressed were more likely to join voluntary associations. Thus, the relationships between volunteering and depression may involve both social benefit and social selection processes (Wethington et al. 2000). While a social benefit mechanism exists when voluntary association membership enhances mental health, a social selection mechanism exists when people with better mental health are more likely to engage in voluntarism.

To our knowledge, Thoits and Hewitt (2001) provided the first investigation of both social benefit and social selection effects.² In separate regression models with two waves of data, they demonstrated strong benefit effects and some evidence of a selection effect. Their analyses showed that volunteering improved all six aspects of personal well-being based on measures of happiness, life satisfaction, self-esteem, sense of control over time, physical health, and depression. A selection effect was identified when they found that people with higher well-being invested significantly more time in community volunteer services. However, this effect disappeared once they controlled for current level of participation in religious and other community organizations. Others suggest that social benefit and social selection may operate simultaneously and interactively (Moen et al. 1992). In our study, we seek to advance this line of inquiry by considering the dynamic relationship between volunteering and depression with three waves of data.

Based on social integration theory, however, there may be another social selection process at work: *compensation*. Recognizing the value of integration, it is possible that people with depressive symptoms will actually seek out volunteer activities as a means of overcoming low morale. Studies of adjustment to role losses show that volunteer work may be used as a coping mechanism during seasons of negative affect. If people with depressed affect seek out volunteer activities, especially in the retirement years, this would reflect a compensatory process. As Bäckman and Dixon (1992) assert, compensation is likely when a person attempts to counterbalance a mismatch between environmental demands and personal skills. People take

compensatory efforts such as retrieving previously unused skills and resources and developing new ones in order to bolster functioning that is perceived to be threatened or deteriorating (Carstensen, Hanson, and Freund 1995; Ferraro and Farmer 1995). Thus, volunteering may represent a socially acceptable way for older adults to engage in activities that will help others and presumably help themselves.

In sum, the relationship between volunteering and depression may involve several mechanisms that can offset or counterbalance one another. As Rotolo (2000) points out, volunteer activity is variable over the life course, and initiating and terminating voluntary activity may be more likely during certain seasons of the life course. Our review leads us to identify two “social causation” processes and two “social selection” processes. Social causation may be manifest as either of the following two:

1. *Benefit*—Volunteering decreases the likelihood of depression. We hypothesize that the benefit effect is most likely for participation in *formal* volunteer activity.
2. *Strain*—Volunteering increases the likelihood of depression. We hypothesize that strain is most likely for participation in *informal* helping.

Although there is relatively little empirical research on the topic, we suggest that social selection may be manifest as either of the following two:

1. *Volunteer elite bias*—Depression decreases the likelihood of volunteering because persons with low levels of depression are more likely to volunteer.
2. *Compensation*—Depression increases the likelihood of volunteering when people pursue volunteer activities as a way to alleviate a season of depressed affect.

The challenge is that with cross-sectional data, there is no way to clearly distinguish between these mechanisms. Longitudinal data, especially with three waves, permit an examination of the alternative mechanisms, but they are vulnerable to the complication of nonrandom attrition. If nonrandom attrition exists, the analyses performed on only those subjects who have complete data across waves may result in misleading conclusions. The concern is that volunteers and people with lower levels of depression might be more likely to complete follow-up interviews. This is a type of *sample*

elite bias, but we refer to it as *nonrandom attrition* to distinguish it from volunteer elite bias. The estimated relationships between volunteering and depression will likely be attenuated because nonvolunteers and more depressed persons are underrepresented in the complete data (Berk 1983). In the present research, we seek to better understand the social causation and selection mechanisms in the relationships between volunteerism and depression by using three-wave longitudinal data while accounting for nonrandom attrition.

METHODS

Sample

This research uses data from the Americans' Changing Lives (ACL) study (House 1995), which is a multistage stratified area probability sample of persons 24 years of age or older who lived in the continental United States. The baseline data were collected in 1986 (N = 3,617) and include an oversample of black adults (N = 1,174) and persons 60 years of age or older (N = 1,669). All baseline interviews were face-to-face interviews conducted in the home of the respondent.

The focus of this investigation is the relationship between depression and volunteering among older people for both substantive and methodological considerations. Volunteering is elevated in significance in later life when people face shrinking social networks and major role losses such as widowhood and retirement (Musick and Wilson 2003). Volunteer activities become one of the few alternatives for social engagement. Later adulthood is also a time when depression becomes more prevalent in the population and seriously affects individual lives. If mental health problems are a barrier to volunteer work, a greater number of older adults will be subject to its negative impact. On the methodological front, our early analyses showed that measurement invariance, which is a basic requirement for comparing age groups, could not be established for the group of people over age 60 and the younger age group using ACL data (Byrne, Shavelson, and Muthén 1989). Therefore, we decide to include only people who were 60 years of age or older at the baseline survey in this analysis.

In 1989, follow-up interviews were successfully completed on 1,279 of the respondents who

began the study at 60 years of age or older. Approximately 7.5 years after the initial interview, a second follow-up interview was conducted in 1994, and 889 older respondents who completed both interviews in 1986 and in 1989 were surveyed. In addition, about 70 of the initial older respondents who did not respond in 1989 were successfully relocated and reinterviewed. The living nonresponse rate is 14.5 percent at the second observation and 10.5 percent at the third observation. By the end of the third observation period, 27.5 percent of the older adults had died.

