****Continuing Education Contact Hour Opportunity Pending**

Exploring the Relationship Between Self-Determination Theory, Adults' Barriers to Exercise, and Physical Activity.

James W. Ball, Matthew R. Bice and Kimberly A. Maljak

Abstract

Physical activity is a preventative measure that can help decrease obesity trends. However, many individuals struggle to live a physically active lifestyle. The purpose of this study was to explore the relationships between Self-Determination Theory, adults' barriers to exercise, and those who have met and have not met the Center for Disease Control and Prevention recommendations for weekly physical activity. Participants (n = 217) completed the Barriers to Being Active Questionnaire, the Psychological Need Satisfaction in Exercise Questionnaire, and the International Physical Activity Questionnaire. In this study it was revealed that participants who have met and who haven't met the CDC's physical activity weekly recommendations felt they have the motivation to engage in physical activity. However, participants who haven't met the weekly physical activity recommendations reported numerous barriers to engaging in physical activity. Individuals need to develop the motivation to overcome the barriers found in this study and numerous other studies. Motivation that is more self-regulated and intrinsically motivated could help inspire individuals to engage in physical activity more frequently.

Keywords: Exercise, Motivation, Regulation

Introduction

Rates of obesity are climbing across the country. According to the United States (US) Surgeon General, the National Institutes of Medicine, and the Director of the Centers for Disease Control and Prevention (CDC) the US has declared an obesity epidemic with rates tripling since 1980 (Ogden, Carroll, & Flegal, 2014, Ogden, Carroll, Kit, & Flegal, 2014; The Robert Wood Johnson Foundation and American Heart Association, 2005). As a result, physical activity levels have been labeled as a major public health concern to help combat the obesity epidemic and Healthy People 2020 has developed objectives to decrease the obesity levels in this country. (Biddle, Gorely, & Stensel, 2004; Dietz, 2004; Healthy People 2020, 2016; Koplan, Liverman, & Kraak, 2005).

According to the CDC (2015), there are many benefits of physical activity such as reducing the risk of developing high blood pressure, coronary heart disease, diabetes, and symptoms of anxiety and depression. In addition, participating in physical activity helps maintain a person's healthy body weight, muscle and bone strength, and flexibility (CDC, 2015). Participation in regular PA is also reported by the United States Department of Health and Human Services (USHHS) (2008) to improve physiological and psychological health. Currently, the CDC (2015) suggests that adults should participate in at least 150 minutes of moderate-intensity aerobic activity every week to benefit from physical activity. However, even with this information widely available, the most recent Surgeon General report by the CDC (2015) found that more than 60 percent of Americans are not regularly active and 25 percent of Americans are not active at all. Although the benefits of physical activity and consequences of not engaging in physical activity are well documented, questions still exist as to why a substantial portion of the population is not meeting suggested physical activity recommendations.

Barriers to PA

Meeting the CDC's recommended minutes of aerobic activity each week can serve as a preventative measure to help decrease obesity, but many individuals struggle to live a physically active lifestyle. Studies have found that during the process of aging, there is a sharp decline in physical activity during the adolescent years and they tend to become more sedentary (CDC, 2015). Furthermore, as individuals move into adulthood, the decline continues and adults spend less time being physically active (Flegal, Graubard, Williamson, & Gail, 2005; Kwan, Cairney, Faulkner, & Pullenayegum, 2012). Research has found that some of the barriers to being physically active include: lack of time, energy, willpower/motivation, and resources/money (Kulavic, Hultquist, & McLester, 2013; Lovell, El Ansari, & Parker , 2010; Ross & Melzer, 2016). Greaney et al. (2009) conducted a qualitative study and found that participants mentioned lack of discipline, social situations, social support, and time as barriers to achieving weight management. It is important for people to overcome these barriers and be motivated to participate in physical activity so they can achieve the CDC's weekly physical activity recommendations.

