UNIVERSITY OF WISCONSIN-LA CROSSE

Graduate Studies

SOCIAL NETWORKING AND PHYSICAL ACTIVITY LEVELS AMONG YOUNG ADULTS

A Manuscript Style Thesis Submitted in Partial Fulfilment of the Requirements for the Degree of Exercise and Sport Science: Physical Education Teaching

Celia DeVitis

College of Science and Health

Exercise and Sport Science: Physical Education Teaching

Emphasis on Adventure Education

May, 2018

SOCIAL NETWORKING AND PHYSICAL ACTIVITY

LEVELS AMONG YOUNG ADULTS

By Celia DeVitis

We recommend acceptance of this thesis in partial fulfillment of the candidate's requirements for the degree of Physical Education Teaching: Adventure Emphasis

The candidate has completed the oral defense of the thesis.

Dr. Zack Beddoes, Ph.D. Thesis Committee Chairperson	4.23.18 Date
Dr. Debra Sazama, Ed.D. Thesis Committee Member	4.23.18 Date
Dr. Teresa Hepler, Ph.D. Thesis Committee Member	4-23-18 Date

Thesis accepted

Meredith Thomsen, Ph.D. Graduate Studies Director	5-22-18 Date

ABSTRACT

DeVitis, C. C. Social networking and physical activity levels among young adults. MS in Exercise and Sport Science, Physical Education Teaching, May 2018, 58pp. (Z. Beddoes)

This study examined how posting daily pictures of physical activity (PA) to social networking sites (SNS), influenced young adults PA levels and motivational profiles. Participants (N = 58) were 18-22 years of age. The 2-week intervention consisted of group A (SN group) uploading pictures of themselves working out on their Instagram account, while group B (Non-SN group) did not upload pictures. Both groups kept a daily PA log, and tracked steps taken, calories burned, and distance traveled using an OMRON Walking Style Pedometer. The Exercise Regulation Questionnaire (BREQ-2), was distributed on days 4, 7, and 10 to determine if posting to SNS influences intrinsic motivation (IM). Results indicated a significant difference within and between group intervention $t(50) = -3.044$, $p = 0.004$, indicating a greater increase in PA for the SN group, than the non-SN group. Findings also indicated that IM was the most significant predictor of PA while focusing on young adults' psychological needs for competence, autonomy, and relatedness support. In conclusion, posting PA pictures to SNS can increase PA levels, as well as moving young adults' motivational profiles along the continuum towards being more IM to engage in PA.

ACKNOWLEDGMENTS

I would first like to thank my advisor Dr. Zack Beddoes for his unlimited help, support and encouragement. I would not have accomplished this without his dedication to see me succeed. Special thanks to my other committee members Dr. Debra Sazama and Dr. Teresa Hepler who assisted myself, and gave great feedback to better our study.

I would also like to thank my number one fans: my Mom, and two sisters Amanda and Dana. Without you guys cheering me on, this would not have been possible. Finally, I would like to thank my Dad for giving me the strength to achieve my goals and aspirations. Whether it be in my academic or personal life, your guidance is what pushes me forward.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF APPENDICES

INTRODUCTION

Declining Rates of Physical Activity

Declining rates of physical activity (PA) among children and young adults (Troiano et al. 2008; Strong et al., 2005) is problematic given the link between physical inactivity and adverse health concerns such as, diabetes, hypertension, stroke and cardiovascular disease (National Health Center for Health Statistic, 1997). Studies support the need for regular PA in the prevention of cardiovascular disease, and as many as 25 different chronic diseases in individuals of all ages (McGavock, Anderson & Lewanczuk, 2006; Chakravarthy & Booth, 2004). As a response to these concerns, the 2008 Physical Activity Guidelines recommend adults participate weekly in 150 minutes of moderate PA, 75 minutes of vigorous PA, or a combination of the two. Muscle-strengthening activities of a moderate to vigorous (MVPA) nature involving all major muscle groups should be performed at least two or more days per week. Yet, notwithstanding the benefits of regular PA engagement (e.g., increased aerobic fitness, healthier body composition, skeletal health), only 20% of adults meet the recommendations (Centers for Disease Control and Prevention).

Self-Determination Theory and Physical Activity

Given the low percentage of individuals choosing to engage in healthful levels of PA, Self-Determination Theory (SDT; Ryan & Deci, 1985) has commonly guided research efforts in exploring why some individuals are more physically active than others (Sun & Chen, 2010). Within the SDT framework, motivation lies on a continuum ranging

from amotivation to intrinsic motivation. See figure 1. Amotivation (AM) is characterized by an absence of value for an activity, which generally results in the lack of identification to the task. Extrinsic motivation (EM) consists of behavior that is driven by external factors, where individuals feel compelled to accomplish a task for tangible rewards or to avoid punishment. Specifically, EM is comprised of four sub-constructs: external regulation, introjected regulation, identified regulation, and integrated regulation. External regulation refers to involvement in an activity to gain rewards or to avoid punishment (Barkoukis, Tsorbatzoudis, Grouios & Sideridis, 2008), and is the most representative type of EM. Introjection refers to a more internalized involvement with an activity, which oneself is more involved. The individual is beginning to internalize the reasons for his/her actions but is not fully self-determined in a given task. Identified regulation represents behaviors that are valued, and considered important. This sub-construct is a more self-determined type of EM, because engagement is perceived as a choice. Lastly, integrated regulation refers to the most self-determined type of EM. Although behavior is still performed for external reasons, an individual motivated by integrated regulation considers the activity as goal-directed (Barkoukis et al., 2008). Intrinsic motivation (IM) denotes engagement in an activity for enjoyment in the activity itself. Figure 1 shows the motivation continuum, and how each motivational regulator becomes more self-determined as you move towards the right. Movement along the motivational continuum is done as in individual becomes more self-determined. The concept of internalization describes how one's motivation for behavior can range from amotivation, to passive compliance, to active personal commitment (Deci, 2000). Deci describes that when increased internalization is achieved, greater persistence, more

positive self-perceptions become apparent, and better quality of engagement is accomplished.

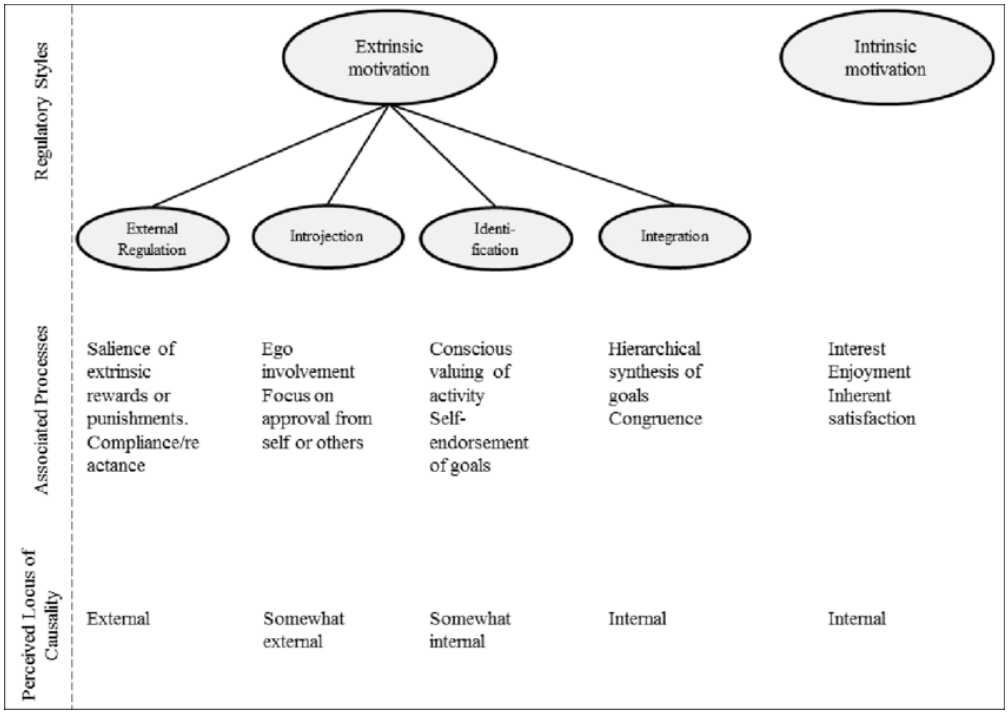

Figure 1. A taxonomy of human motivation (Ryan & Deci, 2000)

Self-Determination Theory postulates basic psychological needs of autonomy, competence, and relatedness are innate and essential for ongoing psychological growth, internalization, and well-being (Van den Broeck, Ferris, Chang, & Rosen, 2016). Applied to the educational setting, SDT postulates a student must perceive sufficient autonomy ("I have choices"), competence ("I can") and relatedness ("I feel encouraged by my teacher and peers") support within a given task in order to maximize his/her IM, or self-determination, to complete the task (Ryan & Deci, 2001).

