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Perceived Benefits and Barriers of Exercise in College Age Students Before and After Participating in Regular Exercise Comparted to a Cohort Group

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PERCEIVED BENEFITS AND BARRIERS OF EXERCISE IN COLLEGE AGE STUDENTS BEFORE AND AFTER PARTICIPATING IN REGULAR EXERCISE COMPARED TO A COHORT GROUP

A thesis submitted in partial fulfillment
of the requirements for the degree of
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By

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Abstract

The highest rate of decline in physical activity occurs in late adolescence and early adulthood (US Department of Health and Human Services, 2000). The lack of continuation of regular physical activity from adolescence to young adulthood has impact on morbidity and mortality rates in the United States. While the reason for this decline is not fully known, numerous studies have described both the benefits and barriers to exercise. In contrast, few studies have examined changes in benefits and barriers to exercise in college-aged students as a result of participating in a physical activity intervention. The purpose of this study was to examine the perceived exercise benefits and barriers of college aged students before and after participating in regular exercise. A quasi-experimental design was used. The Exercise Benefits/Barriers Scale (EBBS) is a reliable and valid instrument, and was given to participants prior to and after completing the Physical Activity and Christian Living (PACL) class at Cedarville University. In order to increase physical exercise in young adults, it is important to understand what can affect perceived benefits and barriers of exercise in adolescents. Within this context, the perceived benefits and barriers to exercise are important mediators of exercise behavior change (Lovell, Ansari, & Parker, 2010).

Keywords: perceived barriers, perceived benefits, exercise, college age students

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Chapter 1: Introduction and Literature Review

The highest rate of decline in physical activity occurs between the ages of 18 to 24 years (US Department of Health and Human Services, 2000). The lack of continuation of regular physical activity from adolescence to young adulthood has had a significant impact on morbidity and mortality rates in the United States. In 2010 three out of the four leading causes of death in the United States were coronary heart disease, cancer, and stroke (Center for Disease Control and Prevention, 2012). A significant number of premature deaths in these areas can be avoided through healthy lifestyle changes, such as adoption of regular physical activity (Bozorgmehri, 2012).

There are widespread awareness campaigns highlighting the benefits of regular exercise. For example, in 2002 the Centers for Disease Control and Prevention launched the VERB campaign to encourage children aged 9 to 13 years to be physically active every day (Huhman et al., 2010). Despite awareness campaigns, data suggest most adults and children are not active enough to positively affect their health (Bozorgmehri, 2012). Healthy People 2020 (2013) stated that, "More than 80 percent of adults do not meet the guidelines for both aerobic and muscle-strengthening activities. Similarly, more than 80 percent of adolescents do not do enough aerobic physical activity to meet the guidelines for youth. Working together to meet Healthy People 2020 targets via a multidisciplinary approach is critical to increasing the levels of physical activity and improving health in the United States" (p. 1). Regular physical activity can improve the health and quality of life of all ages, regardless of the presence of a chronic disease or disability ("Physical Activity," 2013). Among adults and older adults, physical activity can lower the risk of: early death, coronary heart disease, stroke, high blood pressure, type 2 diabetes, breast and colon cancer, falls, and depression ("Physical Activity," 2013). Among children and

adolescents, physical activity can: improve bone health, improve cardiorespiratory and muscular fitness, decrease levels of body fat, and reduce symptoms of depression ("Physical Activity," 2013).

In order to increase physical exercise in young adults, it is important to understand what can affect perceived benefits and barriers of exercise in adolescents. Previous studies have shown a strong correlation between exercise benefits and regular exercise (Grubbs & Carter, 2002; Kennedy, DeVoe, Skov, & Short-DeGraff, 1998). Within this context, the perceived benefits and barriers to exercise are important mediators of exercise behavior change (Lovell, Ansari, & Parker, 2010).

Literature Review

In 2010 the perceived benefits and barriers to exercise was reported in 200 British non-exercising female university students using the Exercise Benefits/Barriers Scale (EBBS) (Lovell, Ansarim, & Parker). These researchers reported the greatest perceived benefit from exercise as *physical performance* followed by the benefits of *psychological outlook*, *preventive health*, *life enhancement*, and finally, *social interaction*. The greatest perceived barrier to exercise was *physical exertion*, which was rated significantly higher than *time expenditure*, *exercise milieu*, and *family discouragement*. The implications of this study was that when encouraging exercise in female college students, the benefits of enhanced physical performance and psychological outlook should be presented, along with how the exerciser can deal with the discomfort associated with physical exertion. One of the main limitations of this study was that only female students representing a narrow age range were studied. (Lovell et al., 2010).