*James W. Ball, Ph.D., Assistant Professor, Northeastern Illinois State University, 5500 N. St Louis Avenue, Chicago, Illinois 60025; Email: jwball@neiu.edu; Phone: 773-442-5539; Fax: 773-442-4180

Matthew R. Bice, Ph.D., Assistant Professor, University of Nebraska Kearney, 1410 West 26th Street, Kearney, Nebraska 68849; Email: bicemr@unk.edu; Phone: 308-865-8052

Kimberly A. Maljak, Ph.D., Assistant Professor, Northeastern Illinois State University, 5500 N. St Louis Avenue, Chicago, Illinois 60025; Email: kamaljak@neiu.edu; Phone: 773-442-5575

*Corresponding Author

Self-Determination Theory

Deci and Ryan developed the self-determination theory (SDT) and it has been used in numerous studies to attempt to explain what motivates individuals to participate in PA (Deci & Ryan, 1985, 2000). According to Deci and Ryan, motivation occurs when basic psychological needs are met (Deci & Ryan, 1985, 2000, 2002). The basic psychological needs include three constructs: autonomy (power to choose), competence (mastering skills), and relatedness (creating or building meaningful connections) (Deci & Ryan, 1985, 2000, 2002).

Studies have reported mixed results on whether or not a persons' level of autonomy, competence, and relatedness encourage participation and engagement in physical activity. One of the main conclusions from a systematic review of the literature on exercise, physical activity, and SDT explained that results of past studies show consistent support for a positive relationship between more autonomous forms of motivation and exercise (Teixeira, Carraca, Markland, Silva, & Ryan, 2012). Another recent study concluded, "There were not significant differences between psychological needs and those who did and did not achieve CDC recommendations" (McDaniel, 2012, p. 1). Maltby and Day (2001) found that college students who were intrinsically motivated were increasingly likely to be more physically active. Another study found students who were more extrinsically motivated were increasingly likely to be physically active (Egli, Bland, Melton, & Czech, 2011). When comparing gender, it has been found that males typically engage in PA for intrinsic motivational factors and women for extrinsic motivational factors (Egli, Bland, Melton, & Czech, 2011; Lauderdale, Yli-Piipari, Irwin, & Layne, 2015).

In the literature review Teixeira, Carraca, Markland, Silva, & Ryan (2012) also reported that competence satisfaction and more intrinsic motives positively predict exercise participation across a range of samples and settings. Other studies have found that people who continuously participate in physical activity are more likely to set health-related goals and have a higher level of self-efficacy (Doerken, Umstattd, & McAuley, 2009; Lowry, Galuska, Fulton, Wechsler, Kann, & Collins, 2000; Petosa, Suminski, & Hortz, 2003). The purpose of this study was to explore the relationships between the basic psychological need constructs of the SDT, adults' barriers to exercise, and those who have met and have not met the CDC recommendations for weekly physical activity.

Methods

A Midwestern University's Institutional Review Board (IRB) approved the research study. With the IRB approval the researchers were granted permission to distribute the survey via email. Data were collected using a questionnaire administered through Survey Monkey. After survey administration, surveys were recorded and analyzed in the Statistical Package for the Social Sciences (SPSS) version 20. Only the research team had access to the electronic file that stored survey responses.

Participants

Study participants (n = 217) included students at a Midwestern university in the US. An email solicitation was sent to all students, stating survey completion was voluntary and they could withdraw anytime. The email contained a link to the informed consent and survey in Survey Monkey. Participants clicked yes or no on the informed consent form in survey monkey to agree or disagree to participate in the study. If they clicked no then the survey was ended. If they clicked yes then participants answered questions concerning their (a) demographics, (b) barriers to exercise, (c) physical activity motivation, and (d) physical activity levels. Participants were encouraged to accurately answer each question before submitting survey responses electronically.

Barriers to being active questionnaire

The CDC developed the barriers to being active questionnaire, which consists of 21 items related to seven different barriers to physical activity (CDC, 2016). The following are the seven different barriers to physical activity: 1) lack of time, 2) social influence, 3) lack of energy, 4) lack of willpower, 5) fear of injury, 6) lack of skill, and 7) lack of resources (CDC, 2016). Some of the questions in the survey are "I'm getting older, so exercise can be risky", I don't have access to jogging trails, swimming pools, bike paths…, "I'm embarrassed about how I will look when I exercise with others", and "I want to get more exercise, but I just can't seem to make myself stick to anything". The questionnaire uses a 4-point Likert scale and each barrier in the questionnaire has three items that are summed for scoring. The Likert scale included: strongly agree, agree, disagree, and strongly disagree.

