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The Relationship Between Three Sources of Social Support and Physical Activity Level in Middle-Aged and Older Adults

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Abstract

This study examined how different sources of social support from family members (excluding partners), friends, and partners were associated with moderate and vigorous leisure-time physical activity (LTPA) among middle-aged and older adults. This study included married participants aged 45 or older ($N = 2{,}155$) from the Midlife in the United States secondary data set. Hierarchical linear regression was performed to investigate the relationship between the three sources of social support and moderate LTPA, and separately, with vigorous LTPA. Partner support ($b = 0.19$, $p < .01$), family support ($b = -0.19$, $p < .01$), and friend support ($b = 0.26$, $p < .001$) were all significantly associated with moderate LTPA. Only social support from friends was associated with vigorous LTPA ($b = 0.24$, $p < .001$). Our study emphasizes the significance of social support in influencing LTPA behaviors among middle-aged and older adults. Future programs promoting physical activity should incorporate social support from friends to have the greatest impact.

Keywords

aging, social support, social relationships, physical activity

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Introduction

Engaging in physical activity is recognized as a crucial factor for the promotion of healthy aging, benefiting both the physical and mental well-being of individuals (Beard et al., 2016; Eckstrom et al., 2020; Kim et al., 2021). However, empirical investigations have consistently indicated that middle-aged and older individuals frequently fail to meet the established guidelines for physical activity (Watson et al., 2016). The Centers for Disease Control Prevention conducted an analysis using national data, focusing on adults aged 45 years and above, which revealed that 27.5% of individuals in the middle and older age groups reported no participation in leisure-time physical activity (LTPA) within the past month (Watson et al., 2016). Moreover, the prevalence of physical inactivity exhibited a significant rise with increasing age, reaching 25.4% among individuals aged 50–64 years, 26.9% among those aged 65–74 years, and 35.3% among individuals aged 75 years and above (Watson et al., 2016).

Social support has been recognized as a crucial determinant of physical activity (Beselt et al., 2021; Mendonça et al., 2014). Previous studies have revealed that higher levels of social support are linked to an increased likelihood of engaging in physical activity (Laird et al., 2016). Furthermore, the association between social support and physical activity may differ based on the source of support (e.g., peer, family, friends, and partner). For instance, Pluta et al. (2020) discovered a positive correlation between three sources of social support (including parental, teacher, and peer support) and physical activity among adolescents, where teachers' and parents' social support exerted a greater influence on adolescent physical activity compared to peer support (Pluta et al., 2020). Another study identified social support from friends and family as crucial correlates of activity levels in college students, with family support being more significant than friend support (Leslie et al., 1999).

While previous studies have explored the link between different sources of support and physical activity, few investigations have specifically focused on middle-aged and older individuals. Middle and old adulthood represent critical life stages during which individuals encounter significant life events such as retirement, illness, or losing a partner (Monson et al., 2016; Singh & Misra, 2009). During these stages, individuals in the middle-aged and older population commonly experience a dynamic and multifaceted network of social support from various sources (Schnittger et al., 2012) and also declines in physical activity (Watson et al., 2016). It is essential to identify the most effective sources of social support pertaining to engagement in physical activity to tailor strategies for promoting active lifestyles among middle-aged and older populations.

Theoretical Background

Social Networks and Social Support theory proposed by Heaney and Israel (2008) emphasizes that different social support resources have a different impact on health behaviors (e.g., physical activity) by offering either personal or environmental social resources. Personal social resources encompass ongoing support, encouragement,

and companionship, creating a stable foundation that positively influences engagement in physical activity (Heaney & Israel, 2008). Furthermore, environmental social resources facilitate the creation of a practical environment that encourages participation in physical activity (Heaney & Israel, 2008). In the context of middle-aged and older adulthood, intimate individuals, such as partners or spouses, serve as long-term personal resources for social support. These close relationships provide a source of ongoing support and emotional connection, establishing a strong foundation for promoting engagement in physical activity (Gellert et al., 2011). Other family members and friends also play a crucial role in providing environmental social resources; they create a practical environment through interactions and participation in shared physical activities (McPhee et al., 2016). Taken together, social support can manifest through various relationships, each with its own unique characteristics within the context of middle-aged and older adulthood. Based on Social Networks and Social Support theory and previous research, family members, friends, and partners have been identified as three critical social support resources among the middle-aged and older population, which we examined in this study.

