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Online First Publication

### **CITATION**

Mahr, M. M., Phillips, B. N., Huck, G. E., Johnson, E. T.,  
& Chan, F. (2020). Predicting exercise behaviors of college  
students with disabilities. *Future Review: International  
Journal of Transition, College, and Career Success*, 3(1).

# Predicting Exercise Behaviors of College Students with Disabilities

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**Objective:** The purpose of this study was to examine whether constructs embedded in Bandura's social cognitive theory influence exercise behaviors in college students with disabilities. The constructs of exercise self-efficacy, exercise outcome expectancies, impediments to exercise (i.e., stress, alcohol abuse, and physical barriers to exercise), and facilitators to exercise (i.e., social support and climate towards disability) were considered. **Participants:** Participants were college students registered through the disability support services offices of two Midwestern universities. **Method:** Data was primarily analyzed using hierarchical linear regression analysis. **Results:** Exercise self-efficacy, exercise outcome expectancies, and facilitators of social support were found to have a significant relationship with physical activity participation for college students with disabilities. **Conclusion:** Results from this study largely support the use of social cognitive theory in predicting college students with disabilities physical activity. Outcomes of this study may prove useful in developing university-based physical activity programs aimed at promoting initial physical activity participation and maintaining positive healthy behaviors.

Keywords: exercise, social cognitive theory, disabilities, college students

Health is an important aspect of optimal functioning that promotes integration into all aspects of society for people with and without disabilities (Lynch & Chiu, 2009; Ravesloot, Seekins, & White, 2005). The lack of physical activity (PA) and poor dietary-intake choices have been repeatedly shown to have a negative effect on health and wellbeing and on the maintenance of a healthy weight (Plotnikoff et. al, 2015). In fact, the lack of physical inactivity has been called the number one public health concern of the twenty-first century (Trost, Blair, & Khan, 2014). Participation in PA has been shown to increase both physical and psychological health (Bradshaw, Lovell, & Harris, 2005; Faulkner & Biddle, 1999; Knöchel et al., 2012; Roberts & Bailey, 2011). Further, PA has been recognized as an integral aspect of disease prevention, and low levels of PA have the potential to restrict functional independence and increase the risk of chronic disease (Washburn, Zhu, McAuley, Frogley, & Figoni, 2002). More specifically, physical exercise has been shown to diminish stress, enhance mood, and help to prevent obesity. In contrast, inadequate PA has been linked to a number of negative health outcomes that include obesity, anxiety, depression, and other health conditions (Eichorn, Bruner, Short, & Abraham, 2018). Another advantage for engaging in PA is that individuals can

see the results of increasing their PA in a very short period of time with positive outcomes. This strategy also creates a new context for health, fitness, and recreation. The immediate effects of increasing PA with minimal cost to the government or health insurance companies make this strategy very appealing at the present time (Keating, Guan, Piñero, & Bridges, 2005).

Unfortunately, people with disabilities often face challenges and barriers related to community engagement, including, but not limited to, PA. For example, people with disabilities may have obstacles in relying on adequate accessibility and transportation to fitness facilities, physical barriers (mobility), minimal social support, and medication side effects. In a 2016 research project examining barriers and facilitators that impact PA for people with disabilities, it was found that the most frequently cited factors were in the psychological subcategories of affect and emotion, attitudes/beliefs/perceived benefits and self-perceptions and the body functions and structures theme (Martin, Ma, Latimer-Cheung, & Rimmer, 2016). The authors noted that specifically, negative mood, depression, anxieties, fears, and embarrassment related to activity were frequently cited as affective/emotional barriers (Martin et al., 2016).