Vallerand (1997) expanded SDT to include three levels of generality, situational movtivation, contextual motivation and global motivation, (see figure 2). Situational motivation, is most malleable and refers to an individual's motivational profile for a

specific activity. This includes how an individual feels while engaging in the activity (e.g., a throwing and catching lesson, or a kicking lesson in soccer). Contextual motivation is how an individual feels about a certain life context (e.g., sports, physical education, running). Contextual motivational profile is comprised of a multitude of experiences at the situational level. The next level of motivation is the global level because it is the least malleable of the three levels, and reflects one's life traits (e.g., how one feels about engaging in an active lifestyle).

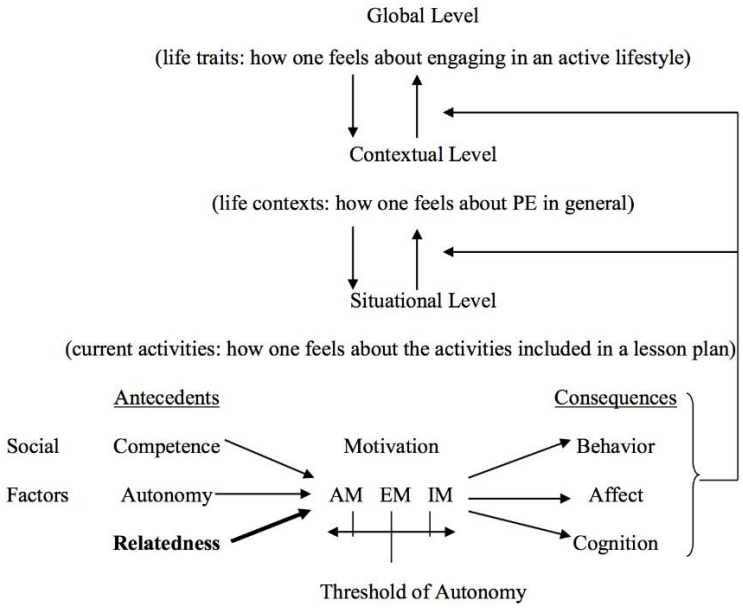

Figure 2. Hierarchical Model of Self-Determination Theory

Note: This model is adapted from Prusak et al., (2004) to illustrate the multi-dimensional nature of SDT and represent its' theoretical construct. Relatedness is bolded to suggest the particular nutriment isolated in the present study.

The research literature supports the notion that students who feel competent (e.g., Bevans, Fitzpatrick, Sanchez, & Forest, 2010), autonomous in their learning (Prusak, Treasure, Darst, & Pangrazi, 2004), and enjoy social support from peers and teachers (Gao, Lee, Ping & Kosam, 2011), are more likely to be engaged, and stay on task in PE

(see figure 3). Similarly, enjoyment of PA has been recognized as an important correlate of PA (Health Education Authority, 1997; Sallis, Prochaska, & Taylor, 2000), and research suggests that enjoyment may be critical in determining motivation for and participation in PA (Carroll & Loumidis, 2001; Kremer et al., 1997). Engaging students in PA at a young age will increase their chances of staying physically active throughout their lifetime (Dohle & Wansink, 2013).

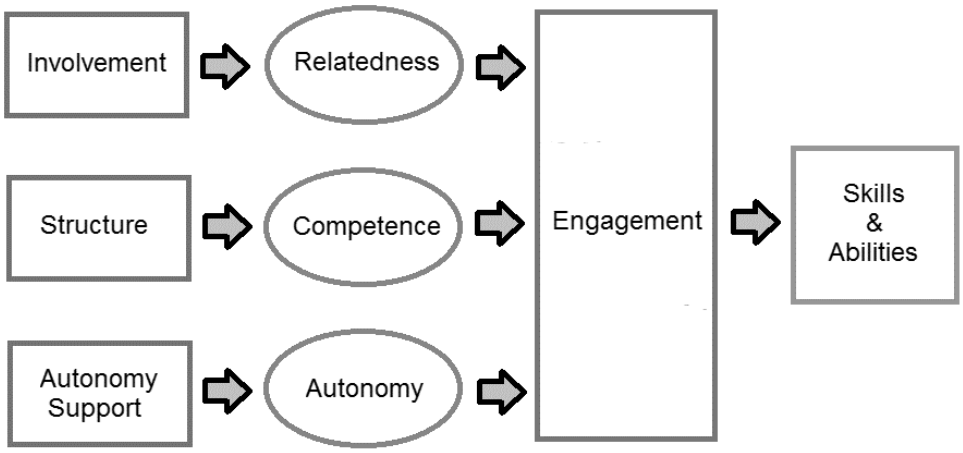

Figure 3. Factors to increase satisfied motivation, learning and well-being

Note: Suggestions to satisfy competence, relatedness, and autonomy, the PE teacher must fulfill three factors related to caring (Connell & Wellborn, 1991).

Social Media and Relatedness Support

Usage of social networking sites (SNS) is among the most common activity of today's young adults (Schurgin O'Keeffe & Clarke-Pearson, 2011). Alt (2015) suggests that social networking engagement is positively associated with increased extrinsic motivation and amotivation, which may be mediated by fear of missing out (FoMo, 2000). Fear of missing out indicates a pervasive apprehension that others might be having

a rewarding experiences from which they are not, facilitating a desire to stay continually connected with what others are doing (Przybylski, Murayama, DeHaan, & Gladwell, 2013). In accordance with SDT, FoMo could serve as a facilitator linking deficits in psychological needs to social networking engagement (Alt, 2015).

Some scholars advocate the need to embrace SNS as an educational tool (e.g., Ito et al., 2009; Jenkins et al., 2009). Young adults are described as having a focus on social media interaction and preferring group-based approaches to study and communicate within social activities (McMahon & Pospisil, 2005). Tarantino, McDonough, and Hua (2013) have observed that by engaging with social media, students can develop connections with peers, establish a virtual community of learners and ultimately increase their overall learning skills. However, the most effective methods for incorporating SNS into educational settings is unclear.

In relation to PA, a recent study concluded that using SNS to post pictures of daily activities may increase awareness of their PA levels and lead to enhanced PA for children throughout the week (Treadwell & Taylor, 2017). Teodoro & Naaman (2013) also discovered that those who posted motivational exercise posts to Twitter were more likely to maintain adherence to an exercise program. Additionally, it is believed that some young adults engage in SNS simply for social connection, but later adopt health-related behaviors due to enhanced self-efficacy, or belief in their own capacity to implement behaviors necessary to produce specific performance achievements (Bandura, 1997). For example, one study examined how posting exercise or diet activities on SNS, became a part of participants daily lives. As a result, participants were more likely to engage in post goal-oriented eating and fitness behaviors. This suggests that SN

technologies may replicate the same persuasion strategies humans use to influence others like positive feedback, modeling target behaviors or attitudes, social support, and influencing normative rules and social dynamics (Consolvo et al., 2009; Fogg, 2003; Zajonc, 1965).

