

Research Paper

# Social support, depression, and physical disability: Age and diagnostic group effects

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## Abstract

**Background:** Social support is an important resource that may benefit individuals aging with physical disabilities, although its effects may vary depending on age, sex, and type of disability.

**Objectives:** To (1) examine differences in social support – and how support might vary as a function of age and sex – in samples of individuals with multiple sclerosis (MS), spinal cord injury (SCI), and muscular dystrophy (MD) and (2) understand the extent that associations between different support domains and depression might be moderated by disability diagnosis, sex and age.

**Methods:** A convenience sample ( $N = 1416$ ) of individuals with MS, SCI, and MD completed surveys that included measures of perceived social support and depressive symptoms.

**Results:** No significant support differences were found between diagnostic groups. There was a gradual decrease in social support with chronological age, and women reported more support than men, particularly friend support. Levels of perceived friend support were negatively associated with depression, and the associations between social support and depression did not differ as a function of age, sex, or diagnosis.

**Conclusions:** Social support is similarly associated with lower levels of depression for men and women, across disability diagnoses and all ages. Being a man and being older may be associated with lower levels of perceived support. Research is needed to determine if interventions that improve support will decrease depression and improve quality of life in persons with disabilities, particularly for men and individuals who are aging. © 2014 Elsevier Inc. All rights reserved.

**Keywords:** Social support; Depression; Disability

With improved medical management of individuals with physical disabilities, as well as the general “greying” of the population, an increasing number of individuals with disability are aging into middle age and beyond.<sup>1,2</sup> However, along with the benefits of greater longevity, individuals aging with disability are at risk for age-related health conditions, such as fatigue, physical deconditioning, and sensory impairments, among others.<sup>3,4</sup> The presence and

severity of such symptoms can all contribute to decreases in participation and psychological functioning.<sup>5</sup>

Social support is an important resource that can serve to buffer the negative effects of health conditions on psychological functioning.<sup>6,7</sup> Research demonstrates consistent negative associations between measures of social support and depression in individuals with spinal cord injury (SCI),<sup>8</sup> as well as positive associations between measures of social support and psychological health in persons with multiple sclerosis (MS)<sup>9–13</sup> and muscular dystrophy (MD).<sup>14</sup>

However, there remain a number of important unanswered questions with respect to social support, aging, depression, and physical disability. For example, social support is a complex domain that can vary along a number of factors, including type of support (e.g., instrumental/tangible support versus emotional support), overall support network size, perceived availability of the network,

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satisfaction with the network, and source of social support (family, significant other, friend). Different domains of support are associated with different outcomes.<sup>15</sup> No research has yet directly compared the relative importance of different types of social support to the psychological functioning of persons with disabilities. Such knowledge is important to clinicians for understanding the social support needs of their patients and when developing interventions to address those needs. Similarly, no research has yet compared the availability or amount of social support received between people with different disabilities. Significant differences in social support between disabilities would indicate a need for research to help us understand the reasons these differences exist, as a first step toward developing ways to address them.

There are also important demographic considerations that have not been adequately addressed in the research literature. For example, although studies of social support across the lifespan have identified differences between men and women as they grow older (e.g., Refs. <sup>16,17</sup>), with most documenting larger and more flexible social networks in women than men from middle-age onward,<sup>18</sup> the role of sex in social support has not been adequately examined in adults with disabilities. The same can be said for age. Whereas research indicates that the beneficial effects of social support may increase with age,<sup>19</sup> there is also evidence that the structure and function of social support networks can change over the lifespan — with older people generally describing networks consisting of smaller groups of close friends and family members relative to younger individuals.<sup>20</sup> However, only a handful of studies have examined age differences in the types and source(s) of social support available to individuals with disabilities.

