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Running Head: Helping behavior, physical activity and elderly people mood

The Effect of Helping Behavior and Physical Activity on Mood States and Depressive Symptoms of Elderly People

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Abstract

The current study examines the effects of helping behavior and physical activity on mood states and depressive symptoms of older 10 adults. Participants (n = 102) reported their chronic conditions, volunteering, supporting behavior, and physical activity. Helping behavior, as well as physical activity, was practiced by more than half of the participants. Physical activity was positively associated with cheer fulness and vigor and explained 4% of the variance in 15 both moods. No links were detected between the level of physical activity and depressive symptoms. Helping behavior was positively correlated with cheer fulness and vigor and explained 6% and 22% of these moods, respectively. It was negatively correlated with depressive symptoms and explained 6% of the variance in their 20 occurrence. The positive link between helping behavior and physical exercise can be explained by adaptation theories of aging which regard the psychological benefits of multiple for ms of activity in late life.

KEYWORDS: elderly, exercise, helping behavior, mood states

The Effect of Helping Behavior and Physical Activity on Mood States and Depressive Symptoms of Elderly People

The current study examines the effects of helping behavior and physical activity on mood states and depressive symptoms of older adults. Previous studies indicated helping behavior such as volunteering activity enhanced well-being over time (Van Willigen, 2000), increased life satisfaction especially at high rates of volunteering (Morrow-Howell, Hinterlong, Rozario & Tang, 2003), enhanced the level of positive emotions (Diwan, Jonnalagadda, & Balaswamy, 2004; McAuley, Konopack, Motl, Morris, Doerksen, & Rosengren, 2006; Vecina Jimenez & Chacon Fuertes, 2005), and decreased depressive symptoms (Greenfield & Marks, 2007). Moreover, older people who volunteer experience better perceived health (Brown, Nesse, Vinokur, & Smith, 2003), lower morbidity (Brown, Consedine, & Magai, 2005), and reduced mortality rate (Harris & Thoresen, 2005; Shmotkin, Bumstein & Modan, 2003).

Physical activity is another pursuit researchers explored in order to determine its effect on sustaining physical and mental health of aging individuals. Previous studies have shown various forms of physical activity could prevent and alleviate depressive and pain symptoms of older people (Craft, 2003), induce positive affect and positive self-perceptions (Montross, Depp, Daly, Reichstadt, Golshan, & Moore et al., 2006), and enhance sense of control and social involvement (Shmotkin et al, 2003). High intensive doses of exercise, such as aerobic training, were formerly reported to be linked with promoting positive affective states (Dishman, 1986). Other researchers (Dunn, Trivedi, & O'Neal, 2001; Ekkekakis & Petruzzello, 1999) failed to reveal a consistent pattern of intensity effect on psychological factors. Recent studies indicated that moderate exercise benefited most the psychological well-being, (Netz, Wu, Becker & Tenenbaum, 2005); and physical health of older adults (Pate, Pratt, Blair, Haskell, Macera, Bouchard et al., 1995).

Few theories and models explained the impact of volunteering and physical activities on the well-being of aging people. Role theory claims that these practices facilitate the function of replacing past activities such as work role with novel roles which induce physical and mental well-being (Lemon, Bengtson, & Petersen, 1972). The continuity theory explains these practices as a continuous activity, that is, individuals who practiced volunteering and physical activity in their younger age would continue to do so as they aged (Atchley, 1993; 1997).

The current study is innovative in examining both helping behavior and physical activity as possible practices that enhance the psychological well-being of aging individuals. We examine the relationships of helping behavior and physical activity on the mood states and depressive symptoms of aging individuals.

Method

Study Population

Recruitment procedure included advertisements and lectures given by the authors at two major protected residential houses in the southern part of Israel. Older people who agreed to take part in the study were paid $20 for their participation.

Our study was part of a larger research program focusing on balance, gait, nutrition, and falls. The cohort inclusion criteria were the ability (a) to stand independently for 90 seconds, (b) to walk 10 meters (with a cane if necessary), and (c) to understand verbal instructions. The exclusion criteria were (a) serious visual impairment, (b) inability to ambulate independently (cane acceptable, walker not), and (c) severely impaired cognitive status. The final group consisted of 102 elderly adults.