Research Questions

As SNS create a space to enhance social interaction, these social media outlets have the potential to enhance a young adult's perceived relatedness support and subsequent exercise patterns. To date, research examining the influence of posting to SNS on PA levels within a SDT framework is limited. The purpose of this study is to examine PA levels, and motivational profiles of young adults when posting and not posting the activities to SNS. Accordingly, the research questions are:

1. Does PA increase by a greater amount in young adults who post PA pictures to SNS as compared to young adults who do not?
    a. We hypothesize that young adults who post PA pictures to SNS will demonstrate significantly greater enhancement of PA than young adults who do not post to SNS.
2. How does posting physical activities on SNS effect one's motivational profile toward PA?
    a. We hypothesize that young adults who post PA pictures to SNS will report significantly more intrinsic motivation than young adults who do not post PA to SNS.

METHODOLOGY

Design

This study employed a repeated-measures, between-subjects design wherein each participating student experienced one treatment (i.e., with and without posting to SNS). This design was appropriate given the number of participants and the desire to obtain sufficient statistical power. Group A represented the treatment group, while Group B was the control group. Each group completed surveys on day 4, 7, and 10 of the intervention.

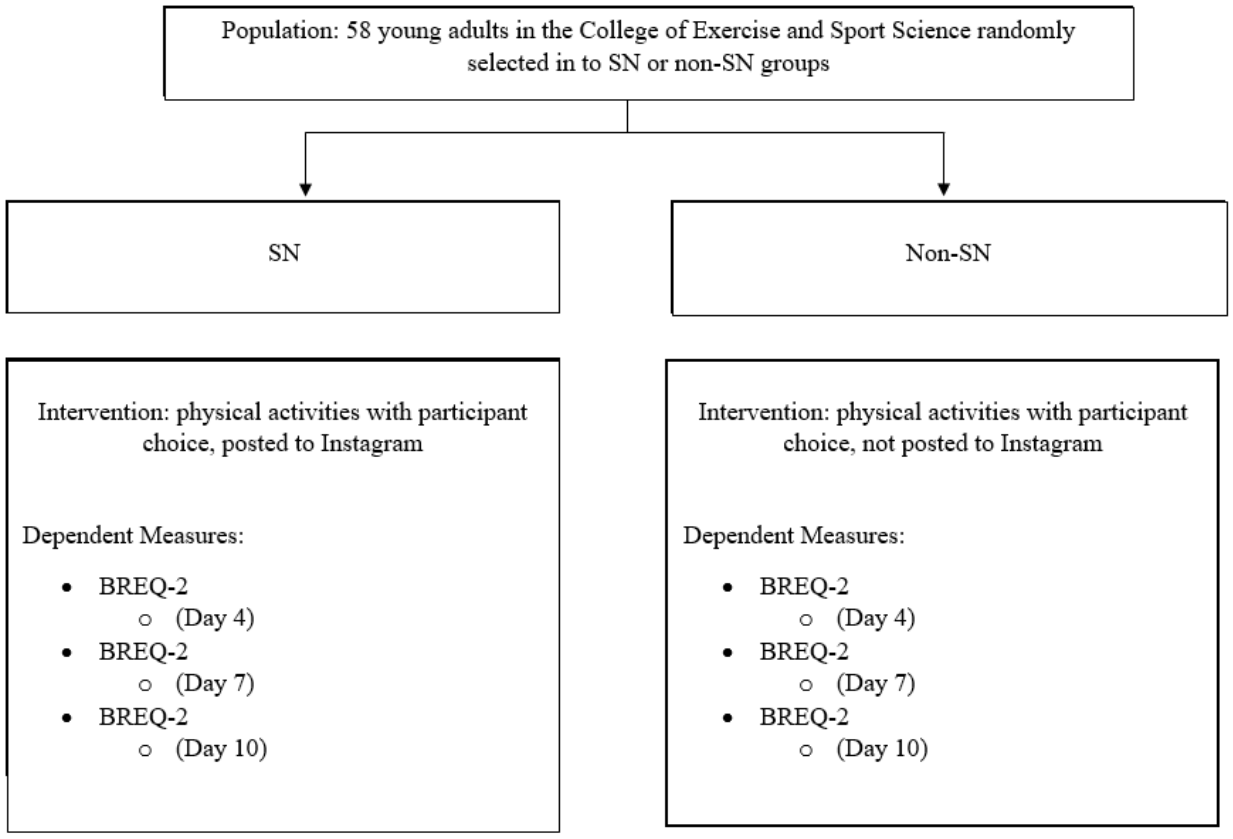

Figure 4. Procedures map of BREQ-2 survey

Participants

The sample of students who volunteered to participate in this study included young adults ages 18-22 in an introductory fitness class. Approval was obtained by the Institutional Review Board. Participants for the research consisted of 58 students (female n=44) (male n=14). Physical activity levels were tracked using Qualtrics where participants could select their levels by answering daily, 2-3 times per week, rarely, and almost never. Physical activity level percentages were calculated as followed; 43% exercised daily, 33% exercised 2-3 times per week, 0% rarely exercised, 1% almost never exercised, and 22% did not answer. Participants PA included weight lifting, cardio, gymnastics, swimming, basketball, softball, biking etc. When asked about their SN usage, the percentages were calculated as followed; 5% multiple posts per day, 5% once a day, 19% 2-3 times per week, 48% rarely, and 22% did not answer.

Measures

The instruments for this study were selected with the aim of assessing PA levels and motivational profiles of participating students without extensive familiarization.

Pedometers

The OMRON Walking Style Pedometer, model HJ-720ITC used in the study has 2 uni-axial piezoelectric acceleration sensors, oriented at 90 degrees to each other to count steps, allowing it to accurately count steps when placed horizontally or vertically. This device was worn on the waistband and initial set up for the pedometer included setting the weight and stride length on the device for each individual student. The pedometer included the capabilities of being connected to a computer by a USB cable, allowing for data to be downloaded to a PC. For each participant, a user account was

created that allowed up to 41 days of data to be downloaded. Holbrook et al. (2009), found this instrument had extremely high consistency, (3% absolute percent error whether worn at the waist or in the pocket, under prescribed and self-paced walking conditions).

Behavioral Exercise Regulation Questionnaire (BREQ-2)

The Exercise Regulation Questionnaire 2 (BREQ-2; Mullan, Markland, & Ingedew, 1997) is comprised of four subscales assessing external (4 items, e.g., "I exercise because other people say I should"); introjected (3 items, e.g., "I feel guilty when I don't exercise"); identified (3 items, e.g., "I value the benefits of exercise"); and, intrinsic (4 items, e.g., "I exercise because it's fun") regulations. In addition, four amotivation items from Mullan et al.'s (1997) initial item pool were included ("I don't see why I should have to exercise"; "I can't see why I should bother exercising"; "I don't see the point in exercising"; and "I think that exercising is a waste of time"). Researchers observe that the BREQ-2 could prove useful when assessing amotivation in order to develop a more complete understanding of motivation for PA (Markland & Tobin, 2004).

Procedures

Walking Style Pedometers, model HJ-720ITC, were distributed and appropriate calibrations, and coaching on how to use and wear the pedometer was given in person as well as followed up through email. The device tracked number of steps, distance, and caloric expenditure with a horizontal spring suspended lever arm moving up and down with acceleration of the hip joint during ambulation. Students were required to keep a log of their daily steps, distance traveled, and calories burned from the time they woke up until they went to bed. See appendix A.

Students were familiarized with the BREQ-2, two days prior to data collection through email. To align with previous research (Prusak et al., 2004), surveys were completed on Days 4, 7, 10, immediately following the activity. Surveys were distributed at 12:00 am on the days taken through the university's Qualtrics Survey Software.

Group A was randomly selected and emailed instructions on how to create a SN account. A list of all participants in Group A was distributed to each member in the group which included names along with an assigned username including their first and last three initials and a six-digit number to conceal their identity to any outside account. Group A participants spent one weekend "following" the other participants in Group A, and the principle investigator. Once participants became familiar with the site on a desktop computer or mobile device, they practiced uploading a picture and writing a brief caption.

Both groups wore the pedometer from the moment they woke up, until the moment they went to bed for 14 consecutive days. Data logs were submitted via email to the researcher on day 7 to keep participants accountable for their data, and again the day proceeding the intervention. Data logs which were subsequently deidentified, keyed and secured in an electronic document by researchers, to ensure all identities were concealed.