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The college years provide a critical window as health behaviors developed in young adulthood may impact long-term health and quality of life. Research has shown that an increase in obesity or weight gain in college raises the risk for serious health conditions later on in life (e.g. diabetes, circulatory issues, respiratory concerns), health conditions that influence long-term health (Greene et al., 2011). Researchers often emphasize PA during the transition from high school to college. A study by Li et al., (2016) found that moderate to vigorous PA decreased from high school to one year after high school and that social contextual factors helped to predict PA during this transitional period. Kampf and Teske (2013) showed that PA, as measured by the number of times students used recreation facilities on campus was a significant predictor of student retention after the first year of college. This finding supports the self-reported perceptions of undergraduate and graduate students on the positive influence of recreational facilities and programs on retention and well-being (Devine, 2013; Henchy 2011, 2013). Also, the results of a study conducted by Tyson, Wilson, Crone, Brailsford, & Laws (2010) noted that students who participated in high levels of PA showed significantly lower levels of anxiety and depression than the medium and low PA groups. These outcomes have caused researchers suggest that health professionals and administrators in both high schools and post-high school organizations (e.g. universities, worksites) recognize the need for interventions to address this issue.

As more people with disabilities enter higher education (Fleming, Edwin, Hayes, Lockard, & Locke, 2018), this population needs to have the same opportunities, including an active healthy lifestyle. PA may play an even more important role in the lives of people with disabilities. For people with disabilities, concern for health and healthy behaviors often demand even greater emphasis, with nearly 10% of students with disabilities who fail to graduate from college reporting health as a primary cause (Newman, Wagner, Cameto, Knokey, & Shaver, 2010). Research has shown that people with disabilities lead more sedentary lives and experience more obesity and associated co-morbidities when compared with the general population (Katz, McHorney, & Atkinson, 2000; Paeratakul, Lovejoy, Ryan, & Bray, 2002; Weil et al., 2002). This gap in PA between people with and without disabilities is likely caused by multiple factors. In addition to limits stemming directly from disability, college students with disabilities may face environmental challenges preventing them from engaging in healthy behaviors such as a lack of accessible exercise facilities and transportation (Henchy, 2011). These challenges and barriers are compounded by the

disruption of previously established habits of PA common to all students in the stress of transitioning to college life and adjusting to the demands of higher education.

The benefits of PA are clear for both people with and without disabilities. However, there is minimal data showing what specific factors influence PA among college students with disabilities. It is not only important to increase PA, but also to maintain and sustain this lifestyle change. Therefore, it is helpful to identify potential factors that promote or prevent exercise. This current study examined factors influencing PA of college students with disabilities using social cognitive theory as the framework for the study.

Bandura's social cognitive theory (SCT) is widely known as an applied theory for understanding how people acquire and maintain certain behaviors (Eagle et al., 2017; Wise, 2002). Bandura (1977) proposed that human motivation and action are regulated by forethought and the perceived control one has over a situation. Based on these ideas, Bandura later conceptualized five specific factors that influence an individual's behavior: (a) self-efficacy or the confidence in one's ability to execute the behavior, (b) outcome expectancy or belief about the anticipated consequences of engaging in behavior, (c) facilitators and impediments to achieving the desired goals, (d) knowledge, including information about risk and benefits of behavior change, and (e) goals (Bandura, 2004). The aim of this study was to examine whether the first three of Bandura's five factors for influencing human behavior predict the PA of college students with disabilities. The focus of this study was to investigate the cognitive and psychological components of SCT as predictors to exercise; therefore, the research did not include the factors of observational learning or modeling. The SCT construct of self-efficacy is a prominent factor in multiple health promotion models. The SCT theory, as a whole, has been applied to several health behavior studies including adhering to medical recommendations (William & Bond, 2002), eating a healthy diet and managing one's weight (Schnoll & Zimmerman, 2001). An example of this applicability comes from Motl et al. (2002) who found that applications of SCT assisted adolescents in participating in vigorous PA/exercise, with self-efficacy as the strongest predictor of moderate and vigorous PA/exercise. This current study provides a partial test of the theory by testing the research hypothesis that exercise self-efficacy, exercise outcome expectancy, exercise facilitators (i.e., climate towards disability and social support) and exercise impediments (i.e., stress, alcohol abuse and physical barriers to exercise) will each serve to predict exercise behaviors of college students with disabilities.