In 2002 (Tergerson and King) posed the question "Do perceived cues, benefits, and barriers to physical activity differ between male and female adolescents?" The study's

multivariate analyses of covariance revealed that perceived cues, benefits, and barriers to physical activity differed significantly based on gender. The authors of this study recommended specific gender-based strategies to increase male and female adolescent physical activity levels be offered. A limitation to this study was that there was no non-exercising control group. (Tergerson & King, 2002)

An older, but well-conducted experimental study (Kennedy et al., 1998) examined barriers and benefits to exercise using the EBBS along with exercise adherence in a group of sedentary minority women before and after a nine-month, biweekly education and exercise program. Fifty sedentary Mexican American women participated in the intervention, and results were compared to a non-exercising control group. Compared to Mexican American and Caucasian control groups, the experimental participants displayed significant increases in the benefits score, and a significant decrease in the barriers score (Kennedy et al., 1998). It is of note that the effect size from this study was calculated at 0.97.

Finally, in 2002 using a descriptive correlational design, Grubbs and Carter examined the relationship of perceived benefits and barriers to reported exercise behaviors in college undergraduates. The research analysis used elements of descriptive statistical methods, such as frequency distributions of responses to different areas of the EBBS. Correlations between the most frequently cited perceived benefits and barriers to exercise and current exercise habits were described using analysis of variance (ANOVA), chi-square analysis, and independent t-test analysis. These researchers reported a significant positive correlation between perceived benefits to exercise and current exercise habits; and a significant negative correlation between perceived barriers to exercise and current exercise habits. These researchers also suggested that a greater understanding of perceived benefits and barriers to exercise may assist health care providers and

educators to establish methods for promoting exercise for the improved physical and mental health of a college-age population. (Grubbs & Carter, 2002)

Summary

Although several studies have described the benefits and barriers to exercise, only one experimental study has been conducted that examines changes in the barriers and benefits of exercise before and after an exercise program (Kennedy et al., 1998). Furthermore, the stated purpose of the Kennedy et al. study (1998) was to examine attitude changes and exercise adherence in a group of sedentary minority women. Because of this study's limited generalizability and its date of publication, further research needs to be conducted (Kennedy et al. 1998).

Numerous studies have been done focusing on perceived benefits and barriers of exercise in populations with: chronic illnesses (Stroud, Minahan, and Sabapathy, 2009), terminal diseases (Blaney et al., 2010), chronic pain (Crowley and Kennedy, 2009), and mental illness (Ussher, Stanbury, Cheeseman, and Faulkner, 2007). Studies have also been conducted that compared physical activity among different populations based on age, sex and ethnicity (Lovell, Ansari, and Parker, 2010; Tergerson and King, 2002; Kennedy et al., 1998). However, no studies published to date have examined both benefits and barriers to exercise before and after a physical activity intervention in college aged students.

Such a gap in knowledge related to the perceived benefits and barriers to exercise for college aged students not only represents a specific under-researched population, but hinders the development of successful exercise strategies targeting this population. Therefore, the purpose of this study is to examine the perceived exercise benefits and barriers of college aged students before and after participating in regular exercise compared to a cohort group.

Chapter 2: Theoretical Framework

Theoretical Framework

The Health Belief Model (HBM) is a theoretical model that researchers and health care providers have used to try and predict health behaviors (Green & Kreuter, 2005). Originally developed in the 1950s, and updated in the 1980s, the HBM was developed by a group of U.S. Public Health Service social psychologists for the purpose of preventing and detecting disease (Green & Kreuter, 2005).

The HBM was spelled out in terms of four constructs representing the perceived threat and net benefits: perceived *susceptibility,* perceived *severity,* perceived *benefits,* and perceived *barriers.* These concepts were proposed as accounting for people's "readiness to act." An added concept, *cues to action,* was theorized to activate that readiness and stimulate overt behavior. A recent addition to the HBM was the concept of *self-efficacy,* or one's confidence in the ability to successfully perform an action. This concept was added to help the HBM better fit the challenges of changing habitual unhealthy behaviors, such as being sedentary, smoking, or overeating. (Von, Ebert, Ngamvitroj, Parj, & Kang, 2004)