Measures

There are two categories of endogenous variables: volunteer work and depression. In ACL, depressive symptomatology consists of 11 items from the Center for Epidemiologic Studies Depression (CES-D) Scale (Radloff 1977). Factor analysis was used to explore domains of depression such as somatic affect, depressed/positive affect, and interpersonal relationship. Consistent with previous research (Krause et al. 1992), we deleted four items that reflect interpersonal relationship and positive affect, and a single item called "loneliness." Items reflecting interpersonal relationships were deleted because they might be confounded with the social support system (i.e., volunteer work in this study). The item "loneliness" was deleted because it loaded high on both somatic and positive factors. After deleting the five items, only one factor, hereafter referred to as depression, was extracted from the exploratory factor analysis. This factor was indicated by six CES-D items: (1) "I felt depressed," (2) "I felt sad," (3) "I could not get going," (4) "I did not feel like eating," (5) "everything was an effort," and (6) "my sleep was restless." All six items have the same response categories. They are hardly ever (coded 1), some of the time (2), and most of the time (3).

Volunteer work consists of four measures: formal volunteer index, formal volunteer hours, informal helping index, and informal helping hours. Following Wilson and Musick (1997), we combined the formal volunteer index and volunteer hours to form a formal volunteer latent construct, and we combined the informal helping index and helping hours to form an informal help construct. The formal volunteer index was constructed by summing five types of

volunteer work the respondent did during the last 12 months. They are volunteering in (1) church, synagogue, or other religious organization; (2) school or educational organization; (3) political group or labor union; (4) senior citizen group; and (5) other national or local organization. People were scored 0 if they did not volunteer and scored 5 if they volunteered for all five types of organizations. Formal volunteer hours measure the number of hours the respondent spent doing formal volunteer work during the past year. It contains six survey response categories, where 0 was assigned to those who did not participate. The other responses include volunteering for (1) less than 20 hours, (2) 20–39 hours, (3) 40–79 hours, (4) 80–159 hours, and (5) 160 hours or more. Informal helping index was constructed by summing the types of help the respondents gave to friends, neighbors, or relatives in the last 12 months. These are (1) providing transportation, shopping, or running errands; (2) helping with housework; (3) doing child-care without pay; and (4) doing any other things. People were scored 0 if they did not help and scored 4 if they provided all types of help. Informal helping hours measure the number of hours the respondent spent helping others. They have the same coding as formal volunteer hours.

All exogenous variables included are baseline measures that have shown to be significant in earlier studies of volunteer work (Krause et al. 1992; Musick and Wilson 2003; Thoits and Hewitt 2001; Van Willigen 2000; Wilson and Musick 1997).³ These are age, gender, race, marital status, education, income, church attendance, functional impairment, and informal social integration. Age was measured in years (ranging from 60 to 96). Gender and race were two binary variables with female and black each coded 1. Marital status was coded 1 for those who were married or living together with a partner for six months or longer and 0 for all others. Education represented the highest years of schooling completed and ranged from 0 to 17. Total family income was measured with 10 categories ranging from less than \$5,000 (coded 1) to over \$80,000 (10). Church attendance refers to how often respondents attended religious services from never (coded 0) to more than once a week (5).

Functional impairment measured the degree to which the respondent had difficulty in performing a variety of daily tasks such as bathing by oneself, climbing a few flights of

stairs, walking several blocks, and doing heavy work around the house. This index was coded from 1 (no functional impairment) to 4 (most severe impairment). Informal social integration is a standardized scale constructed by taking the arithmetic means of two items: (1) how often in a typical week the respondent talks on the telephone with friends, neighbors, or relatives; and (2) how often the respondent gets together with friends, relatives, or neighbors. The responses for the first item ranged from never (coded 1) to more than once a day (6), and for the second item from never (1) to more than once a week (6).

Missing Data

Both item missing data and unit missing attrition were examined. Imputation of missing values available in PRELIS 2 (Jöreskog and Sörbom 1996b) was utilized to handle item missingness. This imputation method substitutes a case with a value that is obtained from another case which has a similar response pattern over a set of matching variables for a missing value. PRELIS 2 imputes only missing values that have matching cases, and the variance ratio in the imputation is small. For this analysis, the majority of the item missing values are in the depression items (a total of 60 missing cases were identified from listwise deletion). Similar missing patterns exist for both wave 2 and wave 3 depression items. Total missing values for the depression items across the three waves are 111 (11.6 percent of the total surviving sample in 1994). We did not impute missing values for the respondents who answered fewer than four of the six CES-D items in any of the three waves. A standardized score derived from taking the arithmetic mean of the 11 items from CES-D in each wave was used as the matching variable. As a result, 50 cases of the surviving sample in 1994 were assigned values and restored to the sample. There were 13 missing cases for all other variables in the analysis (they were not imputed). The complete sample for all three waves was 815.