Prior studies have highlighted the distinct relationships between social support and different levels of physical activity, specifically moderate activities (e.g., brisk walking, mowing the lawn, gardening, etc.) and vigorous activities (e.g., hiking, running, shoveling, etc.). For instance, research has indicated that parental and peer support are linked to higher levels of vigorous physical activity among college students (King et al., 2013). Another study focusing on children demonstrated a moderate positive correlation between teenagers' perceived social support and the intensity and duration of their physical exercise (Ren & Li, 2020). However, there has been limited empirical research on the various influences of social support sources in predicting different levels of physical activity among middle-aged and older individuals. Thus, there is a need to understand how different sources of social support are associated with physical activity intensity (moderate and vigorous) in middle and older adults.

In summary, prior studies and theoretical frameworks provide the rationale for investigating how different social support from family members (excluding spouse/partner), friends, and partners are associated with moderate and vigorous physical activity in middle-aged and older adults (adults aged 45 years and above). This study has two objectives: (1) to understand the link between different sources of support and physical activity among middle-aged and older adults, and (2) to determine the association between different sources of social support and levels of moderate and vigorous physical activity among middle-aged and older adults.

Methods

Data and Participants

This study utilized data from the third wave of the secondary dataset Midlife in the United States (MIDUS, $N = 3294$), which encompassed the years 2013 to 2014

(Ryff et al., 2016). The MIDUS project was designed to investigate the influence of behavioral, psychological, and social factors on health outcomes (Ryff et al., 2016). The data collection was through a 45-min phone interview, followed by a self-administered questionnaire, which captured participants' responses on both physical and mental health factors. Demographic information, such as age, gender, and marital status, was also collected. Aligned with the study objectives, the current investigation focused on middle-aged and older adults (age ≥ 45 years old) who were married. By excluding participants below the age of 45 ($n = 81$) and those in separated, divorced, never married, or widowed marital statuses ($n = 1058$), the initial sample size of 3,294 participants decreased to 2,155 individuals.

Measurements

Social Support From Family Friends and Partners

Three different forms of social support—family, friends, and partner—were evaluated through separate questions. For each source of social support, respondents were asked to rate their family, friends, and partner in terms of (1) care, (2) understanding of their feelings, (3) reliability, and (4) openness (Walen & Lachman, 2000). An additional set of questions focused only on the partner, encompassing (1) "*How much does he or she appreciate you*?" and (2) "*How much can you relax and be yourself around him or her*?" (Walen & Lachman, 2000). A 4-point scale (1 = a little to 4 = a lot) was used to measure each response. The mean score was calculated for each social support resource, with higher scores reflecting more substantial support.

Leisure-Time Physical Activity

Participant's LTPA was measured using the following questions: "*How often do you engage in moderate/vigorous PA during your leisure or free time?*" separately for moderate LTPA and vigorous LTPA with an explanation and examples of moderate and vigorous physical activities provided (Ryff et al., 2016). For example, a moderate level would be "*heart rate to increase slightly, and you typically work up a sweat*," and a vigorous level would be "*work up a good sweat and are breathing heavily*" (Ryff et al., 2016). Questions related to LTPA were asked separately for summer and winter to account for seasonal influence. A 6-point scale ("1" = "several times a week or more" to "6" = "never") was used for measuring responses. For the current study, the answer was reverse-coded for a more intuitive interpretation. Additionally, the mean of summer and winter PA levels were calculated separately for moderate and vigorous LTPA, with higher scores reflecting higher LTPA levels.