The HBM postulates that a person's willingness to change their health behaviors is primarily due to the following factors: perceived susceptibility, perceived severity, perceived benefits, and perceived barriers (Green & Kreuter, 2005). However, there are modifying factors that can affect behavior compliance (Green & Kreuter, 2005). Modifying factors could include media, health professional, personal relationships, incentives, and self-efficacy of recommended health action (Green & Kreuter, 2005). For the purpose of this study, the two constructs that were examined were perceived benefits and perceived barriers. This theoretical framework proposes that the likelihood that an individual will engage in a health behavior, such as exercise,

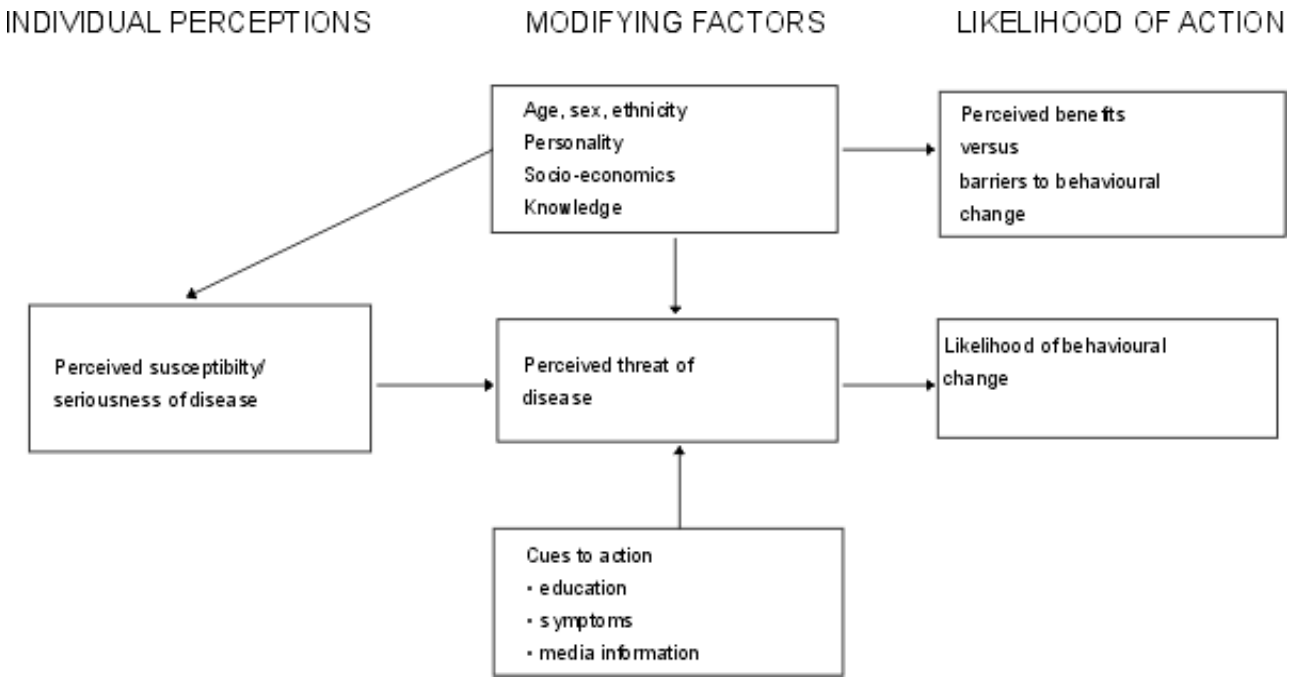
depends largely on perceived magnitude of the barriers against being physically active, and their perceived benefits to being physically active.

Perceived benefits. The definition of perceived benefits associated with the HBM is, "belief in the efficacy of the advised action to reduce risk or seriousness of impact" (*Theory at a Glance*, 1995, p.14). The construct of perceived benefits for exercise is slightly different than the original definition associated with disease prevention. Benefits of physical activity are defined as a person's "perceptions of positive and enjoyable outcomes of this behavior" (Juarbe, Turok, & Pérez-Stable, 2002, p.3). The original definition of perceived benefits was a belief that taking action (e.g. mammography screening) would reduce susceptibility to the condition (breast cancer) or its severity (early detection). Because exercise requires long-term behavior change and is not necessarily linked with a specific disease, the benefits of exercise tend to focus more in feeling better mentally and physically, having more endurance, and being able to engage in activities of daily living without difficulty. For the purpose of my study, I conceptually defined perceived benefits for exercise as a person's opinion of the value or usefulness of exercise for improving physical and mental health. Perceived benefits play an important role in the adoption of secondary prevention behaviors. (Glanz, Rimer, & Lewis, 2002)