Given the above considerations, this study had two aims. The first was to examine differences in three social support sources (significant other, family, and friends) — and how this support might vary as a function of age and sex — in samples of individuals with MS, SCI, and MD. Second, we sought to understand the extent to which the associations between social support domains and depression might be moderated by disability diagnosis, sex and age. We anticipated replicating the negative associations between social support and depressive symptoms in all three groups. We also anticipated that sex differences might emerge in the amount of different types of social support reported, given previous findings of sex differences in non-disabled populations.<sup>17</sup> Specifically, we hypothesized that women would report more support (in particular, from friends and family) than men. However, we did not have any specific hypotheses regarding the amount of social support received or moderating influence of disability diagnosis or age on the association between social support and depression, given the lack of literature on potential mediators in persons with disabilities. The decision to avoid *a priori* hypotheses related to age, disability diagnosis, and social support was also influenced by the observation that

age and disability diagnosis could have different effects on social support and the associations between social support and depression. For example, because people with degenerative conditions might need and therefore elicit more social support needs as they age, it is possible that people with such degenerative conditions (e.g., MS and MD) might report receiving more social support than people with more stable conditions (e.g., SCI). Regarding age effects, it is possible that older individuals might need more social support due to increases in the frequency of secondary health conditions (e.g., health conditions caused or worsened by a primary disability, and the subsequent effects of these on disability<sup>21</sup>) and may therefore seek out and receive more social support than younger individuals. On the other hand, people who are more disabled and who are aging may have fewer opportunities to receive social support; it is also possible that as people age they develop more effective coping skills, and therefore have a decreased need for social support.

## Methods

### Procedures

This study is an analysis of measures administered as part of a large and ongoing longitudinal survey study of individuals aging with physical disabilities.<sup>22–24</sup> Participants with SCI and MS were primarily recruited from a pool of individuals who had participated in previous survey studies in the University of Washington and who had agreed to be part of a registry of subjects for research participation, although some were also recruited through print and web advertisements. The participants in the registry had at one time been inpatients in the University of Washington Rehabilitation Service (SCI participants) or had at one time been patients in the University of Washington outpatient MS clinic. Study participants with MD were recruited by sending invitation letters through the University of Rochester Muscular Dystrophy Research Registry, which requires a confirmation of MD diagnosis before being entered in the registry. Thus, even though we did not meet with any of the study participants to confirm their diagnosis, we are confident that the great majority of participants with SCI, MS, and MD had these diagnoses.

To be eligible, potential subjects had to be able to read and write English and be at least 18 years of age. Participants who were eligible and interested in participating were sent a survey, consent form, and return envelope for both. Participants who did not return their survey within one month were sent a reminder letter, and a reminder call was made if it still had not been received by six weeks. A total of 1562 surveys were sent out, of which 102 were not returned, and 44 were excluded because a signed consent was not received, the subject did not have a true diagnosis of MS, MD or SCI, or the subject declined to participate. This led to a total of 1416 completed surveys

(91% response rate). Upon receipt of the survey, research staff reviewed for missing data and confirmed receipt of the signed consent form. Missing data were collected over the phone and all participants were sent \$25 for their time and effort. The survey data used in this study were collected from June, 2009 to March, 2013. Informed consent was obtained from all participants and procedures were approved by the University of Washington Human Subjects division.

### Measures

The measures described in this section represent those measures needed to address the study questions, selected from a larger set of measures administered in a longitudinal survey study of secondary health conditions in individuals aging with physical disabilities.<sup>22–24</sup>

#### Demographic variables

Participants were asked to provide basic demographic information (age, medical diagnosis, education level, income, ethnicity, sex) as well as descriptive information about their diagnosis (e.g., level of SCI, type of MS, type of MD).

#### Depressive symptoms

We used the Patient Health Questionnaire-9 (PHQ-9) to assess depressive symptoms.<sup>25</sup> The PHQ-9 is a nine-item questionnaire that assesses each of the nine DSM-IV depression symptoms. Each PHQ-9 item is scored from 0, “not at all,” to 3, “nearly every day.” The PHQ-9 can be used as a screening tool, with summed scores ranging from 0 (no depressive symptoms) to 27 (all symptoms occurring daily). Summed scores of 0–4 represent a minimal level of depression; 5–9, mild; 10–14, moderate; 15–19, moderately severe; and 20–27, severe. The PHQ-9 can also be used as a diagnostic tool using a “diagnostic algorithm”; major depression is diagnosed if 5 or more of the 9 symptoms have been present at least more than half the days of the past 2 weeks and 1 of these symptoms is either depressed mood or anhedonia. Higher scores represent higher levels of depressive symptoms. The PHQ-9 has been widely used in clinical and research settings and has a great deal of support for its validity in populations with physical disabilities.<sup>26–28</sup> The internal consistency (Cronbach’s alpha) of the PHQ-9 in the SCI, MS, and MD samples in our study were 0.86, 0.85, and 0.86, respectively, indicating a good level of reliability across the diagnostic groups in this study.