Demographic data including age, education, country of birth (COB), marital status, living arrangements, and data regarding health status were collected in an interview.

Participants were asked whether they were told by their general practitioner that they suffer from various diseases including hypertension and diabetes.

Ethical approval for the study was granted by the regional ethics committee and the participants gave their informed consent to collect psycho-social information.

The following data were collected using a structured questionnaire administered by one interviewer:

Cognitive functioning was assessed by the Mini-Mental State Examination (MMSE—Folstein, Folstein, & McHugh, 1975). Patients with a total score of 24 and below were excluded from the study because of their limited ability to understand, cooperate, and communicate verbally during the interview.

Depressive symptoms were assessed using the Geriatric Depression Scale (GDS—Yesavage et al. 1982–83). Internal consistency measured by Cronbach $\alpha = .784$.

The state-trait cheerfulness inventory (STCI) assessed cheerfulness, seriousness, and bad mood. The short version consisted of 18 items—cheerfulness (7 items), seriousness (6 items), bad mood (5 items). Each item is scored on a 4-point Likert scale. Scores ranged from 6 to 24 (Ruch, Köhler, & van Thriel, 1996). Internal consistency, measured by Cronbach α, for cheerfulness was .75; and for bad mood .78. The Cronbach α for seriousness was low ($\alpha = .20$) and not used in the analysis.

Profile of Mood States (POMS)—(McNair, Lorr, & Droppleman, 1971). The POMS consists of 58 items which measure tension-anxiety (9 items), depression-dejection (15 items), anger-hostility (12 items), vigor (8 items), fatigue, and confusion (7 items each). The POMS was employed among other elderly population and found to be a reliable measure for evaluating moods (Nyenhuis, Yamamoto, Luchetta, Terrien, & Parmentier 1999). In the present study, participants were asked to indicate to what extent they felt each item described their mood in the last couple of weeks on a five-point Likert scale. Scores ranged from 0 to 23 for fatigue and confusion to 0 to 42 for depression-dejection. Higher scores indicated a higher

level of the factor. Internal consistency ranged from Cronbach $\alpha = .70$ (confusion), to Cronbach $\alpha = .80$ (anger), to Cronbach $\alpha = .90$ (depression-dejection).

Chronic diseases—A list of chronic conditions/diseases was assessed. For each participant, a score was calculated representing the number of chronic conditions (minimum of 0 to maximum of 7). A higher score indicated more health-impairing conditions.

Helping behavior was measured by two questions: "the frequency one provides support and care for family or friends" and "the frequency one works as a volunteer." Physical activity was measured by two questions: "the frequency one participates in sports activity such as swimming, tennis, walking, jogging" and "the frequency one works out regularly." Both sets of items were taken from the "Late Life Function and Disability Instrument" (Haley, Jette, Coster, Kooyoomjian, Levenson, & Heeren, 2002). Answers were given on a 5 point Likert scale. A mean frequency of helping behavior and physical activity were calculated for each participant.

Data Analysis

Descriptive statistics were used to summarize the sample characteristics (see Table 1) and sum scores of each study instrument (see Table 2). Student t -tests were used to look for differences in the frequency of physical and volunteering activity between males and females. Partial correlations were calculated between emotional indices, frequency of helping behavior, and frequency of physical activity, examining the associations between the variables. Due to the variability in health condition, partial correlations were controlled for chronic diseases. All subscales were standardized into z scores following the results of the Shapiro-Wilke test for normality. Finally hierarchical regression analyses were conducted to test the contribution of variables such as helping behavior and physical activity on mood states and GDS.

Results

Most of the participants were women (72.5%) between the ages of 62 to 145 94 years (mean of 78.28 ± 6.1). More than half of the participants lived alone (58%), while the rest were married or lived with their partners. Eighty-six percent of the participants lived in protected housing, while the rest were community dwelling. Expenses were paid by the elderly persons or their family members, and no debts were registered for any of the participants. As for the participants' health status, they had an average of 2.43 chronic conditions (SD = 1.75) and consume about five kinds of drugs daily (SD = 3.07).

Means and SDs for the mood scales and subscales along with the frequency of helping and physical activity are reported in Table 2.