SN Group

Participants in group A were instructed to upload a picture every day to their SN account of themselves being physically active, and to use self-monitoring captions of what they were doing including the duration and nature of the activity, while group B was only responsible for their data logs. The self-monitoring captions were required to assist in keeping participants accountable for PA levels. As previously mentioned, the

participants were instructed to “follow” each other to provide ideas of what others were doing and to potentially try out new activities. Providing encouragement to other participants was highly recommended and participants were allowed to ask questions regarding other participants pictures or give thoughts on certain exercises, as long as they were respectful.

DATA ANALYSIS

Statistical analyses were performed using SPSS version 25 (SPSS Inc, Chicago, USA). Normality was inspected via visual graph inspection and analysis of skewness and kurtosis statistics for each dependent variable. Non-normally-distributed data were transformed using log transformations. Calculation of descriptive statistics followed confirmation of normality and transformations. The level of analysis were the individual students. Mean scores were calculated for each subscale and subsequent analysis were conducted utilizing subscale means. Correlation analyses were conducted across dependent variables to confirm the simplex pattern of the subscales. Cronbach's alphas were conducted on each of the survey measures to determine internal consistency.

To answer the first research question, does PA increase by a greater amount in young adults who post PA pictures to SNS as compared to young adults who do not, utilized an independent samples t-test to determine any between-group differences in PA change across the intervention. To answer the second research question which asked, how does posting physical activities on SNS effect one's motivational profile towards PA, three a 2 (group) X 3 (trials) repeated measures ANOVA was conducted to ascertain between group and within trial difference for each of the dependent variables measuring motivational indices (amotivation, external regulation, introjected regulation, identified regulation, intrinsic regulation).

RESULTS

Descriptive Statistics and Scale Reliabilities

Descriptive statistics by group are reported for each of the dependent variables in Table 1. Alpha coefficients ranged from $\alpha = .67$ to .81 and met or approached acceptable reliability standards based on $\alpha = .70$. The SN group began with significantly lower mean PA scores at baseline (M = 6264.52) than the Non-SN group (M = 9262.66) at $t(50) = -3.044$, $p = 0.004$. At the end of week two, the SN group (M = 8198.00) did not significantly differ from the Non-SN group (M = 8329.54) at $t(50) = -.112$, $p = 0.911$ indicating a greater PA increase for the SN group than the Non-SN group. Low mean scores ranged from 3.36 to 4.08 for extrinsic regulation, 7.45 to 8.72 for introjected regulation, 9.56 to 11.20 for identified regulation, 13.09 to 13.95 for intrinsic motivation, and 0.22 to 0.50 for amotivation indicating that the students were not disinterested in their PA and felt more intrinsically motivated than externally controlled. Specifically, motivational indices indicated higher scores for motivational constructs representing more intrinsically-driven behavior.

Table 1. Descriptive Statistics and Internal Consistency for Each Measure by Groups

Variable	Social Networking (n=30)	Non-Social Networking (n=28)
Physical Activity		
Baseline	6264.53 (2457.95)	9262.66 (4489.12)
Time 1	9299.07 (4047.99)	11674.54 (4163.86)
Time 2	8198.00 (3806.82)	8329.54 (4668.47)
External regulation		
Baseline	3.36 (3.51)	4.08 (2.90)
Time 1	3.42 (2.69)	5.09 (3.25)
Time 2	4.00 (3.66)	4.59 (3.87)
Introjection		
Baseline	7.45 (2.72)	8.72 (2.54)
Time 1	8.15 (2.98)	9.57 (2.46)
Time 2	8.54 (3.19)	9.59 (2.99)
Identification		
Baseline	11.17 (1.20)	11.28 (1.21)
Time 1	11.42 (1.36)	11.52 (0.95)
Time 2	11.21 (1.44)	11.55 (0.80)
Intrinsic		
Baseline	14.14 (2.17)	12.56 (2.22)
Time 1	13.96 (2.49)	13.22 (2.19)
Time 2	13.96 (2.80)	13.09 (2.14)
Amotivation		
Baseline	0.23 (0.75)	0.68 (1.11)
Time 1	0.43 (0.90)	0.87 (1.55)
Time 2	0.83 (1.71)	0.50 (1.26)

Note: Data are reported as mean (standard deviation).

Correlation Analysis

Correlations between PA and motivational indices are displayed in Table 2. Extrinsic regulation and amotivation are negatively correlated with PA while identified and intrinsic regulation displayed significant positive correlations indicating the more disinterested or externally-controlled a student felt, the less physically active they were. The significant positive linear correlations between extrinsic motivation and amotivation and between intrinsic and identified regulation reveal the expected simplex pattern where adjacent subscales are positively correlated and distal subscales are negatively correlated.

Table 2. Correlation Matrix for Each Measure by Group

	Steps	Ex	Intro	Ide	Intrin	Am
Steps	1.00					
Ex	-0.529*	1.00				
Intro	0.255	-0.024	1.00			
Ide	0.518*	-0.224	0.563*	1.00		
Intrin	0.522*	-0.478*	0.310	.748**	1.00	
Am	-0.510*	0.194	-0.434	-0.908**	-0.684**	1.00

*Correlation is significant at the 0.05 level.

**Correlation is significant at the 0.01 level.

A one-sample *t*-test revealed a significant within-group change for the SN group between baseline (M = 6264.53; SD = 2457.95) and week one (M = 9299.07; SD = 4047.99), $t(27) = 3.93$, $p = 0.001$, and a significant increase in PA across the intervention, baseline (M = 9299.07; SD = 4047.99) and week two (M = 8198.00; SD = 3806.82), $t(27) = 3.29$, $p = 0.003$, Indicating that the SM group increased in PA. An additional one-

sample t-test revealed a significant within-group change for the Non-SN group between baseline (M = 9262.66; SD = 4489.12) and week one (M = 11674.54; SD = 4163.86), $t(23) = 2.59$, $p = 0.016$, but not between baseline (M = 9262.66; SD = 4489.12) and week two (M = 8329.54; SD = 4668.47), $t(23) = -.781$, $p = 0.44$ indicating that the Non-SN group initially increased in PA as the intervention began but regressed into similar PA patterns be the end of the intervention. An independent samples *t*-test revealed a significant between group difference for change in PA across the intervention $t(50) = 2.25$, $p = 0.02$; d = 0.61, with the SN group increasing PA by (M = 1933.46; SD = 4081.76) and the Non-SN group decreasing in PA (M = -933.12; SD = 5850.41) indicating that the SN group experienced significantly more increase in PA across the intervention than the Non-SN group.

Repeated Measures Analysis of Variance

Posting PA on a SNS did not have a significant effect on any of the subscale means although extrinsic regulation $F(1, 37) = 3.499$, $p = 0.06$ and amotivation $F(1, 37) = 3.55$, $p = 0.06$ were trending toward significance.

DISCUSSION

Increase Physical Activity Levels in SN Group

This study examined the effect of social networking on PA levels and motivational profiles of young adults. To address the first hypothesis, results revealed a significant between-group difference for change in PA across the intervention. These findings align with previous studies suggesting that individuals who post motivational exercise posts to SNS are more likely to maintain adherence to an exercise program (Teodoro & Naaman, 2013). Posting to SNS may be an efficient way to enhance conscientiousness about PA levels. A recent study conducted by Treadwell and Taylor (2017) indicated that middle school children who post to SNS about their personal PA were more likely to attach importance to engaging in PA lifestyles than children who did not post.

It has been observed that young adults may be particularly focused on social networking interactions—preferring group-based approaches to studying and social activities (McMahon & Pospisil, 2005). Participants in the SN group may have experienced a social connectedness and enjoyed the group-based approach to sharing PA photos with peers as they commented and liked each other's posts across the intervention.

Prevention of negative health outcomes such as diabetes, hypertension, stroke and cardiovascular disease is most effective when initiated at a young age, and individuals who are active in their youth tend to retain health-enhancing PA behaviors in adulthood (Dohle & Wansink, 2013). Because just under half of participants were physically active

daily (e.g. 43%), further research could draw samples from participants from relatively sedentary lifestyles, who are not accustomed to being as physically active.