#### Social support

Three sources of social support were assessed using the Multi-dimensional Scale of Perceived Social Support (MSPSS).<sup>29</sup> The MSPSS consists of 12 questions that measure social support on a 7-point Likert scale (1 = very strongly disagree, 4 = neutral, 7 = very strongly agree). The measure is divided into 3 domains of four questions

each that assess social support from (1) a significant other (“special person”), (2) family, or (3) friends. The MSPSS is a widely used measure for assessing social support in a variety of populations (including older adults<sup>30</sup>) and its reliability and validity have been confirmed.<sup>29,31–33</sup> The internal consistencies (Cronbach’s alphas) of the total and significant other, family, and friends scales of the MSPSS for the SCI, MS, and MD samples in this study were 0.94, 0.95, and 0.93 (total support), 0.96, 0.95, and 0.93 (significant other support), 0.93, 0.95, and 0.92 (family support) and 0.93, 0.94, and 0.93 (friend support), respectively. These indicate excellent levels of reliability for the social support measures in our samples.

### Data analysis

#### Descriptive analyses of study variables

For descriptive purposes, we first computed the means (for age) and percentages (for the categorical variables of sex, education level, ethnicity, annual household income, and depression classification) for the demographic variables. We then tested for between-group differences using a one-way analysis of variance (for age) and chi-square analyses (for the categorical variables). We then computed the means, standard deviations, skewness, and kurtosis of the study variables for descriptive purposes as well as to evaluate the measures for assumptions for the planned regression analyses.

#### Assumptions testing

Before testing the study hypotheses, we (1) examined the distributions of the variables to ensure that they met the assumptions for the planned regression analysis; (2) tested for possible differences in social support between the diagnostic groups in order to determine if we needed to control for diagnosis in the planned regression analyses; and (3) computed correlation coefficients between all of the predictor variables to ensure that none met the cutoff for potential problems with multicollinearity (i.e., a correlation coefficient of 0.70 or more<sup>34</sup>). No evidence for problematic multicollinearity was observed, providing support to enter all three social support scales into a single regression when predicting depression from the social support measures.

#### Testing for effects of diagnostic group, age, and sex on social support

To test for the effects of diagnostic group, age, and sex on social support, and the extent to which age or sex moderated the associations between diagnostic group and social support, we performed four regression analyses (one for each social support scale as the criterion: significant other, family, friend, and total). Diagnostic group and annual household income were entered as predictors in step 1 (dummy coded), age (centered) in step 2, sex in step 3, Age × Sex interaction term in step 4, age<sup>2</sup> in step 5 (to test

for a possible curvilinear effects of age on social support), and Age<sup>2</sup> × Sex in the final step. In the event that a significant age or age<sup>2</sup> effect emerged, we planned to classify the participants into one of six age groups (18–34, 35–44, 45–54, 55–64, 65–74, 75+ years) and compute the means of the social support variable(s) that demonstrated the linear (i.e., significant age effects) or curvilinear (i.e., significant age<sup>2</sup> effects) effects for each age cohorts to help understand the age effects.

#### Testing for the effects of social support on depression

We also used hierarchical regression analysis to examine the associations between social support and depressive symptoms, and how these might vary as a function of diagnostic group, sex and/or age. We centered all of the continuous predictor variables in order to reduce any potential problems associated with multicollinearity. The PHQ-9 score was the criterion variable. In the first step, we entered sex, age (centered), and annual household income as predictors. In step two, we entered diagnostic group, dummy coded as two variables (using MD as the reference group). In step three, we entered the three MSPSS scales (significant other, family, friend). In step four, we entered all two-way interactions (Sex × Age [centered], Sex × Diagnostic group

[represented by three product terms], Sex × Social support [three product terms for each social support scale], Age × Diagnostic group [three terms], Age × Social support [three terms], and Social support × Diagnostic group [i.e., a total of nine interactions]). We entered all three-way interactions in step five, and all four-way interactions in step six. We examined the *R*-square change associated with each step to determine the extent to which main effects or interactions contributed significantly to the prediction of depressive symptoms, and the beta weights and significance levels of each predictor to evaluate their independent contribution. Although there were a large number of predictors (29 in total), the sample size (*N* = 1416) was much larger than needed to ensure an adequate sample size to predictor ratio.<sup>34</sup> SPSS Version 18.0.0 (IBM, Armonk, NY) was used for all of the analyses reported in this study.