For tension and depression-dejection subscales, the mean scores were 9.75 ±7.26 and 9.57±10.20. Anger, fatigue, and confusion scores were in the lowest section of the range, while the mean score for vigor was in the highest portion of the range (20.73 ±6.91), followed by a high mean for cheerfulness (mean = 17.61±3.87). More than half of the participants (55%) practiced helping behavior with a mean frequency of 1.7 ±0.6 times a week. A similar percentage participated in physical activity with a mean frequency of 2 ±.62 times a week.

Analyses with reference to gender yielded few results: female participants engaged in physical activity more frequently than men (male, mean = 11.6±5.9, female, mean = 14.5±3.7 (Student t -test = 2.1, $p \leq .05$), but no statistical difference was detected in the frequency of helping behavior. The frequency of physical activity or helping behavior was not related to the age, education, country of origin, marital status, or residential location of the participants.

Partial correlations were calculated between emotional indices (POMS subscales, GDS and two of the STCI scales), helping behavior, and physical activity with the effects of chronic disease partialled out. Vigor correlated .45 with helping behavior and cheerfulness with helping behavior at .36 and both of these were $p \leq .01$. Moreover, depressive symptoms were highly and reversely associated with supporting others and volunteering ($r = –.5$, $p \leq .01$). Vigor correlated .32 with physical activity ($p \leq .05$) and cheerfulness correlated with

physical activity at .40 ($p \leq .01$). The level of depressive symptoms was not found to be correlated with physical activity. Helping behavior was also positively associated with physical activity, namely indicating the positive relationships between these two practices among our participants ($r = .34$, $p \leq .05$). The mood scales, which draw on similar themes, were associated with each other and provide content validity. For example; GDS was positively related to POMS tension and depression–dejection (r range from .42 to 0.6, $p \leq .01$) and negatively related to cheerfulness and vigor (r range from –.37 to –0.57, $p \leq .01$).

In order to determine which practices influenced depressive symptoms and mood states of the participants, hierarchical regression analyses were conducted for every mood/emotion (dependent variable). An "enter method" was employed with the statistically significant correlated variables. Blocks of entry were ordered by the sequence of chronic diseases, frequency of helping behavior, and frequency of physical activity. See Table 3.

Hierarchical regression coefficients of chronic diseases and frequency of helping behavior on depressive symptoms were employed to detect the effect of chronic disease and frequency of helping behavior on depressive symptoms. The number of chronic diseases did not contribute to the explained variance in depressive symptoms. However, a lower frequency of helping behavior explained 6% of the variance in depressive symptoms among our participants ($ß = –.26$, $p \leq .05$). To avoid family-wise error and to correct for multiple comparisons, significance level was set at a p value of .025 for depressive symptoms (.05/2 blocks = .025).

Hierarchical regression coefficients of chronic diseases, frequency of helping behavior, and frequency of physical activity on vigor mood were employed. Three blocks of entry were ordered by this sequence. The number of chronic diseases contributed 4% to the explained variance in vigor mood ($ß = –.21$, $p \leq .05$). In the second stage, a higher frequency of helping behavior was added to the regression analysis and explained 22% of the variance in vigor mood state ($ß = –.48$, $p \leq .01$). In the third stage, when frequency of physical activity

was added to the analysis the explained variance in vigor was increased in 4% (ß = 0.24, $p \leq .05$). To avoid family-wise error and to correct for multiple comparisons, significance level was set at a p value of .0166 (.05/3 blocks = .0166) for vigor.

Finally, hierarchical regression coefficients were obtained to evaluate the contribution of chronic diseases, frequency of helping behavior, and frequency of physical activity on cheerfulness. Three blocks of entry were ordered by this sequence. The number of chronic disease did not contribute to the explained variance in cheerfulness. In the second stage, the frequency of helping behavior contributed 6% to the explained variance in cheerfulness (ß = .26, $p \leq .05$). In the third stage, when frequency of physical activity was added to the analysis it explained an additional 4% of the variance in cheerfulness (ß = .22, $p \leq .05$). To avoid family-wise error and to correct for multiple comparisons, significance level was set at p value of 0.0166 (.05/3 blocks = .0166) for cheerfulness.

