Self-Efficacy, Social Support, and Physical Activity among People with Spinal Cord Injury

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ABSTRACT

The purpose of this study was to understand some of the variables related to physical activity among people with spinal cord injury (SCI). Previous studies show that people with SCI are less likely than the average American to meet physical activity recommendations, and they face more preventable disease as a consequence. 52 American adults with SCI took an online survey to measure the relationship between self-efficacy, social support, and physical activity. Moderated multiple regression analysis showed a significant correlation between self-efficacy and physical activity, but self-efficacy did not moderate the relationship between social support and physical activity. Health and fitness professionals should focus on improving clients' exercise self-efficacy to increase exercise behavior, and future research should use more objective physical activity measures to look again for the potential moderating effect of self-efficacy.

INTRODUCTION

- An estimated 270,000 people with SCI currently live in the U.S (National Spinal Cord Injury Statistical Center, 2012).
- Compared to the general public, people with SCI are less likely to lead physically active lifestyles (Kehn & Kroll, 2009).
- Regular physical activity can help prevent secondary health conditions (Kehn & Kroll, 2009). Furthermore, maintaining strength, coordination, balance, and flexibility can help people with SCI live more independently (Jacobs & Nash, 2004).
- Among people with physical disabilities, previous research establishes that increased physical activity is directly correlated with both social support for exercise and exercise self-efficacy (Bandura, 2004; Orsega-Smith et al., 2007; Kayes et al., 2011).
- Some research suggests that self-efficacy moderates the relationship between social support and physical activity (Dishman et al., 2009; Warner et al., 2011).
  - *This means that social support better predicts physical activity when combined with high self-efficacy, beyond what can be explained by the predictive power of each variable on its own.*
- No known research to date examines the relationship between social support, self-efficacy, and physical activity using subjects with SCI.
- ***RESEARCH QUESTION:*** What is the relationship between exercise self-efficacy, social support for exercise, and leisure time physical activity among adults with SCI in the U.S.?

HYPOTHESIS

Exercise self-efficacy moderates the relationship between social support for exercise and leisure time physical activity among adults with spinal cord injuries in the U.S.

STUDY DESIGN AND METHODS

PROCEDURE:
- Volunteer sampling – need for participants announced on Reddit, Facebook, and 3 online disability support groups found through Google searches.
- Subject-centered survey administered through SurveyMonkey.

SUBJECTS:
- 52 American men and women with SCI over the age of 18 (see Table 1 and Fig 2).

INSTRUMENTS:
- *Social Support for Exercise Behaviors Scale* (Sallis et al., 1987): 10-item questionnaire with a 5-point Likert scale to rate how often family and friends have shown support for subjects' exercise goals in the past 3 months. 3 scores: family support (10-50 points), friend support (10-50 points), and total support (20-100 points).
- *Spinal Cord Injury Exercise Self-Efficacy Scale* (Kroll et al., 2007): 10 items rating subjects' confidence in overcoming specific barriers to exercise using a 4-point Likert scale. Validated for populations with SCI. One score between 10 and 40.
- *Leisure Time Physical Activity Questionnaire for People with Spinal Cord Injury* (Martin Ginis et al., 2012): Only published questionnaire validated to measure leisure time physical activity (LTPA) in subjects with SCI. Originally designed for researcher-led interview, but modified in this study for online use. Measures minutes of LTPA in the past week. 4 scores: mild LTPA, moderate LTPA, heavy LTPA, and total LTPA.

ANALYSIS:
- A correlational analysis revealed that of the 3 social support scores and 4 LTPA scores, total support and heavy LTPA best correlated to exercise self-efficacy, so these were the scores used in the final analysis.
- Followed the procedure Cohen et al. (2003) advise for finding a moderator:
  - Found the cross product of the potential moderator (self-efficacy) and the other I.V. (social support) to create a 3rd I.V. (self-efficacy x social support).
  - Centered all I.V.s.
  - Identified age as a potential confounding variable because it significantly correlated with social support.
  - Performed a hierarchical regression analysis using the following variables:
    - Age – constant
    - LTPA – D.V.
    - Self-efficacy, social support, and self-efficacy x social support – I.V.s