## Results

### Participants

Demographic information about the study participants is listed in Table 1 both for the study sample as a whole and separately for each diagnostic group. As can be seen, the

Table 1

Demographic information of the study sample

Variables	All subjects	Spinal cord injury	Multiple sclerosis	Muscular dystrophy	Chi square/ <i>F</i> value
Sample size ( <i>N</i> )	1416	492	584	340	
Age, mean (SD)	52.6 (12.7)	50.0 (14.0) <sub>a</sub>	54.5 (10.8) <sub>b</sub>	53.2 (13.0) <sub>a</sub>	17.46***
Sex					268.18***
Men, <i>N</i> (%)	573 (41%)	328 (67%) <sub>a</sub>	102 (18%) <sub>b</sub>	143 (42%) <sub>c</sub>	
Women, <i>N</i> (%)	842 (60%)	164 (33%) <sub>a</sub>	481 (82%) <sub>b</sub>	197 (58%) <sub>c</sub>	
Education level					13.34***
<High school, <i>N</i> (%)	26 (2%)	15 (3%) <sub>a</sub>	5 (1%) <sub>b</sub>	6 (2%) <sub>a,b</sub>	
High or Tech. school, <i>N</i> (%)	294 (21%)	128 (26%) <sub>a</sub>	95 (16%) <sub>b</sub>	71 (21%) <sub>a,b</sub>	
Some college, <i>N</i> (%)	351 (25%)	123 (25%) <sub>a,b</sub>	159 (27%) <sub>a</sub>	69 (20%) <sub>b</sub>	
College graduate, <i>N</i> (%)	435 (31%)	147 (30%) <sub>a</sub>	192 (33%) <sub>a</sub>	96 (28%) <sub>a</sub>	
Some grad. school, <i>N</i> (%)	308 (22%)	78 (16%) <sub>a</sub>	132 (23%) <sub>b</sub>	98 (29%) <sub>c</sub>	
Ethnicity <sup>a</sup>					
Black/African American, <i>N</i> (%)	58 (4%)	41 (8%) <sub>a</sub>	16 (3%) <sub>b</sub>	1 (0%) <sub>c</sub>	37.85***
Asian, <i>N</i> (%)	15 (1%)	10 (2%) <sub>a</sub>	2 (0%) <sub>b</sub>	3 (1%) <sub>a,b</sub>	7.43**
White/Caucasian, <i>N</i> (%)	1317 (93%)	429 (87%) <sub>a</sub>	557 (95%) <sub>b</sub>	331 (97%) <sub>b</sub>	40.07***
Hispanic/Chicano, <i>N</i> (%)	18 (1%)	7 (1%)	8 (1%)	3 (1%)	0.55
Native Am./Alaska Native, <i>N</i> (%)	27 (2%)	14 (3%)	7 (1%)	6 (2%)	3.93
Pacific Islander, <i>N</i> (%)	2 (<1%)	2 (0%)	2 (0%)	0 (0%)	3.77
Other, <i>N</i> (%)	14 (1%)	4 (1%)	5 (1%)	5 (2%)	1.05
Annual household income					67.03***
<\$25,000, <i>N</i> (%)	322 (23%)	159 (32%) <sub>a</sub>	112 (19%) <sub>b</sub>	51 (15%) <sub>b</sub>	
\$25,000–\$55,000, <i>N</i> (%)	387 (27%)	143 (29%) <sub>a</sub>	161 (28%) <sub>a</sub>	83 (24%) <sub>a</sub>	
\$56,000–\$85,000, <i>N</i> (%)	274 (19%)	93 (19%) <sub>a</sub>	110 (19%) <sub>a</sub>	71 (21%) <sub>a</sub>	
>\$86,000, <i>N</i> (%)	358 (25%)	74 (15%) <sub>a</sub>	170 (29%) <sub>b</sub>	114 (34%) <sub>b</sub>	
PHQ-9 depression classification					19.19*
Minimal (0–4)	619 (44%)	244 (50%) <sub>a</sub>	225 (39%) <sub>b</sub>	150 (45%) <sub>a,b</sub>	
Mild (5–9)	448 (32%)	144 (30%) <sub>a</sub>	205 (35%) <sub>a</sub>	99 (29%) <sub>a</sub>	
Moderate (10–14)	204 (15%)	61 (13%) <sub>a</sub>	87 (15%) <sub>a</sub>	56 (17%) <sub>a</sub>	
Moderately severe (15–19)	89 (6%)	27 (6%) <sub>a</sub>	43 (7%) <sub>a</sub>	19 (6%) <sub>a</sub>	
Severe (20–27)	46 (3%)	10 (2%) <sub>a</sub>	24 (4%) <sub>a</sub>	12 (4%) <sub>a</sub>	