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### Method

In the following section, we present the methodology for the study including participants, procedures, and measures. A quantitative descriptive design utilizing hierarchical linear regression was used to evaluate whether the constructs of SCT predict exercise behaviors for college students with disabilities.

#### Participants

The sample for this study included 75 college students who self-reported as having a disability. The age range for participants was 18-47 ( $M = 24$ ,  $SD = 7.9$ ). Among participants, 20 were male (26.7%), 53 female (70.7%), one transgender (1.3%), and one did not report (1.3%). A total of 53 were Caucasian (70.7%), five African American (6.7%), three Hispanic/Latino (4%), four Asian (5.3%), seven reported having two or more races (9.3%), and two reported Other (2.7%). A majority of the participants reported having either a learning disability or mental illness as their primary disability. The breakdown of disability type, from most to least common, was 39 (52%) with a psychiatric condition or mood disorder, 31 (41.3%) with a learning disability or attention deficit hyperactivity disorder, 10 (13.3%) with a chronic health condition, five (6.7%) with brain injury, five (6.7%) who were deaf or hard of hearing, four (5.3%) with autism spectrum disorder, two (2.7%) with mobility impairment (e.g. spinal cord injury), and one (1.3%) for both intellectual disability or cognitive deficit as well as for blind or visual impairment. Another seven (9.3%) reported an unspecified disability. For the purposes of this study, only the disability category was included.

#### Procedure

Data for this study were collected from two Midwestern universities. Disability resources staff from each university sent an email with a survey link to students who had registered for receiving campus disability services. The staff sent 3 reminders to each student to participate in the study over the course of one semester. Each disability resource center was sent an email invitation with a link to the informed consent form and survey with completion of the survey accepted as consent to participate. The anonymous online survey was developed and hosted on Qualtrics ([www.qualtrics.com](http://www.qualtrics.com)). The survey was sent out from both universities in the spring semester of 2015 and then again in the fall of 2016. To encourage responses, participants were entered in a drawing to win one \$150.00 gift card from Amazon.com.

#### Measures

Variables included in the model are shown in Table 1,

excluding demographics. A brief description of each variable follows.

**Table 1.** Descriptive Statistics for Study Measures ( $N=75$ )

Measure	M	SD
Friend and Family Support for Exercise Habits Scale	1.87	0.83
College Students with Disabilities Campus Climate	4.43	1.04
Perceived Stress Scale	40.08	7.82
Short Michigan Screening Test	0.32	0.93
Barriers to Health Promoting Activities for Disabled Persons Scale	1.94	0.42
Patient Health Questionnaire - 4	9.61	3.78
Outcome Expectations for Exercise Scale	2.06	0.72
Physical Exercise Self- Efficacy Scale	2.93	0.67
The Physical Activity Scale for Individuals with Physical Disabilities	16.59	14.33

**Stress.** Stress was examined using the Perceived Stress Scale (PSS-4) developed by Cohen, Kamarck, and Mermelstein (1983). The Perceived Stress Scale (PSS) is a self-report questionnaire developed by Cohen et al. (1983) to measure a person's evaluation of their overall stress levels over the previous month. Respondents rate how often they experience stressful situations on a 5-point Likert scale ranging from 1 (*never*) to 5 (*very often*). The higher the score on the PSS, the greater the respondent perceives that their demands exceed their ability to cope. The reliability and validity of the PSS-4 have been well established in a variety of settings and in multiple languages (Cohen et al., 1983; Cohen & Williamson, 1988; Mezzacappa et al., 2000; Mimura & Griffiths, 2004; Muller & Spitz, 2003; Stowell, Kiecolt-Glaser, & Glaser, 2001; Warttig, Forshaw, South, & White, 2013). The most recent normative sample showed a Cronbach's alpha of .77. Cronbach's alpha coefficient for the scale in the present study was computed to be .88.