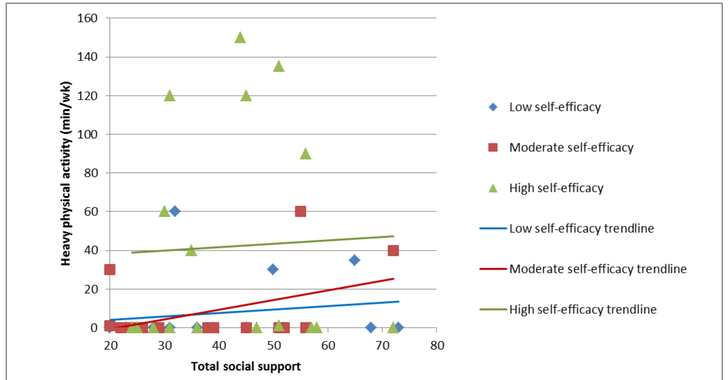

Fig 1. Relationship between social support and physical activity under different self-efficacy conditions.

Table 1. Sample characteristics compared to all U.S. adults with SCI

	Sample (n = 52)	Population (N ≈ 270,000[a])
Gender	42.9% Female 57.1% Male	19.3% Female[a] 80.7% Male[a]
Age	42.1 ± 13.3 yrs	48[b]
Injury type	36.5% Incomplete paraplegia 17.3% Complete paraplegia 30.8% Incomplete quadriplegia 9.6% Complete quadriplegia	18.7% Incomplete paraplegia[a] 18.0% Complete paraplegia[a] 40.6% Incomplete quadriplegia[a] 11.6% Complete quadriplegia[a]

a. (National Spinal Cord Injury Statistical Center, 2012)
b. (Christopher & Dana Reeve Foundation, 2008)

Table 2. Pearson correlation values for all variables included in the final analysis.

	Self-efficacy	Social support	Physical activity	SS x ESE[a]	Age
Self-efficacy	1	.145	.325**	-.175	.100
Social support	.145	1	.181	-.128	-.300*
Physical activity	.325**	.181	1	-.040	-.115
SS x ESE[a]	-.175	-.128	-.040	1	
Age	.100	-.300*	-.115		1

a. The cross product of social support and exercise self-efficacy

* Correlation is significant at the 0.05 level
** Correlation is significant at the 0.01 level

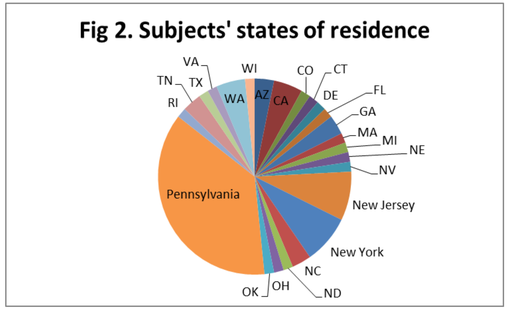

Table 3. Hierarchical moderated multiple regression analysis controlling for age; dependent variable is leisure time physical activity.

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	Social support	.161[b]	1.096	.278	.155	.910
	Self-efficacy	.340[b]	2.532	.015	.340	.990
	SS x SE[a]	-.028[b]	-.198	.844	-.028	.989

a. The cross product of social support and self-efficacy
b. Predictors in the Model: (constant), age

If this table showed a moderator effect, then the cross product of social support and self-efficacy would be a stronger predictor than either social support or self-efficacy alone.

ABREVIATIONS AND DEFINITIONS

- **Exercise self-efficacy**: An individual's belief in his/her own ability to exercise and overcome barriers to maintaining regular exercise.
- **Leisure time physical activity**: Any movement requiring energy that a person chooses to perform during his/her free time; does not include activities performed to accomplish essential self-care and household chores.
- **LTPA**: Leisure time physical activity
- **Moderator**: A variable that impacts the relationship between an independent variable and a dependent variable.
- **SCI**: Spinal cord injury
- **Social support for exercise behavior**: The quantity, structure, and content of relationships through which a person receives assistance towards increasing exercise behavior.

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RESULTS

- Significant ($p < .05$) moderate correlation between exercise self-efficacy and heavy leisure time physical activity (Table 2).
- Social support for exercise not significantly correlated with LTPA (Table 2).
- Exercise self-efficacy did not improve the relationship between social support and LTPA (Table 3).
- Subjects with moderate self-efficacy scores showed a slightly stronger relationship between social support and LTPA, compared to the low and high self-efficacy groups, but not to a statistically significant level (Fig 1).

CONCLUSIONS

- The analysis failed to support the hypothesis. Although self-efficacy itself was associated with increased physical activity, self-efficacy did not strengthen the relationship between social support and physical activity.
- Health and fitness programs for people with SCI should focus on developing exercise self-efficacy to improve participation in LTPA.