\**p* < .05, \*\**p* < .01, \*\*\**p* < .001. Means or rates with different subscripts are significantly (*p* < .05) different from one another.

<sup>a</sup> Ethnicity: these chi-square analyses were run separate because race values can overlap within participants.

sample is highly educated (52% having a college education or higher), and has a relatively high annual income (25% reporting an annual household income of more than \$86,000/year). Significant between-group differences were found for all of the demographic variables measured (see Table 1). The MS participants were older than the MD and SCI participants, the majority of MS participants were women and the majority of SCI participants were men, while MD participants were more equally distributed by sex. MS participants were less likely to have less than some college than MD or SCI participants, MD participants were less likely to have some college than MS participants and more likely to have more than a college degree than MS or SCI participants, and SCI participants were more likely to have less than some college than MD or MS participants. For ethnicity, there were significantly more SCI participants reporting an ethnicity of Black/African American than MD and MS participants, significantly more reporting an Asian ethnicity than MS participants, and significantly fewer describing themselves as White/Caucasian than either MS or MD participants. Significantly fewer MD participants reported a Black/African American ethnicity, and significantly more reported a White/Caucasian ethnicity than SCI participants. Differences in household income are explained by significantly more SCI participants reporting an income of <\$25,000 per year, and significantly fewer reporting an income of >\$86,000 per year compared to MD and MS participants. Differences in PHQ depression classification are explained by significantly fewer MS participants reporting minimal depression as compared to SCI participants.

### Assumption testing

There was no evidence for significant skew, kurtosis, outliers, or heteroscedasticity for any of the predictor or criterion variables, indicating that no transformations of the study variables would be necessary prior to the regression analyses (see Table 2). To control for potential problems with multicollinearity, we assessed the strength of correlation among the main effect predictor variables. Variables were considered to be acceptable for analysis using conventional cut-off values or tolerance >0.10, variance inflation factor <10, and condition index <30.<sup>35</sup> There was no evidence for multicollinearity among the main effects using

Table 2

Description of the study variables for the entire sample				
Variable	Mean (SD)	Range	Skew	Kurtosis
Age	52.63 (12.66)	20–89	−0.20	−0.22
MSPSS scales				
Total	5.41 (1.36)	1–7	−0.98	0.43
Significant other	5.68 (1.64)	1–7	−1.29	0.74
Family	5.37 (1.64)	1–7	−1.06	0.23
Friend	5.18 (1.54)	1–7	−0.88	0.18
PHQ-9	6.55 (5.33)	0–27	1.12	1.00

MSPSS = Multi-dimensional Scale of Perceived Social Support.

these criteria. To control for multicollinearity in the interaction terms, all continuous predictor variables were then centered prior to analysis.

### Effects of age and diagnostic group on social support

The results indicated significant differences between groups for significant other ( $p = 0.01$ ) and family ( $p = 0.04$ ) support. We therefore controlled for diagnostic group in our first step of the regressions. In the hierarchical regression analyses predicting social support, we found a significant effect for household income for three of the social support scales assessing total, significant other and friend support (see Table 3). A marginally significant trend ( $p < 0.10$ ) emerged for the prediction of family support from household income. These effects are explained by the fact that individuals with higher household income reported higher levels of social support. No interaction effects were significant (and are therefore not presented in Table 3).