Communication among young adults is changing rapidly due to the increase of technology and SNS. Ito et al. (2009) proposes that individuals will learn in new ways using social media, and that educators should embrace these new platforms. Results from this study support the use of social media as a tool for increasing PA among young adults. and given that habits maintained in adulthood are often formed in childhood (Dohle & Wansink, 2013), physical educators can equip students with the knowledge and tools which may facilitate PA across the lifespan. A primary possibility for physical educators includes providing opportunities for children to be physically active, and to fundamentally increase PA across the curriculum (Kelder, Karpp, Scruggs & Brown 2014). Getting PE students involved with posting PA pictures to SNS, could be one solution to enhancing youth and subsequent young adult health-enhancing PA patterns.

Possible implications for the Non-SN groups declining PA levels compared to the SN group, could be that the Non-SN group experienced a placebo effect. It is not unreasonable that the novelty of participating in a research study along with emails influenced the initial PA patterns of the control group. However when the novelty wore off, they regressed toward the original baseline mean (see Harvard Health Publishing, 2017).

Intrinsic Motivation as a Significant Indicator of Physical Activity

Within the SDT framework, IM refers to doing something because it is inherently interesting and enjoyable. When motivation is internal-rather than externally-originating, enhanced affect, behavior, and learning may result (Deci & Ryan, 1985). The third

hypothesis considers that posting daily pictures of PA to ones SN account, would move young adults' motivational profiles along the continuum toward being more intrinsically motivated to engage in PA. Though there were no between-group differences, correlation analysis suggests a relationship between participants' PA levels and self-determination for the activities in the study. Fullmer et al. (2018) found that middle school students who kept an online PA log were significantly more self-determined than their peers who did not keep a log. Perhaps the most important implication from the present research is to provide students and young adults a space to track, share, and report on their physical activities. While keeping a personal PA log or journal may be helpful for some, coupling individual reporting with public sharing of activities may increase one's feelings of relatedness over time. Implications of the intervention could be to have students keep a more detailed online self-reporting log of daily physical activities

External Regulation and Amotivation

Results showed a positive correlation between PA and IM for both groups, and a significant negative correlation between PA and EM, and PA and amotivation. These correlations indicate that participants felt intrinsically inclined, rather than compelled to engage in PA. External regulators for participating in an activity, can cause participants to lose interest in the activity (Deci, 1971). As stated previously, participants noted that they were intrinsically motivated to participate in PA, despite the external control when they were posting to SNS. Additionally, there was a positive correlation between intrinsic motivation and identified regulation, which is a more autonomous, or self-determined, form of extrinsic motivation (Ryan & Deci, 2000). Although, particpants reported they were more intrinsically inclined to engage in PA, it should be noted that the SN groups

EM and amotivation did increase slightly throughout the intervention. These findings align with current research conducted by Alt (2015) where he suggests that social networking engagement is positively associated with increased EM and amotivation. Although, participants felt intrinsically inclined to participate in regular PA, they also felt extrinsically inclined to engage in the SN aspect.

CONCLUSION

Guided by Self-Determination Theory, the purpose of this study was to determine how posting pictures of daily PA to SNS could impact PA levels and motivation in young adults. Notable findings include (a) posting to SNS may increase PA levels in young adults; (b) the SN group had significantly higher PA levels than the Non-SN group; and, (c) participants who were more self-determined toward PA were more physically active, despite the non-significant between-group differences in motivation. Given the relatively high PA rates and low amotivation toward PA in the present population, future studies could examine a population of sedentary young adults.

Social networking has become a way of life for youth and young adults. Given the time spent engaged on SNS, posting pictures of and increased dialogue around PA participation holds potential to be a public health tool for enhancing student's participation in health-enhancing levels of PA. University faculty and K-12 teachers alike have an opportunity to be forward-thinking in utilizing online platforms to enhance student engagement in healthful behaviors.

DELIMITATIONS AND LIMITATIONS

Delimitations of the study include the purposeful selection of college-age students in an introductory health course, thus limiting the generalizability of the findings. Limitations of this study likewise include the use of convenience- rather than random-sampling, and self-reporting of PA. Further, the sample size is relatively small though repeated measures were utilized to increase statistical power. Other limitations include student attrition and the unpredictable nature of performing research and self-report in an ecologically valid setting.

REFERENCES

Alt, D. (2015). College students' academic motivation, media engagement and fear of missing out. *Computers in Human Behavior, 49*, 111-119.

Bandura, A. (1997). *Self-efficacy, the exercise of control*. New York: W.H. Freeman and Company.

Barkoukis, V., Tsorbatzoudis, H., Grouios, G., & Sideridis, G. (2008). The assessment of intrinsic and extrinsic motivation and amotivation: Validity and reliability of the Greek version of the Academic Motivation Scale. *Assessment in Education: Principles, Policy & Practice, 15*(1), 39-55.

Bartholemew, K. J., Ntoumanis, N., Ryan, R. M., & Thogersen-Ntoumani, C. (2011). Psychological need Thwarting in the sport context: assessing the darker side of athletic experience. *Journal of Sport & Exercise Psychology, 33*(1), 75-102.

Bevans, K., Fitzpatrick, L., Sanchez, B., & Forrest, C. B. (2010). Individual and instructional determinants of student engagement in physical education. *Human Kinetics Journals, 29*(4), 399-416.

Carrol, B., & Loumidis, J. (2001). Children's perceived competence and enjoyment in physical education and physical activity outside school. *SAGE, 7*(1), 24-43.

Centers for Disease Control and Prevention. May 2, 2013. http://www.cdc.gov/media/.

Chakravarthy, M. V., & Booth F. W. (2004). Eating, exercise, and "thrifty" genotypes: connecting the dots toward and evolutionary understanding of modern chronic diseases. *Journal of Applied Physiology, 96,* 3-10.

Connel, J. P., & Wellborn, J. G. (1991). Competence, autonomy, and relatedness: A motivational analysis of self-system process. *The Minnesota Symposia on Child Psychology, 23*, 43-77. Hillsdale, NJ, US: Lawrence Erlbaum Associates Inc.

Consolvo, S., Klasnja, P., McDonald, D. W., & Landay, J. A. (2009). Goal-setting considerations for persuasive technologies that encourage physical activity. In Proceedings of the 4th International Conference on Persuasive Technology, Persuasive 2009. ACM.

Deci, E. L., (1971). Effects of externally mediated rewards on intrinsic motivation. *Journal of Personality and Social Psychology, 18*(1), 105-115.

Deci, E. L., & Ryan, R. M, (1985). The general causality orientations scale: self-determination in personality. *Journal of Research in Personality, 19*(2), 109-134.

Dohle, S., & Wansink, B. (2013). Fit in 50 years: Participation in high school sports best predicts one's physical activity after age 70. *BMC Public Health, 13, 1100.*

Faucette, N., McKenzie, T. L., & Patterson, P. (1990). Descriptive analysis of nonspecialist elementary physical education teachers' curricular choices and class organization. *Journal of Teaching Physical Education, 9*(4), 284-293.

Fogg, B. J. (2003). Persuasive technology: Using computers to change what we think and do. San Francisco, CA, USA: Morgan Kaufmann Publishers.

Fullmer, M, O., Wilkinson, C., Prusak, K. A., Eggett, D., & Pennington, T. (2018). Adolescent physical activity and motivational profiles while keeping a physical activity record. *Journal of Teaching in Physical Activity, 37*(1), 1-11.

Gao, Z., Lee, A. M., Ping, X., & Kosma, M. (2011). Effect of learning activity on students' motivation, physical activity levels and effort/persistence. *The Journal of Research in Health, Physical Education, Recreation, Sport & Dance, 6*(1), 27-33.

Guay, F., Vallerand, R. J., & Blanchard, C. (2000). On the assessment of situational intrinsic and extrinsic motivation: the situational motivation scale (SIMS). *Motivation and Emotion, 24*(3), 175-213.

Gunnel, K. E., Crocker, P. R. E., Wilson, P. M., Mack, D. E., & Zumbo, B. D. (2013). Psychological need satisfaction and thwarting: A test of Basic Psychological Needs Theory in physical activity contexts. *Psychology of Sport and Science,14,* 599-607.