Perceived barriers. The definition of perceived barriers associated with the HBM is, "the tangible and psychological costs of the advised action" (*Theory at a Glance*, 1995, p.14). The construct of perceived barriers for exercise is slightly different when associated with exercise and is described as "those factors that were perceived as problems, challenges, or difficulties within their own gender, physical, and sociocultural realities" (Juarbe, Turok, & Pérez-Stable, 2002, p.3). Since change is not something that comes easily to most people, the last construct of the HBM addresses the issue of perceived barrier to change. This is an individual's

own evaluation of the obstacles in the way of him or her adopting a new behavior. Of all the constructs, perceived barriers are the most significant in determining behavior change (Glanz, Rimer, & Lewis, 2002). For the purpose of this study, I conceptually defined the barriers to exercise as the tangible and psychological costs of exercise.

Figure 1: Health Belief Model.



(Glanz, Rimer, & Lewis, 2002)

The evidence from previous work is quite clear that as the perceived benefits of exercise increase, the perceived barriers to exercise decrease (Kennedy et al., 1998). This results in a negative correlation between the perceived benefits of exercise and the perceived barriers to exercise. Furthermore, exercise behavior is significantly related to increasing perceived benefits and decreasing perceived barriers for exercise. Therefore, the HBM was used as a guiding framework for this study.

Chapter 3: Methodology

Design

The research design for this study was a quasi-experimental pre-test post-test control group design.

Sample

A convenience sample of 33 undergraduate Cedarville University students was recruited through email. The only inclusion criterion was enrollment in the summer or fall PACL courses at Cedarville University. Those enrolled in the summer course made up the intervention group, and those enrolled in the fall course made up the cohort control group. Based on the major, gender, and student designation (freshman, sophomore etc) of the intervention group, a matched control group was hand selected by the primary researcher. There were no specific exclusion criteria as all students enrolled in the summer PACL course were recruited for the study. Permission to survey the students in PACL was given by Dr. Evan Hellwig, the course instructor and the Chair, Department of Kinesiology and Allied Health (see Appendix A).

The sample size for this study was determined by conducting a power analyses. Using an effect size of 0.97 (Kennedy et al., 1998), an alpha of .05, and beta of 0.80, the calculated sample size is 15 per group. There were 33 participants that took the pre-test survey; 13 were in the intervention group and 20 were in the control group. 27 of the 33 took the post-test survey after taking part of an exercise regimen. Of those 27, 11 were in the intervention group and 16 were in the control group.

Instrument

The Exercise Benefits/Barriers Scale (EBBS) was selected as the measurement tool. The EBBS was developed in response to a need for an instrument to determine perceptions of

individuals concerning the benefits of and barriers to participating in exercise (Sechrist, Walker, & Pender, 1987). Items for the scale were obtained inductively from interviews and from the literature. The resulting instrument has been tested for internal consistency, validity of its constructs, and test-retest reliability (Sechrist et al., 1987). A sample of 650 individuals, primarily from northern Illinois, responded to the instrument. Calculation of Cronbach's alpha for the 43-item instrument yielded a standardized alpha of .954 (Sechrist, Walker, & Pender, 1987). The 29-item Benefits Scale has a standardized alpha of .954 and the 14-item Barriers Scale has a standardized alpha of .866 (Sechrist, Walker, & Pender, 1987). Factor analysis yielded a nine-factor solution initially with an explained variance of 65.2%. Second order factor analysis yielded a two-factor solution, one a benefits factor and the other a barriers factor (Sechrist, Walker, & Pender, 1987). Test-retest reliability was accomplished with a sample of 66 healthy adults at a two-week interval (Sechrist, Walker, & Pender, 1987). Test-retest reliability was found to be .89 on the total instrument, .89 on the Benefits Scale and .77 on the Barriers Scale (Sechrist, Walker, & Pender, 1987). Permission to use this scale was give by Karen R. Sechrist, PhD, RN, FAAN for Pender/Walker/Sechrist (see Appendix B).

The instrument has a four-response, forced-choice Likert-type format with responses ranging from 1 (strongly disagree) to 4 (strongly agree). Missing data was handled by calculating the mean number for the question unanswered. Scores on the total instrument can range from 43 to 172. The higher the score, the more positively the individual perceives exercise.