As expected, there was considerable attrition for the older sample over the 7.5 years of observation. Given the possibility of nonrandom attrition noted earlier, multigroup analysis with complete and incomplete data was applied (Allison 1987; Bollen 1989; McArdle 1994; McArdle and Hamagami 1991). The data were

divided into three subsamples that reflect different patterns of unit missingness. Group 1 includes respondents who completed the survey in all three waves ($N = 815$). Group 2 includes those respondents who have complete data only on the first two waves and are missing on the third wave ($N = 435$). Group 3 includes the remaining sample that answered the questions in the first wave only ($N = 384$).⁴ By means of multigroup analysis, the model was simultaneously estimated for all three subsamples while constraining certain parameters to be invariant across subsamples (Allison 1987). Because the model estimation uses all available information in the data, the sample selection processes become part of the analytic scheme.

In our model, the three subsamples have common as well as distinct sets of variables. While all variables are present in group 1, these variables measured at wave 3 do not exist for group 2. The same variables measured at both wave 2 and wave 3 do not exist for group 3. The estimated matrix is an augmented moment matrix calculated from a covariance matrix and a vector of means. The general LISREL model was implemented following the procedures outlined by Allison (1987), Bollen (1989), and McArdle and Hamagami (1991). This entails "inputting pseudo-values for the missing sample moments and specifying fixed values for certain factor loadings and errors variances" to accommodate different patterns of missingness across subsamples (Allison 1987:81). Pseudovalues were assigned to the covariance matrices and the mean vectors for group 2 and group 3 to make their sizes exactly the same as those for group 1. The estimate for a missing variance was assigned a value of one, whereas zero was assigned as the estimate for the respective missing covariances and means.⁵

When exogenous covariates were included in the model, they were considered y variables in order to hold the model specification that there is only one fixed x variable. These covariates were further represented as perfectly measured η 's, and their effects on the latent dependent variables (used interchangeably with "endogenous variables" in this model) were estimated in the beta matrix. The model was estimated using the fully constrained maximum likelihood fitting function in LISREL 8.53 (Jöreskog and Sörbom 1996a) that provides both consistent and efficient parameter estimates (Allison 1987).

It is important to note that the degrees of

freedom (df) in the likelihood ratio chi-square test are artificially inflated. LISREL program automatically calculates df by subtracting the number of estimated parameters from the total number of moments in the augmented moment matrices (Allison 1987:87). Because pseudovalues exist in the matrices for the subsamples with missing data, they need to be subtracted from the total number of moments in order to obtain the correct df, which are reported in these results.

Conceptual Model

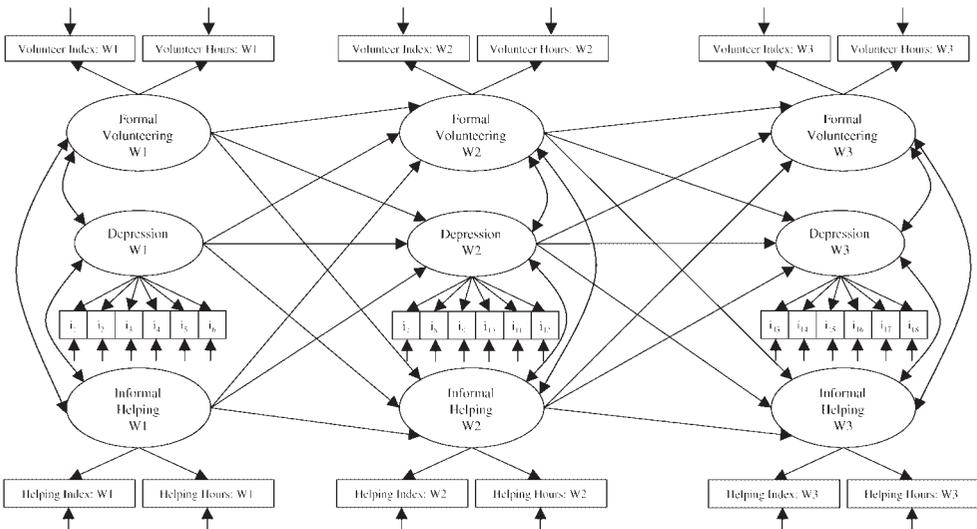
The hypothesized model for this research was a recursive model that tested both the benefit and the selection mechanisms. Figure 1 depicts structural relationships among the endogenous variables. This model tested the lagged effects of the repeated measures of depression, formal volunteering and informal helping on all three measures at the following waves. The model included the direct lagged effects from wave 1 repeated measures to wave 3 repeated measures. A benefit effect would be manifest by a negative lagged effect linking volunteer work in the previous wave to depression. Volunteer elite bias would be manifest by a negative lagged effect linking depression in the previous wave to volunteerism. In

addition, the coefficients of these paths reveal whether there are long-term differential effects of formal volunteering and informal helping on depression and whether there are long-term differential effects of depression on formal volunteering and informal helping. No causal relationships were specified among endogenous variables in each wave. However, the errors among the endogenous variables (ψ) within each wave were allowed to correlate. The errors in the same indicators across time (θ_e) were also allowed to correlate to account for the autocovariance. A simple model without covariates was first tested to evaluate and improve the fit of the multigroup model. Next, the entire model was tested controlling for all the exogenous variables.