We also found significant age effects for the total and significant other support domains and marginally significant trends for an age effect for friend and family support (see Table 3). The direction of the beta weights for the age effects (negative) and the means for the social support measures collapsed across diagnostic groups indicated a general decrease in social support with age, although a slight increase in perceived support after middle age can be observed (see Table 4). We also found significant sex effects for friend support, and marginally significant trends for sex effects for total and significant other support. Women reported higher levels of total (mean [SD] = 5.45 [1.36]), significant other (5.74 [1.62]), and friend (5.25 [1.53]) support than men (5.35 [1.34], 5.60 [1.65], and 4.99 [1.58], respectively). However, only friend support differences between men and women were statistically significant ( $t(1406) = 3.12, p < 0.005$ ).

The results of the regression analyses predicting depressive symptoms from demographic variables, diagnostic group, and social support are presented in Table 5. Household income was a significant predictor of depression ( $p < 0.001$ ), and the direction of the beta weight (negative) indicated less depression was associated with greater household income. However, neither sex nor age was a significant predictor of depression. There was a significant effect for diagnostic group, with SCI participants reporting significantly fewer depressive symptoms (mean [SD] PHQ-9 score = 5.83 [5.06]) than MD (6.62 [5.50];  $t(820) = 2.12, p < 0.05$ ) or MS (7.11 [5.39];  $t(1068) = 3.97, p < 0.001$ ); however, PHQ-9 scores between participants with MS and MD were not significantly different ( $t(918) = 1.32, p = 0.189$ ).

The MSPSS scales also contributed significantly to the prediction of depressive symptoms, with friend support making a significant independent contribution to the prediction of depressive symptoms (see Table 5). As would be

Table 3

Results of hierarchical regression analyses predicting social support domains

Step and variable	Total $R^2$	$R^2$ change	$F - R^2\Delta$	Standardized $\beta$ to enter	$t$
MSPSS total social support					
Step 1: control variables	0.09	0.10	7.73***		
SCI				−0.12	−1.23
MS				−0.15	−1.67 <sup>†</sup>
Household income				0.28	3.64***
Step 2: age (centered)	0.12	0.03	7.76**	−0.19	−2.79**
Step 3: sex	0.14	0.02	4.20 <sup>†</sup>	0.15	2.05 <sup>†</sup>
MSPSS significant other support					
Step 1: control variables	0.09	0.11	7.78***		
SCI				−0.10	−1.05
MS				−0.08	−0.92
Household income				0.29	3.68***
Step 2: age (centered)	0.13	0.04	9.98**	−0.21	−3.16**
Step 3: sex	0.15	0.02	4.75 <sup>†</sup>	0.16	2.18 <sup>†</sup>
MSPSS family support					
Step 1: control variables	0.04	0.05	3.56 <sup>†</sup>		
SCI				−0.12	−1.16
MS				−0.15	−1.61
Household income				0.18	2.23 <sup>†</sup>
Step 2: age (centered)	0.05	0.02	3.18 <sup>†</sup>	−0.12	−1.78 <sup>†</sup>
Step 3: sex	0.04	0.00	0.03	0.01	0.17
MSPSS friend support					
Step 1: control variables	0.07	0.08	5.85**		
SCI				−0.09	−0.89
MS				−0.16	−1.73 <sup>†</sup>
Household income				0.26	3.27**
Step 2: age (centered)	0.08	0.02	4.17 <sup>†</sup>	−0.14	−2.04 <sup>†</sup>
Step 3: sex	0.11	0.04	8.08**	0.21	2.84**

MSPSS = Multi-dimensional Scale of Perceived Social Support.

<sup>†</sup> $p < .10$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

expected, more perceived friend social support was associated with less depression. None of the interaction terms involving age, diagnostic group, or social support made statistically significant contributions to the prediction of depressive symptoms. That is, greater social support was associated with less depression across all three diagnoses, across age, and for men and women. The overall model involving the first three steps of the regression analysis (i.e., including diagnostic group and social support variables) was significant ( $F(7,201) = 9.10$ ,  $p < 0.001$ ).