Harvard Health Publishing. (2017). The power of the placebo effect. Retrieved April 01, 2018, from https://www.health.harvard.edu/mental-health/the-power-of-the-placebo-effect.

Health Education Authority (1997). *Young people and physical activity: a literature review*. London: Health Education Authority.

Holbrook, E. A., Barreira, T. V., & Kang, M. (2009). Validity and reliability of Omron pedometers for prescribed and self-paced walking. *Med Sci Sports Exerc,41*(3), 670–674.

Ito, M., Baumer, S., Bittanti, M., Boyd, D., Cody, R., & Herr-Stephenson, B. (2009). *Hanging out, messing around, and geeking out: Kids living and learning with new media*. Cambridge, Massachusetts: MIT Press.

Jenkins, H. (2009). *Confronting the challenges of participatory culture: media education for the 21st century*. Chicago, Illinois: The John D. and Catherine T. MacArthur Foundation.

Kelder, S. H., Karp, G. G., Scruggs, P. W., & Brown, H. (2014). Setting the stage: Coordinated approaches to school health and physical education. *Journal of Teaching in Physical Education, 33,* 440-448.

Kendzierski, D., & DeCarlo, K. J. (1991). Physical activity enjoyment scale: Two validation studies. *Journal of Sport & Exercise Psychology, 13*(1),50-64.

Kremer, J., Trew, K. and Ogle, S. (1997) *Young People's Involvement in Sport.* London: Routledge.

Markland, D., & Tobin, Vannessa (2004). A modification to the Behavioural Regulation in Exercise Questionnaire to include an assessment of amotivation. *Journal of Sport & Exercise Psychology, 26,* 191-196.

McGavock, J. M., Anderson, T. J., & Lewanczuk, R. Z. (2006). Sedentary lifestyle and antecedents of cardiovascular disease in young adults. *American Journal of Hypertension, 19*(7), 701-707.

McMahon, M., & Pospisil, R. (2005). Laptops for a digital lifestyle: Millennial students and wireless mobile technologies. *Proceedings of the 22nd ASCILITE Conference*, 421-431.

Mullan, E., Markland, D., & Ingledew, D. K. (1997). A graded conceptualization of self-determination in the regulation of exercise behavior: Development of a measure using confirmatory factor analytic procedures. *Personality and Individual Differences, 23*(5), 745-752.

National Health Center for Health Statistics (1997). Update: Prevalence of overweight among children, adolescents, and adults—United States, 1988-1994. *Morbidity and Mortality Weekly Report, 46*(09), 198–202.

Parcel, G. S., Simmons-Morton, B. G., O'Hara, N. M., Baranowski, T., Kolbe, L. J., & Bee, D. E. (1987). School promotion of healthful diet and exercise behavior: an integration of organizational change and social learning theory interventions. *The Journal of School Health, 57*(4), 150-156.

Prusak, K. A., Treasure, D. C., Darst, P. W., & Pangrazi, R. (2004). The effects of choice on the motivation of adolescent girls in physical education. *Journal of Teaching in Physical* Education, 23, 19-29.

Przybylski, A. K., Murayama, K., DeHaan, C. R., & Gladwell, V. (2013). Motivational, emotional, and behavioral correlates of fear of missing out. *Computers in Human*

Behavior, *29*, 1841-1848

Reston, V. A. (2001). National Association for Sport and Physical Education, Shape of the Nation Report: A Survey of State Physical Education Requirements, *American Alliance of Health Physical Education Recreation and Dance.*

Roth, D. L. (1989). Acute emotional and psychophysiological effects of aerobic exercise. *Psychophysiology, 26*(5), 593- 602.

Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*(1), 54-67.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68-78.

Sallis, J. F., & McKenzie, T. L. (1991). Physical education's role in public health. *Research Quarterly for Exercise and Sport, 62*(2), 124-137.

Sallis, J. F., Prochaska, J. J., & Taylor, W. C. (2000). A review of correlates of physical activity of children and adolescents. *Medicine & Science in Sports & Exercise*, Retrieved from http://www.msse.org.

Sarkin, J. A., McKenzie, T. L., & Sallis, J. F. (1991), Gender differences in physical activity during fifth-grade physical education and recess periods. *Journal of Teaching Physical Education, 17*(1), 99-106.

Schurgin O'Keeffe, G., & Clarke-Pearson, K. (2011). Clinical report – the impact of social media on children, adolescents, and families. *American Academy of Pediatrics*, *127*(4), 800-804.

So-Kum Tang, K., Woen Koh, Y., & Gan, Y. (2017). Addiction to intrenet use, online gaming, and online social networking among young adults in China, Singapore, and the United States. *Asia Pacific Journal of Public Health, 29*(8), 673-682.

Strong, W. B., Malina, R. M., Blimkie, C. J.R., Daniels, S. R., Dishman, R. K., Gutin, B. Hergenroeder, A. C., Must, A., Nixon, P. A., Pivarnik, J. M., Rowland, T., Trost, S., &Trudeau, F. (2005). Evidence based physical activity for school-age youth. *The Journal of Pediatrics, 146*(6), 732-737.

Sun, H., & Chen, A. (2010). A pedagogical understanding of the self-determination theory in physical education. *Quest*, *62*(4), 364-384.

Tarantino, K., McDonough, J., & Hua, M. (2013). Effects of student engagement with social media on student learning: A review of literature. The Journal of

Technology in Student Affairs, (8), 1-8.

Telama, R. (2009). Tracking of physical activity from childhood to adulthood: a review. *Obesity facts, 2*(3), 187-195.

Teodoro, R., & Naaman, M. (2013). Fitter with Twitter: understanding personal health and fitness activity in social media. Seventh International Conference on Weblogs and Social Media; Boston, MA.

The National Institute of Child Health and Human Development Study of Early Child Care and Youth Development Network, 2003. Frequency and intensity of activity of third-grade children in physical education. *Archives of Pediatrics and Adolescent Medicine, 157*(2), 185-190.

Treadwell, S. M., & Taylor, N. (2017). PE in pictures: using Photovoice to promote middle school students' reflections on physical activity during free time. *Journal of Physical Education, Recreation & Dance, 88*(4), 26-33.

Troiano, R. P., Berrigan, D., Dodd, K. W., Masse, L. C., Tilert, T., & Mcdowell, M. (2008). Physical activity in the United States measured by accelerometer. *Medicine and Science in Sports and Exercise, 40*(1), 181-188.

U.S. Department of Health and Human Services. HHS.gov. Retrieved from https://www.hhs.gov/.

Vallerand, R. J. (1997). Toward a hierarchial model of intrinsic and extrinsic motivation. *Advances in Experimental Social Psychology, 29*, 271-360.

Van den Broeck, A., Ferris, D. L., Chang, C., & Rosen, C. C. (2016). A review of Self-Determination Theory's basic psychological needs at work. *Journal of Management, 42*(5), 1195-1229.

Wankel, L.M. (1993). The importance of enjoyment to adherence and psychological benefits from physical activity. *International Journal of Sport Psychology 24*, 151–69

Whiting, A., & Williams, D. (2013). Why people use social media: a uses and gratifications approach. *Qualitative Market Research: An International Journal, 16*(4), 362-369.

Zajonc, R. B. (1965). Social facilitation. *Science 149*, 269–274.

APPENDIX A

INFORMED CONSENT

INFORMED CONSENT

Protocol: Title: Social Networking and Physical Activity Among Children

Principal Investigator: Celia DeVitis
19364 Gill Rd.
Livonia, MI 48152
(734)788-7448

- Purpose and procedure
  - The purpose of this study is to examine physical activity levels, and motivation of college aged students when posting and not posting the activities to SNS.
  - This study employed a repeated-measures, within subject's design wherein each participating student experienced one treatment (i.e., with or without posting to SNS).
  - The total time required will be a fourteen day treatments.
  - Testing will take place when students are wearing their pedometers throughout the day.
  - Data will be emailed to the researcher, every Sunday for data analysis.
- Potential Risks
  - The risk of serious or life-threatening complications for healthy individuals like myself, is near zero.
- Rights & Confidentiality
  - My participation is voluntary. I can withdraw or refuse to answer any question without consequences at any time.
  - I can withdraw from the study at any time for no reason without penalty.
  - The results of this study may be published in scientific literature or presented at professional meetings using grouped data only.
  - All information will be kept confidential and secured on an electronic device, using number codes for participants. My data will not be linked with personally identifiable information.
- Possible Benefits
  - I may benefit from working out, and staying healthy.