Measurement of Physical Activity Motivation

The Psychological Need Satisfaction in Exercise (PNSE) scale was developed by Wilson, Rogers, Rodgers, and Wild (2006). The PNSE scale assesses basic psychological need satisfaction based on the SDT (Deci & Ryan, 1985, 2002). The PNSE consists of 18 items (Perceived competence = 6 items; autonomy = 6 items; relatedness = 6 items). Some of the questions in the survey are "I feel confident that I can do even the most challenging exercises", "I feel like I am the one who decides what exercises I do", and "I feel close to my exercise companions who appreciate how difficult exercise can be". Cronbach alpha values reported high internal consistency estimates among all three PNSE scales ($\alpha > 0.90$) (Wilson et al., 2006). The PNSE displayed psychometric characteristics that render usefulness in the context of exercise and physical activity. Information obtained from the PNSE allowed investigators to evaluate adult psychological need satisfaction.

Physical Activity Assessment

The International Physical Activity Questionnaire (IPAQ) - short form was used to examine physical activity over the last seven days (Maddison et al., 2007). The instrument consists of seven questions that ask participants to answer, in minutes, how much time they spend doing vigorous and moderate intensity exercise as well as the total amount of time spent walking and sitting. The IPAQ - short form is an international universally accepted physical activity assessment tool, which has been tested for repeated reliability and validity (Helmerhorst, Brage, Warren, Besson, & Ekelund, 2012; Maddison et al., 2007). Helmerhorst et al., (2012) conducted a review of 34 different

physical activity questionnaires. They concluded that the IPAQ - short form was identified as a reliable and valid tool to assess self-reported physical activity (Helmerhorst et al, 2012). Furthermore, the IPAQ - short form was commonly used in other studies and reported as a desirable measure for physical activity estimation (Helmerhorst et al., 2012). Validity can be problematic with self-reported survey response accuracy; therefore, specific examples of activities were provided for moderate and vigorous physical activities.

Data analysis

Demographic data were analyzed per gender, ethnicity, and age. Furthermore, participants were categorized as reaching 150+ minutes of weekly physical activity and <150 minutes of weekly physical activity. Analyses of variance (ANOVA) were used to identify significant associations between barriers to exercise (time, social influence, energy, willpower, injury, skill, and resources) and physical activity motivation (autonomy, competence, relatedness) among those meeting physical activity recommendations (150 + minutes of weekly physical activity) and those who did not meet physical activity recommendations (< 150 minutes of weekly physical activity). Data were deemed significant at 0.05.

Results

A total of 217 participants completed the survey consisting of retrospective physical activity levels, barriers to exercise, and physical activity motivation. Complete participant demographics are available in Table 1. Significant differences were present between those meeting and not meeting recommended physical activity levels and the motivational constructs of autonomy [$F(1, 217) = 27.53$, $p = 0.001$)], competence [$F(1, 217) = 36.71$, $p = 0.001$)], and relatedness [$F(1, 217) = 20.984$, $p = 0.001$)] (Table 2). When barriers were combined, participants meeting recommended physical activity levels noted significantly lower ratings of barriers ($M = 42.18$) compared to participants who did not meet recommended PA levels ($M = 50.50$) [$F(1, 217) = 45.41$, $p = 0.001$)]. When separated, significant differences were present among the barriers of time [$F(1, 217) = 19.84$, $p = 0.001$)], social influence [$F(1, 217) = 33.18$, $p = 0.001$)], willpower [$F(1, 217) = 60.43$, $p = 0.001$)], energy [$F(1, 217) = 27.28$, $p = 0.001$)], and skill [$F(1, 217) = 19.86$, $p = 0.001$)] (Table 3).

Table 1.