Demographic Variables and Health-Related Variables

Demographic variables included age, race (White or non-White), sex (male or female), and employment status (yes or no). The current study recoded the race variables into White and non-White (African American, Native American or Alaska Native Aleutian Islander/Eskimo, Asian, and other) categories due to the small sample size

of non-White races. Two additional health-related variables, the number of chronic physical diseases and mental/emotional health conditions, were also included in the analysis as control variables. The number of chronic physical diseases over the past 12 months ranged from 0 to 20, with higher values representing a greater number of chronic diseases. Participants were asked to self-rate their mental/emotional health on a five-point scale (1 = excellent, to 5 = poor). The current study reverse-coded the answers with higher scores reflecting better self-rated mental health.

Statistical Analysis

Descriptive statistics were first examined for all study variables using frequencies and percentages for categorical variables and means and standard deviations for continuous variables. Correlation tests were next performed on key variables (including chronic physical health, mental health, moderate LTPA, vigorous LTPA, family social support, friends social support, and partner social support). Aligned with the study objectives, hierarchical linear regression models were next conducted to explore the relationship between the three sources of social support and moderate LTPA and, separately, vigorous LTPA, controlling for age, sex, race, employment status, and physical and mental health. Model 1 only included participants' background characteristics as predictors. Models 2, 3, and 4 accounted for additional variance in moderate and vigorous LTPA beyond what was explained by Model 1. In each model, the three types of social support were added stepwise to examine the proportion of explained variance in moderate or vigorous LTPA by checking the R-square's improvement. Wald Chi-Square tests were used to examine the change in R-square from Model 1 to Model 4. Separate analyses were conducted for moderate and vigorous LTPA.

Among the 2,155 participants included in the study, the percentage of missing data varied across different variables, ranging from 1.07% for race to 13.64% for partner social support. As per the t-test findings, which compared data with missing observations to data without missing observations, there were no significant differences observed between the missing and non-missing data for moderate LTPA (with a missing rate of 13.18%) and vigorous LTPA (with a missing rate of 13.41%) based on sex, race, employment status, chronic physical health, or the three types of social support. However, the t-test findings revealed significant differences in missingness of moderate and vigorous LTPA based on age ($p < .001$) and mental/emotional health ($p < .001$). Given that the proportion of missing data exceeded 10% and was determined to be missing at random, the researchers employed multiple imputation by predictive mean matching (Bailey et al., 2020; Little & Rubin, 1989). This imputation method was chosen due to its demonstrated effectiveness under such conditions (Kleinke, 2017). Missing values were imputed by predicting and utilizing data from matched cases with complete values across all variables. All subsequent statistical analyses were performed using the imputed dataset and conducted in R Studio Version 1.2.

Results

Table 1 summarizes the characteristics of the final study sample ($N = 2,155$) and descriptive statistics for the measured variables. The average age of the participants was 63.07 years (SD: 10.33). The majority of participants were White ($n = 1,974$, 91.60%), male ($n = 1,104$, 51.23%), and employed ($n = 1,092$, 50.67%). On average, participants reported 4.10 chronic physical conditions (SD: 4.14), and their self-rated mental health score was 3.72 (SD: 0.93) on a scale from 1 to 5. The descriptive statistics showed that participants conducted moderate LTPA approximately "*once a week*" while engaging in vigorous LTPA "*several times a month*." Regarding the three categories of social support, participants reported receiving varying degrees of support, ranging from "*some*" to "*a lot*" for each type. Specifically, participants had an average moderate LTPA level of 4.26 (SD: 1.72) and an average vigorous LTPA level of 3.48 (SD: 1.89). The average scores for social support from family members (excluding spouse/partner), friends, and partners were 3.44 (SD: 0.67), 3.38 (SD: 0.63), and 3.69 (SD: 0.50), respectively.