**Physical barriers to exercise.** Perceived barriers to health-promoting activities were measured using the Barriers to Health Promoting Activities for Disabled Persons Scale (BHADP) developed by Becker, Stuifbergen, and Sands (1991). The BHADP is composed of 18 items making up three subscales: (a) intrapersonal barriers (e.g. too tired), (b) interpersonal barriers (e.g. other responsibilities), and (c) environmental barriers (e.g. lack of transportation). All items focus on different problems that might make it difficult for

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them to engage in health behaviors (Chiu, Lynch, Chan, & Rose, 2012). Responses are scored on a Likert scale from 1 (*never*) to 4 (*routinely*). Scores range from 18-72 with higher scores reflecting more perceived barriers. The BHADP was found to have good internal consistency reliability (.82 - .85; Becker & Stuijberger, 2004). Cronbach's alpha coefficient for the scale in the present study was computed to be .80.

**Alcohol abuse.** The Short Michigan Alcoholism Screening Test (SMAST) was used to measure alcohol abuse (Selzer, Vinokur, & van Rooijen, 1975). The SMAST consists of 13 items with scores ranging from 0 to 13. Higher scores denote greater levels of problematic alcohol use. All questions are answered with *Yes* or *No* answers only. The number of answers in the affirmative is then summed, with higher scores reflecting a greater potential level of alcohol abuse. The SMAST has been evaluated for reliability with findings indicating adequate internal consistency, with a Cronbach's alpha of .93 for the overall score (Selzer et al., 1975). Cronbach's alpha coefficient for the scale in the present study was computed to be .73.

**Depression and anxiety.** The Patient Health Questionnaire-4 (PHQ-4) was used to measure the levels of anxiety and depression (Kroenke, Spitzer, Williams, & Löwe, 2009). The PHQ-4 is a 4-item inventory rated on a 4-point Likert scale. Responses are scored on a Likert scale from 1 to 4, with higher scores reflecting greater levels of depression and anxiety. The PHQ-4 has been validated in large clinical ( $n=2149$ ) and general population ( $n=5030$ ) samples (Kroenke et al., 2009), with a Cronbach's alpha of ( $>.80$ ). Cronbach's alpha coefficient for the scale in the present study was computed to be .91.

**Social support for exercise.** Social support for exercise was measured with the Friend and Family Support for Exercise Habits Scale (Sallis, Grossman, Pinski, Patterson, & Nader, 1987). The scale consists of 20 items. Example items include "My friend gave me helpful reminders to exercise" and "My family member gave me encouragement to stick with my exercise program. Each item is rated on a 5-point Likert scale ranging from 1 (*none*) to 5 (*very often*). Scores on this measure range from 20 to 100, with higher scores reflecting more friend and family support for engaging in PA/exercise. Cronbach's alpha has been reported as .84 for the friend support subscale and .91 and .61 for the participation/involvement and rewards/punishments factors of the family support subscale, respectively. Cronbach's alpha coefficient for the scale in the present study was computed to be .94.

**Climate towards disability.** Items from the College Students with Disabilities Campus Climate (CSDCC) developed by Lombardi, Murray, and Gerdes (2011) were used

to measure climate towards disability. It contains 43 items that are asked using a Likert scale ranging from 1 (*never true*) to 6 (*always true*). For this study, the following three items were used from this instrument: "I wish I attended another university"; "I feel comfortable on this campus," and "I feel the overall campus environment is supportive of students with disabilities." The Cronbach's alpha for the CSDCC survey has shown to be 0.80 (Nunnally, 1975) and within subscales ranged from .88 on Peer Support to .58 on Faculty Attempts to Minimize Barriers. Cronbach's alpha coefficient for the scale in the present study was computed to be .75.