Discussion

Helping behavior such as providing support for others and volunteering were practiced by more than half of our participants with a mean frequency of 1.7 times a week. Physical activity was practiced by more than half of our participants with a mean frequency of twice a week. Another study conducted on a national sample of elderly Israeli-Jewish people found similar percentage of volunteers, mean frequency of volunteering activity and similar mean frequency of sport activity (Shmotkin et al., 2003). Lower rate of volunteering activity was detected among American (Morrow-Howell et al., 2003) and Korean elderly (Kim, Kang, Lee, & Lee, 2007), implying possible ethno-culture diversity in the prevalence of helping behavior (Chambré, 1993).

The values of the psychological indices (mood states and depressive symptoms) in the current study were similar to those described among elders in the United States (Nyenhuis et al., 1999) but lower in comparison to a study with elder Korean (Shin & Colling, 2000).

Lower mood states were significantly correlated with female gender, advanced age, unemployment, less education, lower economic status, being widowed or divorced, and depending on children as the main source of income (Shin & Colling, 2000).

Helping behavior was positively associated with physical activity among our participants. The positive link between helping behavior and physical exercise can be explained by adaptation theories of aging, such as activity theory and continuity theory, which regard the benefits of multiple forms of activity in late life on the well being of the elderly (Montross et al., 2006; Shmotkin et al., 2003). The theories claim that an aging individual who learns new roles or continues to employ practices from a younger age is psychologically better than an elderly person who does not. Our findings support these ideas and indicated that physical activity was positively associated with cheerfulness and vigor, and explained 4% of the variance in both moods. The role of exercise in the facilitation and maintenance of positive mental health was documented previously (Stewart, Turner, Bacher, DeRegis, Sung, & Tayback, et al., 2003). Physical activity also enhances physical and mental vigor, goal directed behavior, social affiliation, self-mastery, and intellectual interests (Chambré, 1993).

The following explanations for a positive relationship between physical activity and psychological well being are suggested (Craft, 2003; Salmon, 2001; Stewart, et al., 2003): a distraction hypothesis proposes that the time-out associated with physical activity or exercise may function as an advantageous diversion from chronic disease, stressors and hassles of everyday life (Paluska & Schwenk, 2000). The mastery hypothesis suggested that the feeling of being able to master a highly valued task (e.g., walking vigorously, weight control) may facilitate the enhancement of mood or self-esteem (Biddle & Mutrie, 2001; Buckworth & Dishman, 2002).

However, our results failed to correlate physical activity with depressive symptoms though previous studies detected these associations (e.g., Fox, Stathi, McKenna, & Davis, 2007). The absence of relationship may be related to the physical activity measure we

employed (Haley et al., 2002). Therefore, we exercise caution about generalizing our findings and recommend future studies to employ meticulous scales for measuring sport activity characteristics such as mode, intensity, and total volume. Such measures may further contribute to determine the relationship between physical activity mood and depressive symptoms.

Helping behavior was positively related with cheerfulness and vigor and negatively associated with depressive symptoms. Similar relationships between provision of support and positive moods were reported among independent community dwelling elderly (Hays, Landerman, George, Flint, Koenig, & Land, et al., 1998). The practice of helping behavior explained 6% of the variance in depressive symptoms and cheerfulness mood state, and 22% ($p < .001$) of the variance in vigor. The latter pass the Bonferroni threshold, which controls the family-wise error-rate. Previous researchers relate to the adjusted alpha as ‘highly significant (Williams, Jones, Tukey, 1999). Our data are consistent with several possible explanations: older individuals substitute previous role losses with volunteering activity that is socially approved and provides a sense of meaning in life, which in turn can enhance positive emotions and reduce depressive symptoms (Thoits & Hewitt, 2001). Another explanation claims that elderly people who practice helping behavior are motivated to help others by deeply held values of civic participation in which continuity and growth are possible even in the face of change in physical and mental functioning as well as the opportunity to feel meaningfully engaged with other people (Okun & Schultz, 2003; Van Willigen, 2000). A third explanation looks at the instrumental and socioemotional rewards available to people who volunteer. For example, access to resources as information (Shmotkin et al., 2003), a continuous experience that may lead to accumulation of social status, personal coping resources, and improvement in mental and physical health (Thoits & Hewitt, 2001).