Table 2 displays the correlations among the key variables, including chronic physical health, mental health, moderate LTPA, vigorous LTPA, family social support,

Table 1. Descriptive Statistic of the Study Sample ($N = 2,155$).

Variable	*n*/Range	Mean (SD) or %
Age	45–92	63.07(10.33)
Race		
White	1974	91.60%
Non-White	181	8.40%
Sex		
Female	1051	48.77%
Male	1104	51.23%
Employment		
Yes	1092	50.67%
No	1063	49.33%
Chronic physical health	0–20	4.10 (4.14)
Mental health	1–5	3.72 (0.93)
Moderate LTPA	1–6	4.26 (1.72)
Vigorous LTPA	1–6	3.48 (1.89)
Family social support	1–4	3.44 (0.67)
Friends social support	1–4	3.38 (0.63)
Partner social support	1–4	3.69 (0.50)

Note. SD = standard deviation; *n* = number of participants; % = percentage; LTPA = Leisure Time Physical Activity.

Table 2. Correlations Between Study Key Variables.

	Chronic physical health	Mental health	Family social support	Friends social support	Partner social support	Moderate LTPA	Vigorous LTPA
Chronic physical health	1						
Mental health	−0.24***	1					
Family social support	−0.33***	0.14***	1				
Friends social support	0.14***	0.11***	0.16***	1			
Partner social support	0.03	0.15***	0.09***	0.20***	1		
Moderate LTPA	−0.09***	0.14***	−0.04*	0.10***	0.08***	1	
Vigorous LTPA	−0.09***	0.12***	0.0003	0.08***	0.03	0.56***	1

Note. LTPA = Leisure-Time Physical Activity.
*$p < .05$, ***$p < .001$.

friends social support, and partner social support. The results indicate significant correlations between these variables, except for the correlations between chronic physical conditions and partner social support, family social support and vigorous LTPA, and partner social support and vigorous LTPA. Notably, several moderate correlations with $r \geq 0.30$ should be highlighted. Family social support showed a negative correlation with chronic physical conditions ($r = -0.33$, $p < .001$), while moderate LTPA exhibited a positive correlation with vigorous LTPA ($r = 0.56$, $p < .001$).

Tables 3 and 4 present the results of the regression models examining the associations between the three sources of social support and moderate LTPA and vigorous LTPA and measured covariates. The results from Model 1 in Tables 3 and 4 indicated that higher levels of moderate and vigorous LTPA were associated with younger age, lower chronic physical health, and higher mental health (all $ps <$ .05). Additionally, compared to male participants, female participants exhibited lower levels of both moderate and vigorous LTPA (both $ps < .05$). After conducting the hierarchical multiple regression models, multicollinearity among the

Table 3. Hierarchical Multiple Regression Models of Moderate LTPA ($N = 2,155$), *b* (se).

	Model 1	Model 2	Model 3	Model 4
Age	−0.03 (0.003)***	−0.03 (0.003)***	−0.03 (0.003)***	−0.03 (0.003)***
Race				
White (Reference)	—	—	—	—
Non-White	0.03 (0.13)	0.03 (0.13)	0.04 (0.13)	0.04 (0.13)
Sex				
Female	−0.22 (0.07)**	−0.19 (0.07)**	−0.24 (0.07)**	−0.21 (0.07)**
Male (Reference)	—	—	—	—
Employment				
Yes (Reference)	—	—	—	—
No	−0.01 (0.08)	−0.03 (0.08)	−0.05 (0.08)	−0.06 (0.08)
Chronic physical health	−0.02 (0.01)*	−0.03 (0.01)**	−0.04 (0.01)***	−0.04 (0.01)***
Mental health	0.22 (0.04)***	0.23 (0.04)***	0.20 (0.04)***	0.19 (0.04)***
Family social support	—	−0.13(0.06)*	−0.19 (0.06)**	−0.19 (0.06)**
Friends social support	—	—	0.29 (0.06)***	0.26 (0.06)***
Partner social support	—	—	—	0.19 (0.07)**
R-square	0.06	0.07	0.08	0.09

Note. LTPA = Leisure-Time Physical Activity.
*$p < .05$, **$p < .01$, ***$p < .001$.