**Exercise self-efficacy.** Exercise self-efficacy was measured using the Spinal Cord Injury Exercise Self-Efficacy Scale (ESES; Kroll et al., 2007). The ESES is a 10-item instrument with a 4-point Likert scale (1 = *not at all true* to 4 = *always true*). Although originally developed for people with SCI, scale items are generic enough to be applied across people with different types of physical disabilities (e.g. "I am confident that I can overcome barriers and challenges with regard to physical activity and exercise if I try hard enough," and "I am confident that I can be physically active or exercise even when I am feeling depressed."). Scale items elicit beliefs about personal ability to engage in routine physical exercise. Total scores range from 10 to 40, with higher scores reflecting more confidence in one's ability to engage in routine physical exercise. The scale has excellent internal consistency reliability with Cronbach's alphas ranging from .87 to .93 in the original study (Kroll et al., 2007). Cronbach's alpha coefficient for the scale in the present study was computed to be .93.

**Exercise outcome expectancy.** The outcome expectancy of general health was measured using the Outcome Expectations for Exercise Scale (OEE) developed by Resnick, Zimmerman, Orwig, Furstenberg, & Magaziner (2000). The OEE has nine items that focus on the positive expectations of exercise (e.g. "Exercise improves my endurance in performing my daily activities"). The OEE uses a 5-point Likert-type scale ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). Scores on this measure range from 9 to 45, with higher scores reflecting lower outcome expectations for engaging in PA/exercise. The reliability and validity of the scale have been demonstrated (Resnick et al., 2000), with a Cronbach's alpha of .89. Cronbach's alpha coefficient for the scale in the present study was computed to be .93.

**Exercise behavior.** The Physical Activity Scale for Individuals with Physical Disabilities (PASIPD) was used to measure PA for individuals (Washburn et al., 2002). PASIPD is a well-validated, self-report measure that measures areas of lifestyle PA. The PASIPD contains 12 items and five factors: (a) home repair and lawn and garden work, (b) housework,

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(c) vigorous sport and recreation, (d) light/moderate sport and recreation, and (e) occupation. Respondents are asked to indicate the frequency and duration of engagement in each activity. Scores are computed by multiplying the average hours per day of an activity by a metabolic equivalent of task (MET) value, which represents the intensity of physical activities. The scores are summed across all items, and the maximum possible score is 199.5 MET hours per day (MET-hr/d). Test-retest reliability for the PASIPD over a one-week interval was reported to be .77 (van der Ploeg et al., 2007). Internal consistency coefficients for the five PASIPD factors range from .37 to .59 (Washburn et al., 2002). Cronbach's alpha coefficient for the scale in the present study was computed to be .76.

### Data Analysis

Hierarchical regression analysis (HRA) was used in order to evaluate the incremental variance accounted for by each predictor set in the model with self-reported PA serving as the dependent variable. The Statistical Package for the Social Sciences (SPSS) version 22.0 was used to perform the computations. Three sets of predictors were entered in sequential steps matching with Bandura's framework, namely (a) facilitators to exercise, (b) barriers to exercise, and (c) SCT factors. Facilitators to PA included measures of social support and school climate towards students with disabilities. Barriers to PA included alcohol use problems, perceived stress, perceived barriers to exercise, and depression. Finally, SCT factors included self-efficacy and outcome expectancy for PA. The correlations among the dependent variable and the predictor variables ranged from small to medium and the correlation matrix for all variables are presented in Table 2.

### Results

Results of the hierarchical regression analysis are presented in Table 3, including values of change in R<sup>2</sup> ( $\Delta R^2$ ), unstandardized regression coefficients (B), standard errors (SE B), and standardized coefficients ( $\beta$ ) for the predictor variables at each step and in the final model.