Participant Demographics

Gender	**n**	**%**
Female	157	72.4
Male	60	27.6
Ethnicity	**n**	**%**
White	99	45.6
African American	14	6.5
Hispanic/Latino	68	31.3
Middle Eastern	4	1.8
Asian	16	7.4
Multiracial	13	6
Other	3	1.4
Age	**n**	**%**
18-20	20	9.2
21-25	73	33.6
26-30	39	18
31-35	25	11.5
35+	60	27.6
Weekly PA	**n**	**%**
150+ PA Minutes	90	41.5
<150 PA Minutes	127	58.5

Table 2.

Analysis of Variance between Physical Activity Motivation and PA levels among students meeting PA guidelines

Physical Activiy Motivation		*n*	*M*	*F*	*p*
Autonomy	Meet Recommendations	90	9.37	27.54	***0.01**
	Do Not Meet Recommendations	127	11.69		
Competence	Meet Recommendations	90	11.58	36.72	***0.01**
	Do Not Meet Recommendations	127	14.86		
Relatedness	Meet Recommendations	90	12.23	20.98	***0.01**
	Do Not Meet Recommendations	127	14.72		
Physical Activity Levels		*n*	*M*	*F*	*p*
Total Vigorous PA	Meet Recommendations	90	505.78	10.51	***0.01**
	Do Not Meet Recommendations	127	39.06		
Total Moderate PA	Meet Recommendations	90	307.11	16.41	***0.01**
	Do Not Meet Recommendations	127	18.35		
Total PA	Meet Recommendations	90	812.89	21.74	***0.01**
	Do Not Meet Recommendations	127	57.40		

*Denotes significance at 0.01

Discussion

The current study revealed that participants who reported high ratings of exercise barriers also reported high levels of autonomy, competence, and relatedness. The study also revealed that those participants who met the CDC weekly physical activity recommendations reported lower ratings of exercise barriers. Lastly, when comparing participants who met and did not meet PA recommendations, it was found that those who did not meet recommendations rated time, social influence, willpower, energy, and skill as the main barriers to exercise.

McDaniel (2012) found there were no differences in autonomy, competence, and relatedness among people who met and do not meet weekly physical activity recommendations. Similarly, participants in this study who met and did not meet the CDC's recommendations for weekly physical activity reported similar levels of autonomy, competence, and relatedness. It is interesting that participants who do not meet weekly physical activity requirements rate themselves as having similar levels of autonomy, competence, and relatedness as participants who meet the weekly physical activity requirements. These findings could have evolved because information about engaging in physical activity is widely available. This information enables most people to feel confident in their motivation and ability to engage in physical activity. According to Ross and Melzer (2016), having knowledge of physical activity recommendations does not influence adults' physical activity levels. Therefore, having knowledge and information about partaking in physical activity is not enough to get people motivated and engaged in physical activity.

This study also revealed that people who did not meet the CDCs weekly physical activity recommendations rated time, social influence, willpower, energy, and skill as the main barriers to exercise. Similar findings found that the barriers to being physically active include: lack of time, energy, willpower/motivation, and resources/money (Kulavic, Hultquist, & McLester, 2013; Lovell, El Ansari, & Parker , 2010; Ross & Melzer, 2016). People who overcome barriers and continuously participate in PA are more likely to set health-related goals and have a higher level of self-efficacy (Doerken, Umstattd, & McAuley, 2009; Lowry, Galuska, Fulton, Wechsler, Kann, & Collins, 2000; Petosa, Suminski, & Hortz, 2003). It is important for adults to create healthy goals and accomplish those goals, because that can build the motivation and confidence to continue healthy behaviors and overcome

Table 3.