RESULTS

The ranges, means, and standard deviations of all observed variables are presented in Table 1. Means of the observed variables between the group with complete data (group 1) and the two groups with incomplete data (group 2 and group 3) were compared. Except for one indicator of depression (“sleep was restless”) and church attendance in group 2, all other means in group 2 and group 3 were significantly different from those in group 1 ($p < .05$). People

FIGURE 1. Generic Model of Formal Volunteering, Informal Helping, and Depression



Notes: W1 = wave 1; W2 = wave 2; W3 = wave 3. Nine direct paths from W1 latent constructs to W3 latent constructs were included in the tested model but omitted in the figure. All exogenous variables listed in Table 1 were included in the tested model.

TABLE 1. Range of Indicators and Means and Standard Deviations by Incomplete Data Pattern (Americans' Changing Lives, 1986–1994)

Variables	Range	Group 1: Complete Data (N = 815)			Group 2: Incomplete Data (N = 435)		Group 3: Incomplete Data (N = 384)
		Wave 1	Wave 2	Wave 3	Wave 1	Wave 2	Wave 1
Felt depressed	1–3	1.37 (.56)	1.32 (.54)	1.32 (.56)	1.52* (.66)	1.43* (.62)	1.47* (.61)
Felt sad	1–3	1.34 (.54)	1.39 (.58)	1.39 (.56)	1.49* (.63)	1.51* (.65)	1.47* (.61)
Couldn't get going	1–3	1.51 (.60)	1.48 (.59)	1.46 (.59)	1.63* (.65)	1.65* (.67)	1.65* (.69)
Didn't feel like eating	1–3	1.28 (.56)	1.25 (.52)	1.31 (.60)	1.46* (.65)	1.48* (.71)	1.49* (.68)
Everything was an effort	1–3	1.48 (.64)	1.42 (.62)	1.40 (.62)	1.69* (.72)	1.68* (.76)	1.68* (.72)
Sleep was restless	1–3	1.66 (.68)	1.59 (.66)	1.60 (.70)	1.68 (.74)	1.64 (.73)	1.67 (.71)
Formal volunteer index	0–5	.75 (1.04)	.78 (1.09)	.71 (1.01)	.46* (.87)	.41* (.84)	.31* (.71)
Formal volunteer hours	0–5	1.21 (1.68)	1.28 (1.76)	1.05 (1.56)	.73* (1.39)	.66* (1.37)	.51* (1.21)
Informal helping index	0–4	1.61 (1.26)	1.63 (1.27)	1.33 (1.23)	1.00* (1.18)	.81* (1.09)	.83* (1.13)
Informal helping hours	0–5	2.00 (1.72)	2.06 (1.72)	1.47 (1.49)	1.27* (1.61)	1.07* (1.55)	1.03* (1.50)
<i>Exogenous indicators</i>							
Age	60–96	67.57 (5.79)	—	—	72.60* (7.78)	—	72.44* (8.20)
Female	0–1	.71	—	—	.64*	—	.62*
Black	0–1	.24	—	—	.36*	—	.35*
Marital status	0–1	.60	—	—	.43*	—	.46*
Education	0–17	11.15 (3.52)	—	—	9.37* (3.69)	—	9.51* (3.79)
Income	1–10	4.12 (2.49)	—	—	2.85* (2.02)	—	3.00* (2.11)
Church attendance	0–5	2.83 (1.75)	—	—	2.68 (1.87)	—	2.39* (1.82)
Functional impairment	1–4	1.47 (.86)	1.51 (.86)	—	1.90* (1.05)	2.09* (1.19)	1.97* (1.12)
Informal social integration	–3.07–1.35	.07 (.98)	.18 (.93)	—	–.10* (1.13)	–.23* (1.15)	–.26* (1.14)

Notes: Asterisks indicate a significant difference ($p < .05$) between mean scores for group 2 and group 1 or for group 3 and group 1. Standard deviations are in parentheses. Standard deviations of dichotomous variables are omitted.

who did not complete the eight-year study had more depressive symptoms, and they participated less in both formal and informal volunteer work. These people were more likely to be black, single, older, and men. They also have less education, less income, greater functional impairment, and less social integration. All in all, this shows substantial nonrandom selection in the sample over time and underscores the importance of the multigroup approach.

The proposed model (shown in Figure 1 and later described as model 5) is the best fitting model relative to a group of alternative models tested. Table 2 presents a comparison of six models in terms of the goodness of fit statistics.⁶ Models 1 and 2 are recursive models that

contain both wave 1 and wave 2 covariates. They include seven baseline covariates (age, female, black, education, income, functional impairment, and informal social integration) and two wave 2 covariates that account for the changing levels of functional impairment and informal social integration from 1986 to 1989. The two models are different only in terms of the control of the wave 2 covariates. Model 1 estimated both the lagged effects of wave 1 and wave 2 functional impairment and informal social integration on the latent dependent variables at the following wave whereas model 2 did not assess the effects of wave 2 covariates. Rather, the lagged effects of baseline functional impairment and informal social integration on both

TABLE 2. Comparison of Alternative Models for Maximum Likelihood Estimation of Volunteer Work and Depression (Americans' Changing Lives, 1986–1994)

Model Statistics	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
χ^2	2,858.30	2,857.73	2,663.78	2,665.93	2,576.13	896.17
df	1,185	1,185	1,206	1,208	1,197	546
RMSEA	.00	.00	.00	.00	.00	.03
NFI	.99	.99	.99	.99	.99	1.00
CFI	1.00	1.00	1.00	1.00	1.00	1.00

Notes: df = degrees of freedom; RMSEA = root mean square error of approximation; NFI = normed fit index; CFI = comparative fit index. N = 1,634 (model 1 through model 5), and N = 815 (model 6).

wave 2 and wave 3 latent dependent variables were estimated in model 2. The results showed that controlling for wave 2 covariates did not change the structural relationships among the latent dependent variables. Nor did it improve the model fit. Therefore, the wave 2 covariates were deleted in further model testing.