## Discussion

The key findings from this study are that (1) controlling for household income, the amount of perceived social

support from three sources (significant other, family, and friends) did not differ significantly as a function of diagnostic group; (2) social support tended to decrease with chronological age, especially with respect to significant other support; (3) women tended to report more social support than men, especially for friend support; and (4) higher perceived support was significantly associated with lower depressive symptoms across all three diagnostic groups, and this association did not vary as a function of age or sex. However, *type* of social support did seem to matter, with support from friends appearing to be more closely associated with lower levels of depression than support from significant others or family. These findings have important implications for understanding the role that social support may play in the lives of individuals with disabilities.

Table 4

Means and standard deviations for the measures of total, significant other, and friend support in each of six age groups

	Age group					
	18–34	35–44	45–54	55–64	65–74	75+
MSPSS scale	Mean (SD)					
Total	5.71 (1.15)	5.49 (1.39)	5.27 (1.39)	5.34 (1.37)	5.55 (1.32)	5.60 (1.13)
Significant other	5.80 (1.55)	5.70 (1.70)	5.62 (1.61)	5.63 (1.69)	5.80 (1.58)	5.89 (1.45)
Friend	5.31 (1.64)	5.21 (1.60)	4.98 (1.62)	5.12 (1.53)	5.35 (1.37)	5.24 (1.24)

MSPSS = Multi-dimensional Scale of Perceived Social Support.

Table 5  
Linear regression predicting depressive symptoms from social support domains

Step and variable	Total $R^2$	$R^2$ change	$F - R^2\Delta$	Standardized $\beta$ to enter	$t$
Step 1: demographics	0.06	0.07	5.22**		
Sex				0.08	1.18
Age				-0.01	-0.09
Household income				-0.28	-3.95***
Step 2: diagnostic group	0.18	0.13	15.35***		
MS				0.24	2.79**
SCI				-0.22	-2.28†
Step 3: MSPSS scales	0.29	0.12	11.38***		
Significant other				-0.08	-0.89
Family				-0.12	-1.48
Friend				-0.23	3.05**

MSPSS = Multi-dimensional Scale of Perceived Social Support.

† $p < .10$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

### Disability diagnosis effects

None of the nine possible comparisons between diagnostic groups with respect to social support were statistically significant. Thus, there appear to be more similarity than differences across different disability diagnoses in the amount of support and role that social support plays in the lives of people with disabilities.

### Age effects

In the able-bodied population, significant changes in the structure and function of the social network across the lifespan have been documented. For younger adults, emphasis is typically placed on maintaining both close friends and a large network of potential social partners. This approach maximizes novel social experiences and is associated with positive outcomes (e.g., Ref. <sup>36</sup>). There is also evidence that as one ages through adolescence and into younger adulthood, less emphasis is placed on social support from ones parents and family relative to peers.<sup>37</sup> However, adulthood and all that it entails (parenting, geographic moves, increasing time demands, etc.) is associated with a reduction in the number of casual partners and friends. Then, as people live into older age, they tend to elicit support from smaller groups of close friends and family, and thereby offset the decline in social ties with casual friends and acquaintances.<sup>16,38</sup> By the time people reach very old age, family may again represent a primary source of social support.<sup>39</sup>

The findings in our samples are generally consistent with these patterns. Like non-disabled individuals, we note a gradual decrease in friend and significant other support with age. The primary difference found was that our sample of individuals with physical disabilities also noted a decrease in family support with increasing age, although the significance level associated with this decrease suggested a marginally significant trend ( $p < 0.10$ ). Certainly, though, no increase in family support was found among the elderly in our sample. This finding of a gradual decrease in support with older age is worrisome, given the importance of social support across all age cohorts in individuals with

physical disabilities.<sup>40–42</sup> Social support may be particularly important in middle age, as this appears to be a time of more psychological vulnerability in persons with disabilities.<sup>43</sup>

### Sex effects

A number of studies of social support across the lifespan have identified differences in the structure, function and satisfaction between men and women (e.g., Refs. <sup>16,17</sup>). Although the evidence is mixed,<sup>44</sup> most studies document larger and more flexible social networks in women from middle-age onward.<sup>18</sup> Consistent with this research, the women in our samples reported more support than the men, especially for friend support.