Table 4. Hierarchical Multiple Regression Models of Vigorous LTPA ($N = 2,155$), *b* (se).

	Model 1	Model 2	Model 3	Model 4
Age	−0.04 (0.004)***	−0.04 (0.004)***	−0.04 (0.004)***	−0.04 (0.004)***
Race				
White (Reference)	—	—	—	—
Non-White	−0.07 (0.14)	−0.07 (0.14)	−0.07 (0.14)	−0.07 (0.14)
Sex				
Female	−0.30 (0.08)***	−0.31 (0.08)***	−0.36 (0.08)***	−0.35 (0.08)***
Male (Reference)	—	—	—	—
Employment				
Yes (Reference)	—	—	—	—
No	−0.06 (0.09)	−0.04 (0.09)	−0.07 (0.09)	−0.07 (0.09)
Chronic physical health	−0.02 (0.01)*	0.01 (0.01)	−0.02 (0.01)**	−0.02 (0.01)**
Mental health	0.19 (0.04)***	0.19 (0.04)***	0.17 (0.04)***	0.16 (0.04)***
Family social support	—	0.04 (0.06)	−0.01 (0.06)	−0.01 (0.06)
Friends social support	—	—	0.25 (0.06)***	0.24 (0.06)***
Partner social support	—	—	—	0.04 (0.08)
R-square	0.07	0.07	0.08	0.08

Note. LTPA = Leisure-Time Physical Activity.
*$p < .05$, **$p < .01$, ***$p < .001$.

independent variables (friend, family, and partner social support) was assessed using the VIF. The VIF values (all <1.5) indicated that the assumptions for the regression models were met. Based on the results from Models 2, 3, and 4 in Tables 3 and 4, the R-square change was .03 for moderate LTPA and .01 for vigorous LTPA. The Wald tests indicated a small but significant increase in explained variance ($ps < .001$). Among the three types of social support, partner support ($b = 0.19$, $p < .01$), family support ($b = -0.19$, $p < .01$), and friend support ($b = 0.26$, $p < .001$) were all significantly associated with moderate LTPA. As each supporting resource was added to Model 1, it explained an additional 1% of the variance in moderate LTPA. For vigorous LTPA, only social support from friends demonstrated a significant association, with a coefficient of $b = 0.24$ ($p < .001$).

Discussion

The study examined associations between social support from family members (excluding spouse/partner), friends, and partners, and moderate and vigorous physical activity in middle-aged and older adults, controlling for factors such as age, gender, race, physical condition, and mental health. Results revealed that only

social support from friends exhibited a positive association with both moderate and vigorous LTPA. In addition, social support from family members and partners showed a significant association only with moderate LTPA. Surprisingly, the association between social support from family members and moderate LTPA was found to be negative.

Our findings indicated that social support from friends exhibited a positive association with both moderate and vigorous LTPA. This suggests that friends play a crucial role in promoting and engaging middle-aged and older adults in physical activity. This finding aligns well with previous study findings suggesting that social support from friends is more frequently connected to physical activities compared to other sources of social support (Gruber, 2008; Wilks & Spivey, 2010). One possible explanation is that the positive influence of friends on physical activity engagement may be attributed to the motivational and social aspects of friendship, where creating a supportive environment and encouragement serve as essential factors of active lifestyles, as suggested by Social Networks and Social Support theory. Additionally, aging is related to the process of social network shifts and social support shrinkage (Antonucci et al., 1990). Compared to partner and family, the importance of these networks shifts to friends with age. Accordingly, social support from friends is becoming more meaningful to older populations because other social sources may turn to be less stable due to the death of family members or divorce (Gupta & Korte, 1994). Future interventions could focus on leveraging the influence of friends, such as group-based activities or buddy systems, which could prove effective in promoting both moderate and vigorous physical activity among middle-aged and older adults.