Model 3 to model 6 include a total of nine baseline covariates. The two additional covariates are marital status and church attendance, which were significant predictors of volunteer activities in some recent studies (Musick and Wilson 2003; Thoits and Hewitt 2001). Based upon model 3, model 4 is a nonrecursive model that has added the reciprocal effects at baseline between formal volunteering and depression.⁷ Model 5 extends model 3 by estimating the direct lagged effects of wave 1 endogenous variables on wave 3 endogenous variables. The addition of nine paths reduces the chi-square values of 87.65, a substantial improvement of model fit. In order to compare the multigroup analysis by missing data patterns to one based on analysis of those respondents completing all waves, model 6 replicates model 5 using only the complete data (N = 815). Note that the root mean square error of approximation rises to .03. Goodness-of-fit for the hypothesized model (model 5) is very good when compared to other models in Table 2 ($\chi^2 [1197] = 2,576.13$).⁸ Other measures of goodness of fit for this model indicated excellent model fit: the root mean square error of approximation is .00, the normed-fit index is .99, and the comparative fit index is 1.0 (Kelloway 1998).

All factor loadings (results not shown) for the measurement structure (λ_j) are satisfactory ($p < .001$). The λ_j values for each item are the same across time because equality constraints were placed upon the indicators of depression, formal volunteering, and informal helping respectively to ensure consistent measurement for change. The structural relationships among the latent dependent variables and the covariates are

presented in Table 3.⁹ We have included both the direct and total effects in the table.

Columns 1 to 3 in Table 3 reflect the relationships between the exogenous variables and wave 1 latent dependent variables. These equations reveal that people of higher socioeconomic status and more frequent churchgoers tended to have lower depressive symptoms and more volunteer activities, providing evidence of selection processes. Older people had less depression and reported less informal helping. Married persons experienced less depressive symptoms, but provided more informal help. Women had more depression and less engagement in informal helping. Note the strength of the effects due to functional impairment: People with greater functional impairment were more likely to be depressed and have lower levels of both formal and informal volunteering. The effects on depression and informal helping are substantial. Finally, social integration was positively related to both formal and informal volunteer activities.

Columns 4 to 6 display the lagged effects of baseline variables on wave 2 latent dependent variables. The coefficients for the repeated measures indicated consistent levels of depression and volunteer behaviors across time (Wheaton et al. 1977). The results showed a moderately significant benefit effect. Formal volunteer work at wave 1 reduced depression at wave 2. Formal volunteering was also shown to encourage informal helping over time rather than the other way around. Education reduced depressive symptoms, whereas functional impairment increased depressive symptoms. Women and black people became less likely to provide informal help at wave 2. Older people became less engaged in both formal and informal volunteer work. These patterns were reinforced when we examined the total effects. In addition, higher income was related to lower depression at wave 2. People with functional impairment provided less informal help.

TABLE 3. Recursive Model of Maximum Likelihood Estimates of the Relationship between Volunteer Work and Depression among American Older Adults 60 Years of Age and Over (Americans' Changing Lives, 1986-1994) Using Multigroup Analysis for Incomplete Data

	Wave 1			Wave 2			Wave 3		
	Depression	Formal Volunteering	Informal Helping	Depression	Formal Volunteering	Informal Helping	Depression	Formal Volunteering	Informal Helping
<i>Wave 1 measures</i>									
Depression	—	—	—	.517*** ^a (.035)	-.020 (.059)	.037 (.077)	.330*** (.046)	-.113 (.088)	-.091 (.116)
Formal volunteering	—	—	—	-.033* (.017)	.709*** (.031)	.125** (.039)	-.036 (.027)	.133* (.052)	.014 (.068)
Informal helping	—	—	—	-.012 (.014)	.026 (.024)	.485*** (.034)	-.041* (.019)	.519*** (.037)	.071 (.050)
<i>Wave 2 measures</i>									
Depression	—	—	—	—	—	—	.303*** (.048)	.249** (.092)	.058 (.121)
Formal volunteering	—	—	—	—	—	—	-.007 (.025)	.562*** (.049)	.047 (.063)
Informal helping	—	—	—	—	—	—	-.004 (.021)	-.029 (.040)	.208*** (.055)
<i>Wave 1 covariates</i>									
Age	-.005** (.002)	-.002 (.003)	-.032*** (.004)	.001 (.002)	-.006* (.003)	-.034*** (.004)	.004 (.002)	-.011*** (.004)	-.036*** (.005)
Female	.070** (.025)	-.050 (.045)	-.154** (.060)	-.049 (.026)	.018 (.046)	-.057** (.060)	.002 (.023)	-.016*** (.055)	-.055*** (.073)
Black	.044 (.027)	.018 (.049)	-.113 (.064)	-.003 (.028)	-.023 (.046)	-.135* (.060)	.077* (.029)	-.033 (.055)	-.087 (.073)
Marital status	-.056* (.025)	.035 (.047)	.170** (.062)	-.021 (.027)	.001 (.047)	-.290*** (.062)	.051 (.029)	-.015 (.056)	-.236** (.075)
	—	—	—	-.011 (.027)	.069 (.047)	.066 (.062)	.054 (.029)	.029 (.056)	-.033 (.075)