The EBBS questionnaire was given to both the intervention and control groups on May 14, 2013, and again on August 2, 2013. These dates corresponded with the beginning and ending of the summer session PACL course.

Intervention

While taking PACL students were required to participate in twelve weeks of physical activity, at least four days per week. Ideally, the students were to use two of the days to partake in aerobic activity (at least 30 minutes of continuous activity) and two days of strength training type exercises (ten different exercises that address both upper and lower body major muscle groups).

Data Collection

The participants had a chance to complete the EBBS questionnaire on surverymonkey.com between May 14 and May 30, 2013. The link to this survey was emailed to them along with instructions and a brief description about the study (Appendix C). The EBBS was again taken by the same participants between August 2 and August 11, 2013. Data analysis was conducted immediately following final data collection.

Data Analysis

Since the measurement tool has a likert-type format, the data was treated as interval/ratio level data. Demographics were analyzed using means, standard deviations, and percentages. Differences between and within groups were determined using t-tests and chi-square analysis. All data was analyzed using SPSS for windows. The alpha was set at 0.05.

Ethical Considerations

Approval to conduct this study was received from the CU Institutional Review Board. No harm occurred to any participant of this study, and students were assured that participation or refusal to participate would not affect their course grade. The participants were offered an incentive for taking the survey. If participants took the survey both before the PACL class and at the end of PACL they received a five dollar gift card to Chipotle. The measurement tool is a self-

reporting questionnaire which was completed in the privacy of the participants own homes. All returned questionnaires were kept confidential. The survey was anonymous to everyone but the primary investigator. All data was reported in aggregate with no participant identifiers to maintain confidentiality.

Chapter 4: Results

Demographics

Participants in both the intervention and control groups were asked seven demographic questions: (1) gender, (2) age, (3) race, (4) current state of physical health, (5) involvement in a sport as a child or young adult, (6) days in an average week they participated in some form of exercise, and (7) time spent exercising on the days that they did. The demographic questions were presented in a forced-choice likert-type format at the end of the survey. On the question asking about current state of physical health, the participant was given the options of excellent, good, or poor. Excellent was described as "no health problems". Good was described as "some minor or chronic issues, but non-debilitating issues". Poor was described as "it is not safe for me to exercise with my current state of physical health".

There were no significant demographic differences between groups (see Table 1). The majority of both groups were female (92% intervention and 85% control); the mean age of both groups was about 19 years; and there was ethnic heterogeneity across both groups with primarily Caucasian participants. The vast majority (75%) of students claimed to be in excellent health, with the rest identifying themselves as being in good health. Across both groups at baseline, 60-70% of the students already exercised 3 or more times per week, and over 90% exercised 15 minutes or more when they did exercise. One hundred percent of participants were already exercising at least 1-2 days per week at baseline. Twenty seven participants took the posttest; 11 in the intervention and 16 in the control group. Attrition was 18% across both groups

TABLE 1. Demographic Comparison of Intervention Group and Control Group

	Intervention n =13	Control n =20	Between group difference p
Gender	Male: 8% (1) Female: 92% (11)	Male: 15% (3) Female: 85% (17)	.530
Age	18yrs: 23% (3) 19yrs: 77% (10)	18yrs: 20% (4) 19yrs: 60% (12) 20yrs: 10% (2) 21yrs: 5% (1) 22yrs: 5% (1)	.562
Race	African Amer: 7.69% (1) Hispanic: 7.69% (1) Caucasian: 84.62% (11)	Middle Eastern: 5% (1) Caucasian: 95% (19)	.282
Physical Health	Excellent: 76.92% (10) Good: 23.08% (3) Poor: 0% (0)	Excellent: 75% (15) Good: 25% (5) Poor: 0% (0)	.900
Past involvement in sports	Yes: 84.62% (11) No: 15.38% (2)	Yes: 65% (13) No: 35% (7)	.216
Days exercised per week	None: 0% (0) 1-2: 30.77% (4) 3-4: 46.15% (6) 5-6: 7.69% (1) Every day: 15.38% (2)	None: 0% (0) 1-2: 40% (8) 3-4: 45% (9) 5-6: 15% (3) Every day: 0% (0)	.307
Time spent when exercising	0-15min: 7.69% (1) 15-30min: 7.69% (1) 30-45min: 30.77% (4) 45min-1hr: 30.77% (4) >1hr: 23.08% (3) I do not exercise: 0% (0)	0-15min: 5% (1) 15-30min: 25% (5) 30-45min: 45% (9) 45min-1hr: 25% (5) >1hr: 0% (0) I do not exercise: 0% (0)	.164

Between Groups Differences

Adherence to the physical activity program set in place by the PACL course was assumed by the 11 members of the experimental group who took the posttest. There were no between group differences on the pretest or posttest scores when comparing the total score, the barriers subscale score, or the benefits subscale score (see Table 2).