**Table 3.** Hierarchical Regression Analysis for Prediction of Physical Activity Behavior (N = 75)

Variable	At Entry Into Model			Final Model				
	R <sup>2</sup>	$\Delta R^2$	B	SE B	$\beta$	B	SE B	$\beta$
<b>Step One</b>	0.04	0.04						
Learning Disability vs other			2.50	4.80	0.07	-0.98	4.40	-0.03
MI vs Other			-4.65	3.84	-0.16	-2.31	4.12	-0.08
<b>Step Two</b>	0.24	0.19***						
Social Support			7.18	1.96	0.42***	6.25	2.01	0.36**
College Climate			2.04	1.55	0.15	1.34	1.65	0.10
<b>Step Three</b>	0.24	0.01						
Perceived Stress			0.05	0.30	0.03	0.17	0.30	0.09
Drinking Problem			-1.19	1.76	-0.08	0.10	1.67	0.01
Perceived PA Barriers			-1.62	4.11	-0.05	3.97	4.23	0.12
Depression			0.12	0.60	0.03	0.52	0.57	0.14
<b>Step Four</b>	0.38	0.13**						
PA Outcome Expectancy			5.66	2.26	0.28*	5.66	2.26	0.28*
PA Efficacy			6.43	3.19	0.30*	6.43	3.19	0.30*

Note: = learning disability; MI = mental illness; PA = physical activity; MAST = The Short Michigan Alcoholism Screening Test

**Table 2.** Correlations for Variables Used in Hierarchical Regression Analyses

Variable	1	2	3	4	5	6	7	8	9	10	11
Physical Activity Behaviors	1.00										
LD vs other disability	0.15	1.00									
MI vs other disability	-0.20*	-0.52***	1.00								
PA Support Supportive School Climate	0.46***	0.33**	-0.30**	1.00							
Perceived Stress	0.27*	0.15	-0.34**	0.26*	1.00						
Drinking Problem (MAST)	-0.26*	-0.24*	0.53***	-0.45	-0.44***	1.00					
Perceived PA barriers	-0.16	-0.07	0.10	-0.10	-0.32**	0.25*	1.00				
Depression	-0.15	-0.01	0.30**	-0.13	-0.33**	0.40***	0.12	1.00			
PA Outcome Expectancy	-0.19	-0.22*	0.56***	-0.29**	-0.47***	0.67***	0.22*	0.32**	1.00		
PA Efficacy	-0.43***	-0.02	0.19*	-0.24*	-0.28**	0.25*	0.20*	0.28**	0.32**	1.00	
	0.39***	0.18	-0.33**	0.28**	0.40***	-0.61***	-0.34**	-0.55***	-0.49***	-0.41***	1.00

Note: \*p < .05\*\*p < .01, \*\*\*p < .001\*\*\*; LD = learning disability; MI = mental illness; PA = physical activity; MAST = The Short Michigan Alcoholism Screening Test.

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The two disability type dummy variables (learning disability versus other, and mental health disability versus other) were entered in the first step of the regression analysis. This set of variables did not account for a significant amount of variance in PA scores,  $R = 0.21$ ,  $\Delta R^2 = 0.04$ ,  $\Delta R^2 = 0.04$ ,  $F(2, 72) = 1.64$ ,  $p = 0.20$ . Being students with mental health disabilities was negatively related to PA scores ( $r = .20$ ,  $p < .05$ ). In contrast, a learning disability was not significantly related to PA ( $\beta = -.16$ ,  $t(74) = -1.21$ ,  $p = 0.23$ ). Facilitators to PA were entered in the second step of the regression analysis. The addition of these variables accounted for a significant increase in variance of PA beyond that explained by the demographic covariates in the first step:  $R = 0.49$ ,  $R^2 = 0.24$ ,  $\Delta R^2 = 0.19$ ,  $F(2, 70) = 8.81$ ,  $p < .001$ . Social support for PA contributed significantly to the change in variance of PA scores ( $\beta = 0.42$ ,  $t(74) = 3.66$ ,  $p < .001$ ) while school climate did not ( $\beta = .15$ ,  $t(74) = 1.31$ ,  $p = .195$ ). Barriers to PA were entered in the third step of the regression analysis. This set of variables did not account for a significant amount of variance in PA scores beyond that explained by the predictors entered in the first and second steps,  $R = 0.49$ ,  $R^2 = 0.24$ ,  $\Delta R^2 = 0.01$ ,  $F(4, 66) = 0.16$ ,  $p > 0.05$ .