(Continued on next page)

TABLE 3. (Continued)

	Wave 1			Wave 2			Wave 3		
	Depression	Formal Volunteering	Informal Helping	Depression	Formal Volunteering	Informal Helping	Depression	Formal Volunteering	Informal Helping
Education	-.015*** (.004) _b	.056*** (.007) _b	.048*** (.009) _b	-.009* (.004) _b	.023*** (.007) _b	.016 (.009) _b	.000 (.004) _b	.030*** (.008) _b	.022* (.011) _b
Income	-.013* (.006) _b	.041*** (.011) _b	.016 (.015) _b	-.006 (.006) _b	-.008 (.011) _b	.002 (.015) _b	-.011 (.007) _b	.003 (.014) _b	.019 (.018) _b
Church attendance	-.016* (.006) _b	.138*** (.012) _b	.055*** (.015) _b	.005 (.007) _b	.049*** (.012) _b	-.019 (.016) _b	-.006 (.008) _b	.008 (.015) _b	.006 (.020) _b
Functional impairment	.169*** (.012) _b	-.050* (.021) _b	-.192*** (.028) _b	-.030* (.014) _b	.005 (.024) _b	-.059 (.031) _b	.011 (.015) _b	-.072* (.029) _b	-.075* (.038) _b
Informal social integration	-.010 (.011) _b	.110*** (.020) _b	.235*** (.027) _b	.005 (.012) _b	-.039 (.021) _b	-.152*** (.027) _b	.008 (.013) _b	-.094** (.026) _b	-.005 (.034) _b
Pseudo R ²	.243	.240	.275	.418	.565	.531	.552	.591	.502

* $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed)

Notes: Cell entries are unstandardized coefficients, standard errors (in parentheses), and total effects. Model estimates: $\chi^2 = 2,576.13$; $df = 1,197$; $N = 1,634$; root mean square error of approximation = .00; normed fit index = .99; comparative fit index = 1.0.

^a Direct effects.

^b Total effect omitted as it is the same as the direct effect.

^c Total effects.

Greater levels of education, church attendance, and informal social integration increased both types of volunteer activities over time.

Finally, columns 7 to 9 show the equations for wave 3 latent dependent variables. Formal volunteering at wave 1 manifested a modest total effect on depression by wave 3. The direct effects of formal volunteering at both wave 1 and wave 2 on depression at wave 3 were weak. Given the modest effect of formal volunteering at wave 1 on depression at wave 2 and the strong association between depression at wave 2 and depression at wave 3, it was unlikely that formal volunteering at wave 2 would have an additional significant effect on depression at wave 3. Volunteering and depression measures at wave 2 mediated the effects of volunteering and depression at wave 1 on volunteering and depression at wave 3. One significant intervening effect was the positive effect of depression at wave 2 on formal volunteering at wave 3, suggesting a compensatory mechanism. Many baseline control variables held strong long-term total effects on depression and volunteer work. Women, black people, and people who were functionally impaired showed elevated levels of depression. Higher education, income, and church attendance helped to reduce depression over time. Education and church attendance also exerted long-term positive effects on both formal and informal volunteer activities. Increasing age and functional impairment negatively affected both types of volunteer activities over time. Black people were less likely to provide informal help at wave 3. Conversely, informal social integration promoted informal helping at wave 3. Being married at wave 1 showed a direct positive effect on depression at wave 3 but a nonsignificant total effect.

We estimated model 5 again using only the subjects who completed all three waves (model 6 in Table 2). The parameter estimates (not shown) reveal that the nonrandom attrition substantially reduced the structural relations. The significant beneficial effects of baseline formal volunteering on depression at wave 2 and on informal helping at wave 2 disappeared ($\beta = -.019, p > .05$, and $\beta = .040, p > .05$, respectively). In addition, there were fewer significant coefficients among the covariates and the latent dependent variables in this model compared with the model including the incomplete data. Being older became unrelated to the level of depression ($\beta = -.002, p > .05$). Higher income was not associated with

lower depression ($\beta = -.006, p > .05$). Functional impairment was not related to formal volunteer participation ($\beta = -.041, p > .05$). Church attendance was not associated with depression ($\beta = -.004, p > .05$) or informal helping ($\beta = .025, p > .05$). Being married and informal helping became unrelated ($\beta = .143, p > .05$). Examining the total effects, age ceased to reduce formal volunteer participation at wave 2 ($\beta = -.001, p > .05$). Church attendance did not reduce depression ($\beta = -.015, p > .05$) or increase informal helping ($\beta = .035, p > .05$) in the long run. It is clear that nonrandom selection exists for these data. The effects of attrition have so reduced the structural relations that the results from only those with complete data would lead to different substantive conclusions.