LIMITATIONS:
- Non-random sampling – only included people with internet access, ability to use computer, awareness of particular online communities, and motivation to volunteer.
- Gender balance of the sample did not match that of the population (Table 1).
- Subjects did not represent a balance of U.S. states (Fig 2).

PHYSICAL ACTIVITY MEASURES:
- Measuring physical activity via self-report has limited validity (Sarkin et al., 2000).
- Self-report physical activity measures for the general population fail to capture many physical activities performed by people with SCI (Martin Ginis et al., 2011).
- The only published LTPA measurement instrument designed for people with SCI has not been validated for subject-administered measurement.
- Original study design included a researcher-administered phone interview for LTPA measurement, but insufficient volunteer response necessitated a change in design.

FUTURE RESEARCH:
- Develop a self-report LTPA survey for people with SCI.
- Measure LTPA using accelerometers, heart rate monitors, or another more objective measure.
- Knowledge gained from a similar study performed with a more representative sample and a better LTPA measure could lead to more effective health and fitness therapy for people with SCI.

REFERENCES

Bandura, A. (2004). Health promotion by social cognitive means. *Health Education and Behavior, 31*(2), 143-164.

Cohen, J., Cohen, P., West, S.G., & Aiken, L.S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences.* New Jersey: Lawrence Erlbaum Associates, Publishers.

Cristopher & Dana Reeve Foundation (2008). One degree of separation: Paralysis and spinal cord injury in the United States. In *Paralysis Resource Center: Paralysis Facts & Figures.* Retrieved from http://www.christopherreeveorg/site/c.mtKZKgMWKwG/b.5184241/k.ACBD/Average_age_average_length_of_time_since_paralysis_and_SCI.htm

Dishman, R.K., Saunders, R.P., Motl, R.W., Dowda, M., & Pate, R.R. (2009). Self-efficacy moderates the relation between declines in physical activity and perceived social support in high school girls. *Journal of Pediatric Psychology, 34*(4), 441-451.

Jacobs, P.L. & Nash, M.S. (2004). Exercise recommendations for individuals with spinal cord injury. *Sports Medicine, 34*(11), 727-751.

Kayes, N.M., McPherson, K.M., Schluter, P., Taylor, D., Leete, M., & Kolt, G.S. (2011). Exploring the facilitators and barriers to engagement in physical activity for people with multiple sclerosis. *Disability and Rehabilitation, 33*(12), 1043-1053.

Kehn, M., & Kroll, T. (2009). Staying physically active after spinal cord injury: A qualitative exploration of barriers and facilitators to exercise participation. *BMC Public Health, 9*, 1-11.

Kroll, T., Kehn, M., Pei-Shu Ho, & Groah, S. (2007). The SCI exercise self-efficacy scale (ESES): Behavioral Development and psychometric properties. *International Journal of Nutrition & Physical Activity, 4*, 34-36.

Martin Ginis, K.A., Hicks, A.L., Latimer, A.E., Warburton, D.E.R., Bourne, C., Ditor, D.S., … Wolfe, D.L. (2011). The development of evidence-informed physical activity guidelines for adults with spinal cord injury. *Spinal Cord, 49*, 1088-1096.

National Spinal Cord Injury Statistical Center (2012). *Spinal cord injury facts and figures at a glance.* Retrieved from https://www.nscisc.uab.edu/PublicDocuments/fact_figures_docs/Facts%202012%20Feb%20Final.pdf

Orsega-Smith, E.M., Payne, L.L., Mowen, A.J., Ching-Hua Ho, & Godbey, G.C. (2007). The role of social support and self-efficacy in shaping the physical activity of older adults. *Journal of Leisure Research, 39*(4), 705-727.

Sallis, J.F., Grossman, R.M., Pinski, R.B., Patterson, T.L., & Nader, P.R. (1987). The development of scales to measure social support for diet and exercise behaviors. *Preventive Medicine, 16*(6), 825-836.

Sarkin, J.A., Nichols, J.F., Sallis, J.F., & Calfas, K.J. (2000). Self-report measures and scoring protocols affect prevalence estimates of meeting physical activity guidelines. *Medicine & Science in Sports & Exercise, 32*(1), 149-156.

Warner, L.M., Ziegelmann, J.P., Schuz, B., Wurm, S., & Schwarzer, R. (2011). Synergistic effect of social support and self-efficacy on physical exercise in older adults. *Journal of Aging and Physical Activity, 19*(3), 249-261.