In the final step, the two SCT factors were entered into the model. The addition of these two variables accounted for a significant amount of variance in PA scores beyond that explained by the previously entered variables,  $R = 0.61$ ,  $R^2 = 0.38$ ,  $\Delta R^2 = 0.13$ ,  $F(2, 64) = 6.73$ ,  $p < 0.01$ . Both self-efficacy for PA ( $\beta = 0.30$ ,  $t(74) = 2.02$ ,  $p < .05$ ) and outcome expectancy for PA ( $\beta = 0.28$ ,  $t(74) = 2.51$ ,  $p < .05$ ) significantly contributed to the variance in the model, with higher levels of outcome expectancy and self-efficacy associated with an increase in PA behaviors of college students with disabilities. Social support for PA remained a significant predictor of PA in the final model ( $\beta = 0.36$ ,  $t(74) = 3.11$ ,  $p < .01$ ).

The final regression model accounted for 38% of the variance in PA. Controlling for all other factors, social support for PA, PA outcome expectancy, and PA self-efficacy were significant predictors of college students with disabilities exercise behaviors, supporting the ability of Bandura's SCT factors to predict PA level.

### Discussion

The purpose of the present study was to examine the utility of SCT as a model for predicting PA in college students with disabilities. The final model accounted for approximately 38% of the variance in PA, with self-efficacy, outcome expectations, and social support significantly predicting PA. In the final analysis, no impediments significantly influenced the degree to which individuals participated in PA. However, it

was noted in the correlational analysis that each impediment (e.g. perceived stress, alcohol use, depression, and perceived barriers) had an inverse relationship with PA, offering support for the importance of acknowledging potential barriers to ensure the greatest likelihood of behavior change. These findings align with previous research and hold meaning for enhancing the lives of college students with disabilities. A recent article by Rimmer, Lau, and Young (2016) noted that studies related to PA and people with disabilities recommended that community service providers begin to consider options to make their exercise facilities and programs more accessible to people with disabilities. The researchers posit that sustainable effects of a successful short-term clinical exercise trial after the supports are removed (e.g. qualified research staff, funding for transportation, no charge for the program, and accessible facilities) is currently one of the major challenges confronting exercise and rehabilitation scientists. Therefore, understanding how to decrease the barriers for long term success is vital to assist students with disabilities to engage in long term positive outcomes post the college years.

The promise of the results lies in the fact that self-efficacy, outcome expectancies, and social support are factors that have been shown to be modifiable in college student populations. Thus, it seems likely that interventions aimed at increasing these factors in relation to PA would lead to increasing PA and establishing healthy lifestyles during this critical window for college students. The effect on long-term health outcomes for people with disabilities could be substantial. According to Racette, Deusinger, Strube, Highstein, and Deusinger (2005), weight gain, lack of regular exercise, and unhealthy eating patterns appeared to be typical among students in a study with data collected during 1999 and 2000. Findings such as this warrant more research and examination of how adverse behaviors may contribute to a decrease in exercise behaviors for college students with and without disabilities.

These results are also aided by previous research offering strong support for use of SCT-based interventions to encourage PA uptake and maintenance in settings serving both the general population and individuals living with disabilities, although not with college and university students (e.g. Keegan, Chan, Ditchman, & Chiu, 2012; Short, James, & Plotnikoff, 2013). For example, the value of social support for encouraging PA among people with disabilities has been consistently noted (Chiu et al., 2012; Gross, Vancampfort, Stubbs, Gorczynski, & Soundy, 2016; Huck, Finnicum, Morrison, Kaseroff, & Umucu, 2018; Stanish & Temple, 2012). Previous research on health behavior change has highlighted the importance of supportive climates (e.g. Ryan, Patrick, Deci, & Williams, 2008), and this may hold true for

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university settings as well.