Questions regarding study procedures may be directed to Celia DeVitis (734-788-7448), the principle investigator, or the study advisor Dr. Zack Beddoes, Department of Exercise and Sport Science, UW-L (608-785-6524). Questions regarding the protection of human subjects may be addressed to the UW-La Crosse Institutional Review Board for the Protection of Human Subjects, (608-785-8124 or irb@uwlax.edu).

Crosse Institutional Review Board for the Protection of Human Subjects, (608785-8124 or irb@uwlax.edu).

Participant_____ Date_____

Researcher_____ Date_____

APPENDIX B

PHYSICAL ACTIVITY DATA LOG

Physical Activity Data Log

	Daily Steps	Distance Traveled	Calories Burned
Day 1			
Day 2			
Day 3			
Day 4			
Day 5			
Day 6			
Day 7			
Day 8			
Day 9			
Day 10			
Day 11			
Day 12			
Day 13			
Day 14			

APPENDIX C

BEHAVIORAL EXERCISE REGULTIONS QUESTIONNAIRE (BREQ-2)

Behavioral Exercise Regulations Questionnaire (BREQ-2)

Why do you engage in physical activity (PA)?

	Not true for me		Sometimes true for me		Very true for me
1. I participate in PA because other people say I should	0	1	2	3	4
2. I feel guilty when I don't participate in PA	0	1	2	3	4
3. I value the benefits of PA	0	1	2	3	4
4. I participate in PA because its' fun	0	1	2	3	4
5. I don't see why I should have to participate in PA	0	1	2	3	4
6. I take part in PA because my friends/ family/partner say I should	0	1	2	3	4
7. I feel ashamed when I miss PA	0	1	2	3	4
8. It's important to me to participate in PA regularly	0	1	2	3	4
9. I can't see why I should bother participating in PA	0	1	2	3	4
10. I enjoy my PA sessions	0	1	2	3	4
11. I participate in PA because others will not be pleased with me if I don't	0	1	2	3	4

12. I don't see the point in participating in PA	0	1	2	3	4
13. I feel like a failure when I haven't participated in PA for a while	0	1	2	3	4
14. I think it is important to make the effort to participate in PA regularly	0	1	2	3	4
15. I find PA a pleasurable activity	0	1	2	3	4
16. I feel under pressure from my friends/ family to participate in PA	0	1	2	3	4
17. I get pleasure and satisfaction from participating in PA	0	1	2	3	4
18. I think participating in PA is a waste of time	0	1	2	3	4

APPENDIX D

REVIEW OF LITERATURE

Review of the Literature

The purpose of this paper is to determine how much time young adults are spending on social networking sites (SNS), and comparing it to their intrinsic motivation (IM) towards physical activity (PA) levels. Literature will be reviewed, to show the link between SNS, IM, and PA.

Lack of Physical Activity Among Young Adults

There are many different reason why one might live a sedentary lifestyle, but chances are if you have lived an inactive childhood, you are probably going to become an inactive adult (Dohle & Wansink, 2013). A recent study suggests that the obesity epidemic is a global trend, and researchers believe today's generation of children will be the first for over a century for whom life expectancy falls (Hills, King & Armstrong, 2012). According to the Department of Health and Human Services (HHS), it is recommended that adults should accumulate at least 150 minutes of PA per week, 75 minutes of vigorous PA, or a combination of the two while avoiding prolonged periods of inactivity. These guidelines changed nationwide when data came back on how inactive Americans were. Although these recommendations help individuals achieve unlimited health benefits, only 20% of adults are meeting these guidelines (Centers for Disease Control and Prevention, CDC), causing obesity levels to rise. The CDC reports nearly 36.5% of U.S. adults suffer from obesity, and approximately 17% of adolescents are obese. Not only can obesity lead to serious health conditions, but it is extremely costly. The Estimated annual medical cost of obesity in the U.S. was $147 billion in 2008, and the medical costs for people who have obesity were $1,429 higher than those of normal weight (CDC, 2008).

Arguably, being physically active is one of the most important steps that humans of all ages can take to improve their health, according to HHS. That is why the 2008 Physical Activity Guidelines for Americans provide science-based guidance to help Americans ages 6 and up, to improve their health through appropriate PA. Research shows a variety of benefits PA can have including; reducing the risk of many adverse health outcomes, both aerobic and muscle-strengthening activities are beneficial, you will notice benefits for any age, race, or ethnic group, and that physical activity is even valuable for people with disabilities. The guidelines also state, any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above a basal level, is known as PA. There are two different types of activities that HHS define, which are baseline activity, verses health-enhancing physical activity.

First, baseline activities consist of light-intensity work outs such as standing, walking slowly, and lifting light weight objects; this type of activity is considered to be inactive. Other intensity episodes such as climbing stairs for a short period of time also is considered baseline, because they are not performing the task for long enough to count toward meeting the guidelines. On the other end of the spectrum, health-enhancing physical activity consists of movement added onto baseline activity, which produces health benefits. A few examples include: brisk walking, dancing, climbing on the playground equipment, jumping rope, and lifting weights. These are the types of activities individuals should be performing outside of their daily routines.

Physical activity can also have effects on ones' well-being. A study was done at the University of North Texas, linking the lack of health related fitness standards for cardiorespiratory fitness (CFR) and body composition (BMI) with depression in middle

school aged children (Jackson, Greenleaf, Martin & Trent, 2011). All 986 students were assessed using the FITNESSGRAM physical fitness test as a required activity. Researchers then classified the students as either meeting or not meting healthy fitness zones (HFZ), while the Center for Epidemiological Studies-Depression Scale (CES-DC) was administered in the schools to assess cognitive and behavioral aspects of depression (Jackson et al., 2011). Results found that students who did not meet HFZ for CRF, had significantly higher odds of elevated depression. BMI measurements not meeting HFZ did not have a significant relationship to CES-DC classification, but a second logistic regression contrasted children who did not meet the HFZ for both CRF and BMI, with those who had met HFZ. The researchers concluded that a health-related level of CRF and BMI are associated with a lower level of elevated depression, and agree that physical activity should be implemented on children with elevated depression levels, to determine if positive mental health effects would occur as a results.

Consequences of being Inactive

Being inactive, which is also known as having a sedentary lifestyle, puts individuals at a higher risk for negative health outcomes such as diabetes, hypertension, strokes and cardiovascular disease (National Health Center for Health Statistic, 1997). One study conducted by Faigenbaum, A. (1998) showed that children ages five to eight in the U.S., have at least one risk factor for heart disease, and one in eight are considered to be obese. These statistics are alarming, and action needs to be taken to prevent an even greater number or sedentary children, because this number is rising. Results from the 2011-2012 National Health and Nutrition Examination Survey (NHANES), showed that approximately 16.9 percent of U.S. children and adolescents are obese, and around an

estimated 14.9 percent are overweight (Frayar, Carroll, & Ogden, 2014). These statistics have not shown to get any better as youth grow into adults.