DISCUSSION

Our review of the literature led us to identify two social causation processes and two social selection processes that may operate in the relationship between volunteering and depression. Consistent with much of the previous research, we found a *benefit effect* due to formal volunteer activity (Krause et al. 1992; Rietschlin 1998; Van Willigen 2000; Musick and Wilson 2003). The final model provided evidence of the modest benefit effects over the eight years of the longitudinal study, suggesting that volunteering is a long-term antidote to depressive episodes. Continued engagement in formal volunteering is beneficial to older volunteers. This is an important finding for voluntary organizations and speaks more generally to the value of the development of social capital. It is also noteworthy that neither benefit nor strain mechanism was observed for informal helping in these data. Formal volunteering is typically a more public activity—more apt to garner recognition—and, therefore, more likely to manifest public legitimacy. Although informal helping roles may link to greater obligations and volunteer fatigue, its altruistic nature may have helped to neutralize its effect on depression.

The results further showed that formal volunteering and informal helping were not mutually reinforcing. Formal volunteering encouraged informal helping over time, whereas the reverse relation did not exist. The analysis reveals that people who had higher levels of formal volunteer participation were also the ones who

provided more informal help. As such, we recommend that future studies examine the effects of both formal and informal voluntarism on other health-related outcomes. Stated in methodological terms, in each of the three waves of data, formal volunteering and informal helping have significant correlated errors (ψ), suggesting unexplained residual variations between the two variables. By including informal helping in the model estimation, we reduced the potential bias that may result from the unexplained disturbance associated with informal helping. We were then able to obtain the net association between formal volunteering and depression.

Our analyses also provided evidence for a social selection process: *compensation*. Many older people with elevated levels of depression at wave 2 sought out volunteer activities by wave 3, presumably as a way to alleviate a season of depressed affect. This finding merits further attention. We considered two possible explanations for this phenomenon—compensation and physical health barriers—but concluded that it is likely to be a manifestation of compensation in these data.¹⁰ It is plausible that depressed people may gradually recognize the potential benefits of volunteer participation on mental health. This recognition could spur their active pursuit of volunteer work. Most theories of compensatory behavior begin with the premise that “compensation emerges from a skill-demand mismatch and involves an increase in one or more behavioral domains to compensate for a targeted deficit” (Carstensen et al. 1995:109). Depression could be one such targeted deficit that led to alternative lines of action such as volunteering.

Somewhat distinct from previous studies, including Thoits and Hewitt (2001), our analyses of ACL revealed that physical health problems were a significant barrier to volunteering. While the effects of depression on volunteering can operate in two ways, it seems that functional impairment is a strong and robust predictor of volunteer activity. Physical health emerged as a more substantial barrier to successful volunteer engagement, often limiting helping relationships.

The analyses also extend the literature on volunteering and mental health by formally accounting for *nonrandom attrition*. A substantial portion of the longitudinal sample was lost over the two follow-up periods. Examining the pattern of attrition revealed that people who

remained in the study at both wave 2 and wave 3 were more likely to be volunteers and had lower levels of depression. Thus, there was evidence of a *sample elite bias*. The consequence for analyzing the elite sample in which both nonvolunteers and depressed people are systematically underrepresented is the underestimation of the true relationship between volunteering and depression.¹¹ This consequence was also expected in the relationships of other independent variables with volunteering and depression because volunteer elites are also elites in terms of socioeconomic status and social integration. Thoits and Hewitt (2001) found that people who dropped out were more likely to be lower income and less socially integrated individuals. Our results have shown that people who stayed in all three waves were significantly different from those who left in terms of all the included variables.

When comparing the results based on the subjects who completed all three waves to results that accounted for the patterns of missingness, we truly found the attenuated causal relationships among depression, formal volunteering, and informal helping over time. The weakened structural relationships were also evident between a number of exogenous variables and the endogenous variables. These patterns suggested that the consequences of nonrandom attrition in panel data can be serious, particularly for some subgroups of the population such as older adults. Future studies of social relationships and mental or physical health need to account for nonrandom attrition.

Interpretation of these results, however, should also consider the limitations of the study. First, depression is but one type of mental health problem. Previous studies have drawn the link between volunteer work and other mental health indicators such as feelings of personal control, self-esteem, and life satisfaction (Krause et al. 1992; Krause and Shaw 2000; Thoits and Hewitt 2001). Our aim was to systematically examine one mental health outcome in detail, but research is needed to reexamine related phenomena.

Second, although we captured the depth and the level of involvement by using both volunteer hours and the number of organizations to construct the measure of formal volunteer work, this measure is limited in reflecting the volunteer experience of older adults. It would be more helpful if future research gave greater attention to the *types* of volunteer work in which the majority of older volunteers engage. Indeed,

one report showed that only 22 percent of older volunteers work with an educational organization, whereas 65 percent donate time to their church or synagogue (Independent Sector 1998). One recent study has shown that church-related work is more beneficial for older volunteers' mental health (Musick and Wilson 2003). Further research is needed that differentiates secular from church-related volunteer work.