Analysis of Variance between Barriers to Exercise among students meeting PA guidelines and those who did not

Barriers		*n*	*M*	*F*	*p*
Barriers to Exercise	Meet Recommendations	90	42.19	45.41	***0.00**
	Do Not Meet Recommendations	127	50.50		
Time	Meet Recommendations	90	7.23	19.84	***0.00**
	Do Not Meet Recommendations	127	8.61		
Social Influence	Meet Recommendations	90	7.23	33.18	***0.00**
	Do Not Meet Recommendations	127	8.61		
Energy	Meet Recommendations	90	7.61	27.28	***0.00**
	Do Not Meet Recommendations	127	9.12		
Willpower	Meet Recommendations	90	7.34	60.43	***0.00**
	Do Not Meet Recommendations	127	9.62		
Fear of Injury	Meet Recommendations	90	4.88	1.26	0.26
	Do Not Meet Recommendations	127	5.15		
Skill	Meet Recommendations	90	4.80	19.86	***0.01**
	Do Not Meet Recommendations	127	5.98		
Resources	Meet Recommendations	90	3.83	3.11	0.08
	Do Not Meet Recommendations	127	4.17		

*Denotes significance at 0.01

these barriers to exercise.

Participating in physical activity clearly takes more than just the knowledge of what, how, and why to engage. One conclusion from a systematic review of the literature on physical activity and SDT, found that having more intrinsic motivation or goals associated with exercise is associated with greater physical activity participation (Teixeira, Carraca, Markland, Silva, & Ryan, 2012). Health education and promotion professionals should help adults who do not engage in physical activity develop strategies that build self-regulation, self-efficacy, and intrinsic motivation, so they can overcome the barriers reported in this study as well as other studies. Health education and promotion professionals can start by helping people set more specific and realistic daily physical activity goals, start a physical activity journal, use an activity tracker to track daily physical activity, use an activity "app" to monitor physical activity, explain to people they should achieve a minimum of 10,000 steps per day, and identify specific barriers to participating in physical activity programs and how to overcome those barriers. These suggestions can help people gain motivation that is more self-regulated and intrinsically motivated.

Based on the information that is widely available, individuals might think they have to engage in vigorous physical activity for 30-45 minutes to receive any health benefits. Health education and promotion professionals could start by explaining that health benefits can be achieved through moderate exercise taking place throughout the day. The CDC (2015) explained people of all ages could improve the quality of their lives through a lifelong practice of moderate physical activity. You do not have to be training vigorously to receive health benefits from physical activity. Partaking in at least 30-45 minutes of moderate physical activity on a daily basis can reduce your risks of developing coronary heart disease, hypertension, colon cancer, and diabetes (CDC, 2015). Examples include numerous activities such as walking, hiking, bicycling, swimming, cleaning, gardening, kayaking, and many other activities. Additionally, it is important for adults to understand they do not have to engage in 30-45 minutes of moderate physical activity all at once. They can break it up into smaller time increments throughout the day. Meeting physical activity recommendations with moderately intense physical activity can help decrease the likelihood of health-related diseases associated with obesity.

Limitations

This study is reliant on self-reported responses concerning physical activity levels and participants might have reported higher or lower physical activity levels. Data could be misleading due to whether or not participants comprehended the definitions of moderate/vigorous activity. Another

important limitation was location. Surveys were only emailed to participants at one mid-sized university. Lastly, potential socially desirable responses should be listed as a limitation if a participant felt uncomfortable reporting low levels of physical activity or motivation ratings.

Conclusion

The participants in this study who do not meet the CDC's recommended weekly physical activity requirements have an unrealistic view of their motivation to partake in meeting the recommended physical activity requirements. Information may be widely available on how to meet these recommendations, but the results of this study might indicate that health education and promotion professionals need to do a better job of educating people on how to meet these physical activity recommendations. There are many ways for people to participant in physical activity on a weekly basis. First, it is important to know physical activity does not have to be a continuous 30-45 minute bout of vigorous physical activity in order to gain the benefits associated with exercising. Next, adults need to understand what activities (walking, swimming, gardening, biking, etc…) can be done to accomplish moderate physical activity and that doing moderate exercise throughout the entire day can be as beneficial as doing it all at once. Lastly and most importantly, people need to develop the motivation to overcome the barriers found in this study and numerous other studies. Motivation that is more self-regulated and intrinsically motivated will help inspire individuals to engage in physical activity more frequently.

References

Biddle, S., Gorely, T., & Stensel, D. (2004). Health-enhancing physical activity and sedentary behaviour in children and adolescents. *Journal of Sports Science, 22*(8), 679-701.