The relationship between family support and physical activity among middle-aged and older individuals has been understudied. This study found a negative association between social support from family members and moderate LTPA. There are two plausible explanations for these results. Firstly, as suggested by Park et al. (2014), older adults typically engage in physical activities alone. Older adults from families characterized by high levels of support often participate in diverse leisure activities together (Smith et al., 2009; Zabriskie & McCormick, 2001), which in turn limits opportunities for older adults to participate in physical activities, consequently reducing their overall physical activity levels (Park et al., 2014). Secondly, support from family members typically involves care and concerns regarding the safety of older adults (Cutrona, 1986; Heaney & Israel, 2008). When family members express concerns regarding safety or health risks, it may limit an older adult's perceived self-efficacy to participate in physical activities (Brawley et al., 2003; Rector et al., 2020). Further research in gerontology is needed to better investigate the underlying mechanisms that cause this negative association and to assess the differential effects of specific family support related to physical activity and general family support on levels of physical activity. Efforts should also be made for future interventions to address potential barriers arising from family support, aiming to enhance its positive impact on moderate LTPA promotion.

After adjusting for various demographic and health-related factors, our research found different social support associations regarding moderate and vigorous physical activity intensity. Specifically, support from partners demonstrated a positive correlation only with moderate LTPA, while no such association was observed with vigorous LTPA. In a previous study, the relative contributions of psychological, social, and environmental factors were assessed between different intensities of physical activity (Burton et al., 2005). The study demonstrated that social interactions, such as social support, had a greater influence on moderate-intensity activities, while physical health, competition, and time management played a more critical role in vigorous-intensity activities (Burton et al., 2005). Our current findings also emphasized the significant role of social support resources in facilitating moderate LTPA. The distinctive relationships between sources of social support and physical activity intensity underscored the necessity of considering specific intensities when designing interventions for physical activity among middle-aged and older adults.

While this study captured different patterns of associations between three social support sources and moderate and vigorous physical activity, there are limitations of the study that need to be addressed. First, the relatively low R-square value of regression Model 1 suggests that there are additional, unmeasured variables that could predict participants' LTPA levels. Future research could incorporate more individual-level variables and covariates into the models to enhance explanatory power. Furthermore, it is important to acknowledge that both the correlations and R-squared values indicate a relatively small amount of variance being explained. Hence, it is critical to approach the interpretation of our findings with caution and deliberate on the implications of these effects on the levels of physical activity among middle-aged and older adults within real-world contexts. Another limitation of this study is the measurement of LTPA levels, which used a 6-point scale ranging from "*several times a week or more*" to "*never*." This measurement approach may overlook essential aspects such as LTPA duration and intensity that could provide a better understanding of individuals' physical activity behaviors. Future research should consider employing holistic measurements that capture both the duration and frequency of moderate and vigorous LTPA. Furthermore, this study utilized a cross-sectional design, which limits our ability to establish causality or make temporal inferences regarding the associations between social support and LTPA. To gain a deeper understanding of these relationships in life stage development, future studies could consider employing longitudinal designs to examine the causal relationships and the temporal dynamics between social support and LTPA behaviors.

In conclusion, our study reveals the crucial role of social support in influencing physical activity behaviors among middle-aged and older adults. While friends' support was positively associated with both moderate and vigorous LTPA, the associations with family and partner support were specific only to moderate LTPA, with family support demonstrating a negative association. These findings have implications for targeted intervention design that capitalizes on the positive influence of friends and addresses potential limitations associated with family, ultimately promoting physical activity and improving the health and well-being of middle-aged and older adults.

Declaration of Conflicting Interests

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