Despite the limitations, the present research has demonstrated that several different processes—benefit, barrier, and compensation—are at work in the relationship between volunteering and depression in later life. As long as volunteers continue the act of helping others, there appears to be a mental health benefit. Formal voluntary activity is good for mental health, but no such benefit accrues from informal helping. It appears from these data that older people themselves also recognize the value of formal volunteering to boost one's sense of well-being, but physical health problems make volunteer activity difficult to sustain. *Volunteer elite bias* in this study was due to physical health problems, not depression.

Finally, our analyses also suggest some elements of social integration theory need revision and clarification. With support for both social benefit and social selection processes, it seems that social integration theory needs greater consideration of selection processes. Studies of social integration have focused almost exclusively on the effects of integration on well-being. Most often this has been on the beneficial effects of engagement, but there are a multitude of questions about the characteristics of people who are likely to engage in volunteer activities. Moreover, benefits may accrue from volunteer activities only if certain attributes are present in the participants. The convergence of volunteers may also be important to understanding beneficial effects. On the basis of this research, we believe that social selection processes merit greater attention in the development of social integration theory.

NOTES

1. According to Mead (1934:154), "the organized community or social group which gives to the individual his unity of self may be called the *generalized other*."
2. In studies of social engagement and health, social causation typically refers to the

beneficial effect of engagement on health. As we describe below, this may not always be the case. We prefer the use of the term "benefit" to refer to the salubrious link between social integration and mental health.

3. Two wave 2 measures, functional impairment and informal social integration, were included in preliminary analyses to test their lagged effects on wave 3 dependent variables. They were deleted, however, because the results were virtually identical to those obtained using the baseline measures (described below by comparing models 1 and 2 in Table 2).
4. Another incomplete group that consists of people who completed the survey in both wave 1 and wave 3 may be formed. However, we did not analyze it because this group contains so few cases (about 70) in relation to the number of parameters that will be estimated. These cases were assigned to group 3 (wave 1 only). The combined total sample for the three groups is 1,634. That is 35 cases short of the total sample at the baseline survey. The 35 cases include 22 nonimputable missing values for depression in wave 1 and 13 missing values for all other variables in the analysis.
5. In group 1 with the complete data, all specified factor loadings in the Λ_y matrix and specified error variances and covariances in the Θ_ϵ matrix were freely estimated. In group 2 and group 3, missing variables were given fixed values in the two matrices. For instance, in the Λ_y matrix, all elements in row i were fixed at zero for a particular missing y_i variable. In the Θ_ϵ matrix, the variance of ϵ_i was fixed at one while the covariances associated with ϵ_i were fixed at zero. All other free parameters in the Λ_y matrix were constrained equal across the three sample groups. Other invariant parameters include parameter estimates (β) and measurement errors (ψ) across groups (Bollen 1989). The invariance of parameters in the Θ_ϵ matrix was tested by the likelihood ratio chi-square statistic of constrained model against a less restrained alternative. Parameters were allowed to vary to account for group differences and to improve the model fit.
6. The chi-square statistic was substantially reduced in these models when invariance constraints in measurement errors across the three groups were relaxed. An estimation of 23 additional measurement errors was asso-

- ciated with a reduction of chi-square values of 351.73 ($p < .001$). This relaxation of measurement invariance did not change the structural relationships in the model.
7. Model 4 did not show simultaneous effects between formal volunteering and depression at the baseline. The coefficient of formal volunteering on depression was $-.06$ ($p > .05$), and the coefficient of depression on formal volunteering was $.21$ ($p > .05$). Besides, model 3 and model 4 have almost identical structural relationships among the latent dependent variables and covariates.
 8. The df obtained from LISREL output is 2,162. A total number of 965 pseudovalues were used in the model. Group 2 contained 345 pseudovariances and pseudocovariances and 10 pseudomeans. Group 3 contained 590 pseudovariances and pseudocovariances and 20 pseudomeans. After subtracting these values, the correct number of df for model 3 is $2,162 - 965 = 1,197$.
 9. We have also obtained the indirect effects from LISREL. Among endogenous variables, only wave 1 depression and volunteering have both direct effects and indirect effects on wave 3 depression and volunteering. However, except for the coefficients for the repeated measures, none of the direct and indirect effects was statistically significant at $\alpha = .05$ level.
 10. We considered the possibility that a spurious relationship exists between depression and formal volunteering, both of which are causally dependent upon functional impairment. In the equation for wave 3 formal volunteer work, functional impairment was the only other factor besides age that was negatively related to formal volunteering over the eight years. Functional impairment had a strong positive effect on depression at wave 3 (in column 7; $\beta = .108$, $p < .001$). When we estimated a model without controlling for functional impairment (results not shown), we found that depression did not have any significant effect on formal volunteering over time. Thus, we conclude that functional impairment is a more consequential barrier to volunteer work than is depression. Consistent with the work of others, functional impairment is an obstacle for effective social engagement for older adults (Kelley-Moore and Ferraro 2001).
 11. Berk (1983) discussed the selection bias in sociological data. When the missing data tend to accumulate at one end of the regression line, the estimated regression line is biased downward. It means that the regression line systematically underestimates the slope of the population regression line. In such cases, the regression estimates tend to be smaller than the true values and standard errors tend to be larger. Allison (1987, 2000) confirmed these patterns using simulated data. As we compared the estimates from the model using only the complete data with the one that accounted for the missing data, we found smaller regression estimates and larger standard errors in the former model than in the latter model.

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