Center for Disease Control and Prevention (CDC). (2015). Physical activity and health: A report of the surgeon general. Retreived from: https://www.cdc.gov/nccdphp/sgr/

Center for Disease Control and Prevention (CDC). (2015). Adult physical activity and health: A report of the surgeon general. Retreived from: https://www.cdc.gov/nccdphp/sgr/adults.htm

Center for Disease Control and Prevention (CDC). (2016). Barriers to being active quiz. Retreived from: https://www.cdc.gov/diabetes/ndep/pdfs/8-road-to-health-barriers-quiz-508.pdf

Colditz, G. (1992). Economic costs of obesity. *American Journal of Clinical Nutrition, 55*, 503-507.

Colditz, G. & Wang, Y. (2008). *Economic costs of obesity*. Obesity Epidemiology. New York: Oxford University Press. Inc.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior.* New York, NY: Plenum.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*, 227-268.

Deci, E. L., & Ryan, R. M. (2002). *Handbook of self-determination research*. Rochester, NY: University of Rochester Press.

Dietz, W. (2004). Overweight in childhood and adolescence. *New England Journal of Medicine. 350*(9), 855-857.

Dishman, R., & Buckworth, J. (1996). Increasing physical activity: A quantitative synthesis. *Medicine & Science in Sports & Exercise, 28*, 706-719.

Doerken, S., Umstattd, R., & McAuley, E. (2009). Social cognitive determinants of moderate and vigorous physical activity in college freshman. *Journal of Applied Social Psychology, 39*(5), 1201-1213.

Egli, T., Bland, H. W., Melton, B. F., & Czech, D. R. (2011). Influence of age, sex, and race on college students' exercise motivation of physical activity. *Journal of American College Health, 59*, 399-406.

Ersoz, G. (2016). An examination of motivational regulations, dispositional flow, and social physique anxiety among college students for exercise: A self-determination theory approach. *College Student Journal, 50*(2), 159-170

Flegal, K., Graubard, B., Williamson, D., & Gail, M. (2005). Excess deaths associated with underweight, overweight, and obesity. *Journal of the American Medical Association, 293* (15), 1861-67.

Greaney, M. L., Less, F. D., White, A. A., Dayton, S. F., Riebe, D., Blissmer, B., Shoff, S., Walsh, J., & Greene, G. W. (2009). College students' barriers and enablers for healthful weight management: A qualitative study. *Journal of Nutrition Education and Behavior, 41*(4), 281-286. doi:10.1016/j.jneb.2008.04.354

Healthy People 2020. (2016). Physical activity objectives for 2020. Retrieved from: https://www.healthypeople.gov/2020/topics-objectives/topic/physical-activity/objectives

Helmerhorst, H., Brage, S., Warren, J., Besson, H., & Ekelund, U. (2012). A systematic review of reliability and objective criterion-related validity of physical activity questionnaires. *International Journal of Behavioral Nutrition and Physical Activity, 9*(103).

Koplan, J., Liverman, C., & Kraak, V. (2005). Committee on Prevention of Obesity in Youth. Preventing childhood obesity: Health in the balance: Executive summary. *Journal of the American Dietics Association. 105*(1), 131-138.

Kulavic, K., Hultquist C., & McLester, J. (2013). A comparison to motivational factors and barriers to physical activity among traditional versus nontraditional students. *Journal of American College Health, 61*(2), 60-66.

Lauderdale, M., Yli-Piipari, S., Irwin, C., & Layne, T. (2015). Gender differences regarding motivation for physical activity among college students: A self-determination approach. *The Physical Educator, 72,* 153-172.

Lovell G, El Ansari W, & Parker J. (2010). Perceived exercise benefits and barriers of non-exercising female university students in the United Kingdom. *International Journal of Environmental Research and Public Health, 7,* 784–798.

Lowry, R., Galuska, D. A., Fulton, J. E., Wechsler, H., Kann, L., & Collins, J. L. (2000). Physical activity, food choice, and weight management goals and practices among U.S. college students. *American Journal of Preventive Medicine, 18*, 18–27.