The current study draws attention to the importance of broadly viewing the multiple forms of activity in late life and their contribution to affective states and well being of elderly

people. Clinicians are encouraged to facilitate elderly patients whose physical and psychological efficacy may be deteriorating with experiences that may enhance their positive well being. For example, elderly people with severe health problems and/or social isolation can be encouraged to be involved in volunteering activities using phone calls. Future prospective research is called for to explore the impact of helping behavior, physical activity, and other practices such as leisure activities, on the psychological well-being, moods, and affective reactions of aging individuals. Longitudinal studies with several measuring points provide an opportunity to assess the impact of the above practices on mental and physical health outcomes.

Nevertheless, this study suffers from several limitations: the sample consists of mostly high socioeconomic (HSES) individuals and most of the participants are older people of protected residential housing which may not be representative of the entire elderly population. However, these limitations are largely offset by the quality of the data that was obtained, high compliance, and high education levels in this group. Future studies should be conducted in other population groups and should consider that the research tools may need to be modified to allow broad participation among less educated elderly persons. The third limitation arises from the absence of relationship between physical activity and depressive symptoms. Future studies need to employ meticulous scales for measuring sport activity characteristics such as mode, intensity, and duration. Such measures may further contribute to determine the relationship between physical activity mood and depressive symptoms.

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Table 1.
Participants' Characteristics

		Minimum-Maximum
Age Mean, (SD)	78.28 + 6.1	62–94
Years of education, Mean (SD)	12.1 (3.9)	7–26
Sex, n (%)		
Male	28 (27.5)	
Female	74 (72.5)	
Country of birth, n (%)		
Israel	15 (14.9)	
Western Europe, U.S.A, ,South	34 (33.7)	
Africa	39 (38.6)	
Eastern Europe, former USSR	13 (12.8)	
North Africa, Asia		
Housing, n (%)		
Protected housing form 1	51 (47.7)	
Protected housing form 2	35 (34.3)	
Community dwelling	16 (15.7)	
Marital status, n (%)		
Married, living together	42 (41%)	
Live alone	60 (56%)	
Chronic conditions, n (%)		
Hypertension	36 (35.6)	
Congestive heart failure	14 (13.9)	
Myocardial infraction	13 (12.9)	
Osteoporosis	36 (35.6)	
Diabetes	20 (19.8)	
Arthritis	16 (15.8)	
Operation in joints/bones	17 (16.8)	
Stroke	5 (5)	
Cancer, liver or kidney diseas	≤ 2	
No. of drugs used per day	5 + 3.07	0–16

Table 2.
Distribution of Mood Scales, Mood subscales, Physical Activity and Helping behavior

	Level of mood scales & frequencies		
Variable	Mean	SD	Range
Tension	9.75	7.26	0-32
Depression - dejection	9.57	10.20	0-42
Anger	7.47	7.16	0-37
Vigor	20.73	6.91	0-31
Fatigue	7.73	5.96	0-23
Confusion	7.76	4.83	0-23
Cheerfulness	17.61	3.87	6-24
Bad mood	10.44	6.00	6-20
GDS	3.36	2.96	0-13
Sport activity	2.00	0.62	0.6-2.7
Helping behavior	1.70	0.60	0.6-2.9

Table 3.
Hierarchical Regression Analyses of Number of Chronic Disease, Frequency of Helping Behavior and Frequency of Physical Activity on Depressive Symptoms and Mood Scales

Variable	B	Std. Error B	Beta	R square change
Depressive symptoms				
Block 1				
Chronic diseases	0.26	0.16	0.16	0.02
Block 2				
Chronic diseases	0.16	0.16	0.09	
Helping behavior	-0.27	0.10	-0.26*	0.06*
Vigor				
Block 1				
Chronic diseases	-0.73	0.33	-0.21*	0.04*
Block 2				
Chronic diseases	-0.35	0.30	-0.10	
Helping behavior	0.10	0.02	0.48*	0.22**
Block 3				
Chronic diseases	-0.02	0.03	0.06	
Helping behavior	0.08	0.20	0.39*	
Physical activity	0.04	0.10	0.24*	0.04**
Cheerfulness				
Block 1				
Chronic diseases	-0.08	0.06	-0.13	0.02
Block 2				
Chronic diseases	-0.05	0.06	-0.07	
Helping behavior	0.1	0.04	0.26*	0.06*
Block 3				
Chronic diseases	-0.01	0.06	-0.03	
Helping behavior	0.07	0.04	0.17	
Physical activity	0.08	0.03	0.22*	0.4*

*p≤0.05; **p≤0.001