To the extent that social support is associated with better health outcomes, these findings suggest the need to develop creative ways to help all individuals with disabilities, and perhaps in particular men and individuals with disabilities who are growing older, receive more support. Such strategies could include opportunities for social interactions at community centers that serve individuals with disabilities, such as the Administration on Aging's Aging and Disability Resource Centers ([http://www.aoa.gov/AoA\\_programs/HCLTC/ADRC](http://www.aoa.gov/AoA_programs/HCLTC/ADRC)). Research is needed to identify the programs that might be offered through these and other centers and resources that could provide needed social support for individuals with disabilities.

### Social support and depression

Consistent with the study hypotheses and other studies demonstrating significant associations between perceived social support and depression across disability populations,<sup>8–14</sup> we found negative associations between social support and depression. However, the importance of support appeared to differ as a function of the source of support; friend support played the largest role. Moreover, the importance of support, at least with respect to the prediction of depression, did not differ as a function of diagnostic group or age.

These findings emphasize the potential importance of social support for reducing depression and maintaining psychological health. More work is needed to determine if interventions designed to increase social support in individuals with disabilities might result in improvements in depression and other measures of quality of life. Creativity in designing such interventions for persons with disabilities may be particularly important, given that mobility disabilities, environmental barriers and limited transportation options may interfere with participation in in-person social opportunities, especially in individuals aging with disabilities.

Given the multiple issues involved, it is unlikely that any one approach or strategy will prove effective for everyone. Thus, we would advocate for the development and testing of a variety of interventions. One approach would be to connect older adults with disabilities to existing community organizations that provide social support interventions for seniors, perhaps via collaboration with the Aging and Disability Resource Center network (funded by the US Administration on Community Living; see <http://acl.gov>). The same community infrastructure could be used to develop and test new social support interventions for older adults with long-term physical disabilities. Such interventions could include regularly scheduled social and recreational programs and that included transportation services that make it easier for individuals with disabilities to participate. These centers could also provide a clearinghouse for connecting “social support” volunteers with older individuals with disabilities, and also help individuals aging with disabilities connect with each other (including over the phone and via web-based platforms<sup>45</sup>) to socialize regularly.

### Limitations

This study has a number of limitations that should be considered when interpreting the findings. First, understanding the importance of social support across the life-span in persons with disabilities hinges on defining “social support.” Social support is a multidimensional construct that is comprised of network size, type of support (e.g., emotional, instrumental), and satisfaction with support. There is also an important distinction between “perceived support” (one’s potential access to social support) and “received support” (reported receipt of social support resources during a specific time frame).<sup>46</sup> These distinctions are important, because different support domains are associated with different health outcomes.<sup>15</sup> In our study, we only examined perceived support as it is related with depression. A more complete view of the importance of social support might have emerged had we examined additional support or criterion domains. Second, we used a cross-sectional design, and thus cannot draw causal conclusions regarding the impact of social support on depression or vice versa. It is possible, even likely, that

there is a bi-directional impact between social support and psychological functioning. True experiments (e.g., a clinical trial) are needed to determine the extent to which changes in social support result in improved outcomes in individuals with physical disabilities. It is also important to note that there were significant differences between the diagnostic groups for all of the demographic variables measured, including age, sex, education, race/ethnicity, and household income. Although we controlled for some of these in our model, and our age and sex values are comparable to national norms for these disability groups, it is possible that our sample may not be representative of populations of individuals with MD, MS or SCI. Third, the amount of variance accounted for in the models presented for the social support measures (range, 4%–15%) and depression (29%), while statistically significant, was low. Clearly, additional factors beyond those measured in this study are important to both social support and depression in the samples. Finally, it is important to remember that the study sample was one of convenience. Because it was a large postal survey study, we were not able to confirm the participants’ diagnoses. Perhaps more importantly, the sample contained many individuals who had already participated in at least one previous survey. Thus, they may or may not be the representative of the populations of individuals with SCI, MS, and MD. For all of these reasons, replication of the study findings with other samples is necessary to determine their generalizability.

### Conclusions

Despite the study’s limitations, the findings indicate that social support, perhaps in particular perceived support from friends, is associated with less depression. We also found that the importance of social support is similar across disability groups and chronological age cohorts, and that the men with SCI, MS, and MD in our sample report less support than women. The findings indicate the need for the development of interventions that might help to increase the availability of and opportunities for experiencing more social support — perhaps in particular social support from friends — as one possible way to increase the quality of life of individuals with disabilities.

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