Despite some emphasis on adequate social supports in the college setting and emphasis on PA supports for people with disabilities, much less has been done to consider PA social supports specifically for college students with disabilities. There are a number of formal and informal ways that such supports might be fostered at the individual and institutional level for college students with and without disabilities. For instance, a formal institution-level approach might be to provide structures with accessibility for people with disabilities to engage in PA and fitness classes. At the individual and informal level, an additional support could include a peer mentoring program that promotes the interaction of senior students with incoming freshmen to promote healthy lifestyles. In this role, mentors could help mentees with the resistance of visiting the campus recreation facilities for the first time, finding group classes that might serve as a good fit, or taking advantage of other physical activities within the community (e.g. hiking, skiing, cycling). Additionally, college and university administrators could foster PA efforts with student recreation programs and wellness personnel to promote the use of facilities and services by students with disabilities. This might include a new marketing strategy that caters to wellness staff training, a health promotion philosophy, and advertising to promote inclusive fitness programs for students with disabilities. Higher education administrators could also hire certified inclusive fitness trainers, and perhaps offer skill building and fitness classes for students with disabilities.

Given the previously cited connection between health and college completion for students with disabilities, disability resource centers might do well to emphasize campus level supports for PA, including their availability and accessibility. Where lacking, disability resource centers would do well to advocate for greater availability and accessibility. Of course, many instances of health barriers resulting from disability cannot be ameliorated simply by increased PA. That said, people with disabilities noted for experiencing a risk for preventable secondary conditions may stand to benefit from formal supports to engage in desired PA, and a disability resource center may be the entity on campus most equipped to provide it. Disability services on campus can provide resources and education on PA and peer support for students during the initial intake which may help students feel more comfortable.

Regarding self-efficacy and outcome expectancies, recreation centers, intramural sports staff, and other stewards of PA on campus may play a critical role by ensuring that other staff and trainers are knowledgeable on disability accommodations for PA. Despite the fact that, barriers to PA on college campuses did not have a significant influence on

PA in our sample, one of the most effective means for increasing self-efficacy and outcome expectancies is a history of positive experiences or success in the targeted task. It stands to reason then that staff or trainers with expertise on how to support and facilitate an inclusive and safe environment with disability accommodations will positively impact student's perceived self-efficacy and outcome expectancy related to PA. In support of the SCT, exercise self-efficacy for students with disabilities could also be enhanced with greater peer support and integrated group fitness classes at the university level.

### Limitations

In interpreting the findings of this study, several considerations should be made. The instrument utilized for data collection was an anonymous self-report survey, and consequently, may not align with actual exercise behaviors. Socially desirable responding may also have influenced the sample to provide inaccurate answers when describing their alcohol intake due to the sensitive nature of the topic, or because they are concerned about the consequences of underage drinking. It is important to note that, based on an a priori analysis, the study was not sufficiently powered. It is possible that some of the non-significant variables (e.g. disability type, barriers) might be predictive of PA participation in a larger sample. Additionally, the small sample limited the demographic variables that could be included in the regression model. The fact that this study recruited participants from only two universities is another potential factor to consider regarding the outcome. However, due to the small sample population, it warrants a follow-up study with recruitment from other universities in a future study.

### Future Research

The results of this study offer several considerations for future research. First, it would be beneficial to investigate any group differences in studies utilizing more diverse samples. For example, it would be advantageous for further research to examine how self-efficacy is or is not related to college athletic performance in a comparison study between college students with disabilities and college students without disabilities. According to Anstiss, Meijen, and Marcora, (2018), the relationship between self-efficacy and performance is distinct in the endurance sport domain. For example, the types of factors fostering the development of self-efficacy for individuals with physical disabilities may be somewhat different from factors promoting self-efficacy among individuals living with various mental disorders. Different groups of individuals with disabilities may report different experiences. Furthermore, it would be useful to compare



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individuals from different universities in diverse geographical areas to create a more generalizable understanding of how college students with disabilities consider PA-related behavior.

To fully understand the relevance of this study's findings, it will also be important to evaluate the outcomes of specific interventions aimed at enhancing SCT states among college students with disabilities, such as strategy-based experimental studies. A review by Williams and French (2011) provides several suggestions for how interventions might facilitate a positive sense of the SCT constructs. However, until such strategies are found to be effective for encouraging PA-behavior among college students with disabilities, the true applicability of SCT for this group will remain unknown.

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