Maddison, R., Mhurchu, C., Jiang, Y., Vander Hoorn, S., Rogers, A., Lawes, C., & Rush, E. (2007). International Physical Activity Questionnaire: 12-country reliability and validity. *The International Journal of Behavioral Nutrition and Physical Activity, 4*

Maltby, J., & Day, L. (2001). The relationship between exercise motives and psychological well-being. *Journal of Psychology, 135*, 651-660.

McDaniel, T. (2012). Utilizing self-determination theory to assist in understanding college students' motivation for physical activity. *Electronic Theses & Dissertations.* 130. Retrieved from: http://digitalcommons.georgiasouthern.edu/etd/130

Ogden, C., Carroll, M., & Flegal, K. (2014). Prevalence of obesity in the United States. *Journal of American Medical Association, 312*(2), 189-190.

Ogden, C., Carroll, M., Kit, B., & Flegal, K. (2014). Prevalence of childhood and adult obesity in the United States, 2011-2012. *Journal of American Medical Association, 311*(8), 806-814.

Petosa, R. L., Suminski, R., & Hortz, B. (2003). Predicting vigorous physical activity using social cognitive theory. *American Journal of Health Behavior, 27,* 301–310.

The Robert Wood Johnson Foundation and the American Heart Association. (2005). A Nation at Risk: Obesity in the United States, A Statistical Sourcebook. *In: Amrican Heart Association.*

Ross, A. & Melzer, T. (2016). Beliefs as barriers to healthy eating and physical activity. *Australian Journal of Psychology, 68*, 251-260.

Standage, M., Scbire, S. J., & Loney, T. (2008). Does exercise motivation predict engagement in objectively assessed bouts of moderate-intensity exercise?: A self-determination theory perspective. *Journal of Sport & Exercise Psychology, 30*(4), 337-352.

Teixeira, P., Carraca, E., Markland, D., Silva, M., & Ryan, R. (2012). Exercise, physical activity, and self-determination theory: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity 2012, 9*, 78. Retrieved from http://www.ijbnpa.org/content/9/1/78

Thogerscn-Ntoumanis, C., & Ntoumanis, N. (2006). The role of self-determined motivation in the understanding of exercise-related behaviours, cognitions and physical self-evaluations. *Journal of Sports Sciences, 24*(4), 393-404.

Trogdon, J., Finkelstein, E., Hylands, T., Dellea, P., & Kamal-Bahl, S. (2008). Indriect cots of obesity: A review of the current literature. *Obestiy Review, 9*, 489-500.

United States Department of Health and Human Services. (2008). Physical activity guidelines for Americans. Retrieved from: http://www.health.gov/paguidelines/report/pdf/committeereport.pdf

Wilson, P.M., Rogers, W.T., Rodgers, W.M. & Wild, T.C. (2006). The psychological need satisfaction in exercise scale. *Journal of Sport & Exercise Psychology, 28*, 231-251.

This article may provide one
Continuing Education Contact Hour Opportunity for CHES (Approval Pending)
Instructions and self-study questions may be found on page 40

Become a Member of ESG

Professional Membership

Professionals active in the profession of health education and who hold a degree in the field can apply for membership through the Chapter-At-Large. A completed application, copy of official transcripts and an initiation payment of $75.00 must be submitted to the National Office for approval into the Chapter-At-Large. These items along with a check or money order made out to Eta Sigma Gamma can be sent to:

Eta Sigma Gamma
2000 University Ave., CL 325
Muncie, IN 47306

Student Membership

Students may apply for membership through an established collegiate chapter after the completion of two semesters or two quarters of college work and only after officially declaring a major or minor in health education. Students must also earn an overall grade point average of at least 2.7 (on a 4.0 grade point system) in one semester or quarter, followed by an average of at least 2.5 in the next semester or quarter to be eligible for membership. Initiates must also uphold the goals of the honorary by participating in events related to education/teaching, research, and service. In addition, each member must attend Chapter meetings, participate in at least one Chapter committee and pay an initiation fee of $50.00.