Within Groups Differences

For both the experimental and the control groups the barriers subscale significantly decreased (p = .000), the benefits subscale significantly decreased (p = .000), and the total score significantly decreased (p = .000) (See Table 2).

TABLE 2. Means of EBBS Scores Intervention and Control Groups

	Group	Pretest	10 weeks	Within group difference
EBBS Benefits	Experimental	94 +/- 11	91 +/- 9.5	p = .000
	Control	91 +/- 12.5	88.5 +/- 9.5	p = .000
	Between Group Difference	p = .48	p = .54	
EBBS Barriers	Experimental	29 +/- 5.5	26.5 +/- 4	p = .000
	Control	29.5 +/- 7.	28 +/- 5	p = .000
	Between Group Difference	p = .74	p = .32	
EBBS Total	Experimental	134.5 +/- 14.5	134 +/- 10.5	p = .000
	Control	131 +/- 18	130 +/- 13	p = .000
	Between Group Difference	p = .58	p = .50	

Chapter 5: Discussion

This study shows that in a heterogenic group of primarily Caucasian mid-western female college students, exercise is viewed as very beneficial with few barriers. More specifically, it shows that for those who are already exercising, the perceived benefits of exercise are high and the total EBBS scores are high. While the analysis showed that both groups had a statistically significant decrease in their benefits (about 3 points), barriers (about 2 points), and total EBBS scores (<1 point) at posttest, we believe these are spurious and of no clinical significance. When comparing the results of this study to the exemplar study conducted in 1998 by Kennedy et al. there are crucial differences that may account for the lack of significant change in the EBBS scores. First, across groups the mean pretest total and the benefits subscale scores were already high considering that the highest possible total score is 172. When compared to the Kennedy et al (1998) study, *their participants* reached a total EBBS score of about 135 *after a 9-month exercise intervention*, while *our group* entered this study with a *total EBBS of 135 at baseline*. The clinical implication is that in our study there was no room for improvement in the total or benefits subscale scores.

TABLE 3. Comparing Means to Previous Published Study

	Kennedy et al (1998) Post test scores	**Current study** Pretest scores
Benefits subscale	99.71 +/- 5.81	93.97+/-10.93
Total EBBS score	135.46 +/- 9.01	134.60+/-14.46

Second, the participants of this study had a mean age of 19 years compared to the mean age of 60 years for participants in the Kennedy et al. (1998) study. The clinical implication is that our participants' level of activity has not yet started to decline. Although it has been

reported that the highest rate of decline in physical activity occurs in late adolescence and early adulthood in those age 18-24 years, the results of this study suggest that the critical years may occur after college graduation when individuals are not in school, perhaps for the first time in their lives (Grubbs & Carter, 2002).

Third, there was a difference in the participants' physical activity level prior to the intervention. In the Kennedy et al. (1998) study, participants were *required to be sedentary* in their physical activity prior to the investigation. Sedentary status was determined by subject completion of a health risk appraisal and personal interview. In this study, *100% of the participants in both groups were exercising at least 1-2 days per week at baseline*. This study is consistent with research that shows EBBS scores are high for those who are exercising

Fourth, in this study 77% of the participants in the experimental group claimed to be in "excellent" physical health and 85% of the participants stated that had been involved in sports in high school. While participants' current health status was not reported in the Kennedy et al. (1998) study, it may be safe to assume that in a sedentary older female population, they may not have all been in "excellent" health.

Implications for practice

Because the participants of this study scored so high on the total and benefits scales, we decided to investigate the barriers to exercise that they identified, The top three perceived barriers were (1) Exercise tires me ($\bar{x}$ = 2.6), (2) Exercising takes too much of my time ($\bar{x}$= 2.4), and (3) Exercise is hard work for me ($\bar{x}$ = 2.3). An implication for practice is that the APN should focus on the benefits and overcoming the top three barriers with this group. The APN can help the patient create strategies to overcome these barrier to exercise and help them make physical activity part of their daily life. The APN should follow up with the patients and see how

they are doing like the following scenario, "*I want you to start an exercise plan in the treatment of [insert disease condition]. When I see you for review of your health problems and medication, I will also be reviewing the effectiveness of regular exercise in helping you to manage your disease/condition"* (Khan, 2012).

Strengths and limitations

The research design is a strength. This was a quasi-experimental pre-test post-test control group design, which has never been done with this demographic using the EBBS scale. Furthermore, the measurement tool was reliable and valid. The EBBS has been tested for internal consistency (>.80), validity of its constructs, and test-retest reliability (>.70). The limitations of this study were the heterogeneity of the sample and the small sample size. The sample was predominantly Caucasian female students from the Midwest, between 18 and 19 years, who claimed to be in excellent physical health and already exercising. This decreases the generalizability of the study.

Further research

Based on the results this empirical study, two suggestions for further research are made. First, it would be valuable to conduct a long-term study to better understand *when physical activity begins to decline* in this demographic and identify the antecedents to physical activity decline. Second, it would be beneficial to conduct a similar study with a different demographic of college student and/or young adult. We believe that the high level of activity reported by these participants is not consistent with many other groups of young adults, and further research is warranted (Grubbs & Carter, 2002).

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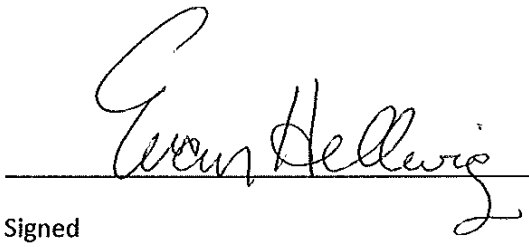
APPENDIX A

I Evan Hellwig give Abby Pippin permission to survey the students on the roster for the 2013 Summer Online PACL course.



Signed

4-22-13

Date

APPENDIX B

Health Promotion Model Instrumentation Group

Nola J. Pender, PhD, RN, FAAN • Susan Noble Walker, EdD, RN, FAAN • Karen R. Sechrist, PhD, RN, FAAN

Dear Colleague:

Thank you for your interest in the Exercise Benefits/Barriers Scale (EBBS). The EBBS was developed in response to a need for an instrument designed to determine perceptions of individuals concerning the benefits of and barriers to participating in exercise. Items for the scale were obtained inductively from interviews and from the literature.

The EBBS is a 43-item summated rating scale consisting of two subscales, Benefits and Barriers. Ratings are obtained using a four-point response system. The EBBS has been tested for internal consistency, validity of its constructs, and test-retest reliability. A sample of 650 individuals over 18 years of age, primarily from northern Illinois, participated in the initial testing of the EBBS. Calculation of Cronbach's alpha for the 43-item instrument yielded a standardized alpha of .954. The 29-item Benefits Scale has a standardized alpha of .954 and the 14-item Barriers Scale has a standardized alpha of .866. Factor analysis yielded a nine-factor solution initially with an explained variance of 65.2%. Second order factor analysis yielded a two-factor solution, one a benefits factor and the other a barriers factor. Test-retest reliability was accomplished with a sample of 66 healthy adults at a two-week interval. Test-retest reliability was found to be .89 on the total instrument, .89 on the Benefits Scale and .77 on the Barriers Scale. Additional information on the development and initial testing of the EBBS can be found at in the following article:

> Sechrist, KR, Walker, SN, and Pender, NJ. (1987). Development and psychometric evaluation of the Exercise Benefits/Barriers Scale. *Research in Nursing & Health, 10,* 357-365.

You have our permission to download and use the EBBS for non-commercial data collection purposes such as research or evaluation projects as long as the following conditions are met:

- The EBBS will be used without any modifications other than translation into a language other than English (see information on translation, if required);
- The copyright statement will appear on the bottom of all copies of the EBBS; and
- All study participants will be over 18 years of age since the EBBS was not validated in younger populations.

another language may place their name as translator following the copyright statement.

The EBBS may be reproduced in the appendix of a dissertation, thesis, or research grant proposal. Reproduction for any other purpose, including publication of study findings, is prohibited.

A copy of the EBBS with scoring information is available for download. A Spanish translation of the EBBS is also available. If you need additional information, you may contact Dr. Karen Sechrist by e-mail (krsech@pacbell.net).

Best wishes with your research,

Karen R. Sechrist, PhD, RN,
FAAN for
Pender/Walker/Sechrist

APPENDIX C

EXERCISE BENEFITS/BARRIERS SCALE

DIRECTIONS: Below are statements that relate to ideas about exercise. Please indicate the degree to which you agree or disagree with the statements by circling SA for strongly agree, A for agree, D for disagree, or SD for strongly disagree.

		Strongly Agree	Agree	Disagree	Strongly Disagree
1.	I enjoy exercise.	SA	A	D	SD
2.	Exercise decreases feelings of stress and tension for me.	SA	A	D	SD
3.	Exercise improves my mental health.	SA	A	D	SD
4.	Exercising takes too much of my time.	SA	A	D	SD
5.	I will prevent heart attacks by exercising.	SA	A	D	SD
6.	Exercise tires me.	SA	A	D	SD
7.	Exercise increases my muscle strength.	SA	A	D	SD
8.	Exercise gives me a sense of personal accomplishment.	SA	A	D	SD
9.	Places for me to exercise are too far away.	SA	A	D	SD
10.	Exercising makes me feel relaxed.	SA	A	D	SD
11.	Exercising lets me have contact with friends and persons I enjoy.	SA	A	D	SD
12.	I am too embarrassed to exercise.	SA	A	D	SD
13.	Exercising will keep me from having high blood pressure.	SA	A	D	SD
14.	It costs too much to exercise.	SA	A	D	SD
15.	Exercising increases my level of physical fitness.	SA	A	D	SD
16.	Exercise facilities do not have convenient schedules for me.	SA	A	D	SD
17.	My muscle tone is improved with exercise.	SA	A	D	SD
18.	Exercising improves functioning of my cardiovascular system.	SA	A	D	SD
19.	I am fatigued by exercise.	SA	A	D	SD
20.	I have improved feelings of well being from exercise.	SA	A	D	SD
21.	My spouse (or significant other) does not encourage exercising.	SA	A	D	SD

(Continued on reverse side)

		Strongly Agree	Agree	Disagree	Strongly Disagree
22.	Exercise increases my stamina.	SA	A	D	SD
23.	Exercise improves my flexibility.	SA	A	D	SD
24.	Exercise takes too much time from family relationships.	SA	A	D	SD
25.	My disposition is improved with exercise.	SA	A	D	SD
26.	Exercising helps me sleep better at night.	SA	A	D	SD
27.	I will live longer if I exercise.	SA	A	D	SD
28.	I think people in exercise clothes look funny.	SA	A	D	SD
29.	Exercise helps me decrease fatigue.	SA	A	D	SD
30.	Exercising is a good way for me to meet new people.	SA	A	D	SD
31.	My physical endurance is improved by exercising.	SA	A	D	SD
32.	Exercising improves my self-concept.	SA	A	D	SD
33.	My family members do not encourage me to exercise.	SA	A	D	SD
34.	Exercising increases my mental alertness.	SA	A	D	SD
35.	Exercise allows me to carry out normal activities without becoming tired.	SA	A	D	SD
36.	Exercise improves the quality of my work.	SA	A	D	SD
37.	Exercise takes too much time from my family responsibilities.	SA	A	D	SD
38.	Exercise is good entertainment for me.	SA	A	D	SD
39.	Exercising increases my acceptance by others.	SA	A	D	SD
40.	Exercise is hard work for me.	SA	A	D	SD
41.	Exercise improves overall body functioning for me.	SA	A	D	SD
42.	There are too few places for me to exercise.	SA	A	D	SD
43.	Exercise improves the way my body looks.	SA	A	D	SD

APPENDIX D

Email sent to selected participants:

"Hello (participants name),

My name is Abby Pippin and I am an RN and also a current Graduate student here at Cedarville University. I am currently working on my thesis for the Family Nurse Practitioner program. Data suggest most adults and children are not active enough to positively affect their health. I have selected you to help me, and science, better understand what can affect perceived benefits and barriers of exercise in adolescents, in order to increase physical exercise in young adults. I ask that you please take this short survey prior to starting your PACL course. Towards the end of your class the same link will be emailed to you and you will take the same questionnaire again. Completing this survey is not a requirement of the PACL course and will in no way be reflected in your course grade. If you do complete this survey prior to the course and at the end of the course, a $5 gift card to Chipotle will be given to you as a thank you for helping me.

Thanks,

Abby J. Pippin