As a consequence, an individual can develop coronary artery disease (CAD). This the buildup of plaque in the coronary arteries that limit the blood flow to the heart. The treatment of CAD, in adulthood does not get to the root of the problem which is prevention (Neufeld & Blieden, 1978), and that needs to start at a young age. Individuals must stay healthy early on to prevent health problems in the future, because people who are active in their youth tend to remain active and physically fit as adults (Dohle, & Wansink, 2013). Since CAD is the leading cause of death in the United States (Cheng, 2001), we need to be more aware of the steps to take to limit our chances of developing CAD. One of the longest and largest cardiovascular disease studies came from the Chicago Hearth Association Detection Project in Industry. 11,016 men ages 18 to 39, with less than 20 years' follow-up showed that major CAD risk factors, many of which are adjustable, are solid contributors to prediction of future risk. Researchers concluded that the results strongly endorse the concept that, coronary risk factors in men age 18 to 39, have a strong effect on long-term risk for death from CAD (Cheng, 2001). Cheng also concluded that hyperlipidemia, which is an abnormally high concentration of fats or lipids in the blood, can play a major role in the early development of atherosclerosis. It is suggested that one should eat a diet in low saturated fats and cholesterol to prevent lipid abnormalities, eat foods high in soluble fiber, maintain a healthy weight, and most importantly to exercise regularly (Margolis, 2011), since CAD clearly begins early in life. Staying in control of hyperlipidemia at an early age by getting children interested in PA, will undoubtedly delay the progression of atherosclerosis in the young.

How do you measure physical activity?

There are many ways to measure physical activity, that can help someone gain, maintain, or lose weight. Some examples include: self-reporting questionnaires, self-reporting activity diaries/logs, direct observation, accelerometers, pedometers, heart-rate monitors, armbands that use motion and heart-related sensors, and more recently the FitBit®. A study conducted by James F. Sallis (1991), elaborates on why self-reporting measures are the most reliable way to track physical activity. He states that self-reports are the most commonly used type of measure of children's physical activity, due to their convenience of administration, low cost, and the ability to collect a variety of physical activity variables over time. Self-reporting can be used for a variety of different purposes, and in the case of children, it could be used as an assignment for a grade in their physical education class.

A pedometer is a non-invasive tool that allows for instant feedback regarding a person's activity level (Rooney, Smalley, Larson & Havens, 2003), and has gained an increased credibility in research and practice as a reasonable approximation of daily ambulatory PA volume (Tudor-Locke et al. 2011). These devices have become more advanced over the years, and studies have supported the theory that they will increase PA levels, decrease body mass index, and decrease blood pressure (Bravata et al., 2007). A current model will have a horizontal, spring suspended lever arm that moves up and down with acceleration of the hip joint during movement. When movement is detected, an electrical circuit closes, and an accumulated step count is displayed digitally on a feedback screen.

But how many steps a day should school aged children be taking? An article written by Tudor-Locke et al. (2011), reviewing current literature on objectively monitored step-defined PA in children (typically ages 6-11), states that boys average 12,000 to 16,000 steps/day and girls average 10,000-13,000 steps/day. Adolescents (typically 12-19 years) steadily decrease steps/day until approximately 8,000-9,000 steps/day are observed in 18-year olds. Tudor-Locke & Bassett (2004), established pedometer-determined PA cut points for healthy individuals, indicating that if you take the famous 10,000-12,000 steps/day you are considered active. A more recent, sex-specific and updated study came out in 2008, that included children ages 6-12 years showing boys who take 15,000-17,499 are considered active, and $\geq$ 17,500 are measured as highly active. Corresponding values for girls imply 12,000-14,999 steps/day are considered active and $\geq$ 14,5000 are highly active (Tudor-Locke, Hatano, Pangrazi & Kang, 2008). These findings are beneficial to get a baseline of how physically active children and adolescents should be to prevent negative health effects later on in life.

Bravata et al. performed multiple studies on the effects these pedometers would have on adults by evaluating 2767 participants throughout physical activity programs. These studies concluded, with the use of a pedometer there is a significant increase in physical activity with a magnitude of approximately 2000 steps or about 1 mile of walking per day.

Additionally, Rooney et al. (2003) researched the benefits of 3 psychosocial factors relating to physical activity, which included goal setting, keeping a log, and wearing a pedometer all of the time. Goal setting involves establishing realistic and attainable steps for performing a desired behavior (Nies, Hepworth, Wallston, &

Kershaw, 2001). The participants in this study who set goals were significantly more likely to be aware of their own PA levels, as well as more aware of the PA levels that were needed to benefit their health. These women saw significant improvements in their energy level, weight loss, stress reduction, and the way their clothes fit. Keeping a log promotes accountability for individuals, which provides feedback of the progress made for the exerciser (Rooney et al, 2003). Lombard, Lombard and Winett (1995), discovered that prompting and feedback from keeping a log, encouraged you to increase and maintain PA, as well as other health behaviors. Lastly, in the Rooney et al. study, the participants were instructed to wear a pedometer for an entire 8-week period. This aspect of the study reiterated all the other positive health findings, because women who did wear the pedometer all of the time saw improvements in the way their clothes fit and were less ill. Furthermore, the same participants were more likely to set aggressive goals, stayed more attentive of their PA levels, became more active, met the 10,000-step per day goal more frequently, and were more likely to walk more than 10,000 steps per day.

Self-determination Theory

Given the declining levels of PA among individuals (Troiano et al., 2008), a physical educator's responsibilities in providing opportunities for children to be physically active is fundamental to increasing PA across the curriculum (Kelder, Karpp, Scruggs, & Brown 2014). When teachers foster supportive classroom environments, the corresponding student internalization of learning experiences can lead to enhanced academic performance, cognition, and affect (Pelletier et al., 1995). Self-determination Theory (SDT; Deci & Ryan, 2000) postulates that internal regulation, or self-determined behavior, is more likely to be enhanced when one's need for competence, autonomy and

relatedness is satisfied. Because SDT examines motivation toward a task, this framework has been used extensively in both general and physical education. For example, Prusak et al. (2002) investigated the effects of incorporating choice among middle school girls in a novel walking unit. Researchers discovered that students who were provided choices were significantly more intrinsically motivated and less amotivated than students in the control group. Other research suggests that teachers may paradoxically offer less autonomy support to students whom they perceive to be least motivated (Taylor, Ntoumanis, & Smith, 2009). Other studies suggest that the students' basic psychological needs should be met by providing opportunities for choice and input, empathize with the students' perspectives, and demonstrate or establish peer-learning groups for support and cooperation (Ntoumanis & Standage, 2009).

Extrinsic motivation (EM) is driven by rewards such as money, grades, praise or some type of reward system. This technique is intended to motivate or reinforce student learning, and has been used by many educators (Deci, Koestner, & Ryan, 2001). In more recent findings on extrinsic motivation methods, researchers have suggested that rewards can at times undermine rather than enhance intrinsic motivation, curiosity, interest, and persistence at learning tasks (Deci et al., 2001). A meta-analysis of extrinsic reward effects on intrinsic motivation was published in the Fall issue of *Review of Educational Research*, implying that overall rewards do not decrease intrinsic motivation. Researchers acknowledged that intrinsic motivation is important for learning and adjustment in educational settings, but, "teachers have no reason to resist implementing incentive systems in the classroom" (Cameron & Pierce, 1994). After extensive review of Cameron and Pierce's results, an argument that their meta-analysis was flawed and the conclusions

were unwarranted (Kohn, 1996; Lepper, Keavney, & Drake, 1996; Ryan & Deci, 1996). From here, a study was conducted to further test the effects of extrinsic motivation, verses intrinsic motivation. Two types of rewards were looked at. Verbal rewards, which translates to positive feedback regarding performance. The cognitive evolution theory (CET) correctly predicted that students are likely to enhance perceived competence, which will enhance intrinsic motivation when being verbally praised with effective feedback (Deci et al., 2001). Tangible rewards are offered to students as an incentive to participate in behavior in which they might not otherwise engage. They are frequently used to persuade people to do things, ultimately controlling their behavior, and according to CET, tangible rewards lead to a decreased intrinsic motivation. Deci et al. (2001) found support, reporting that on average, tangible rewards significantly undermined both free-choice intrinsic motivation, and self-reported motivation. In a physical education setting, if a student is not interested in a particular activity, instead of using extrinsic motivation, the teacher should rely on implementing appropriate autonomy-supportive techniques. This might include, providing a meaningful rationale expressing the importance of partaking in the activity, acknowledging the students' feelings and perspective about the activity, or using language that conveys choice rather than control (Ntoumanis & Standage, 2009).

Additional research has been conducted on SDT by Chatzisarantis and Hagger (2009) using 215 British students from ten different schools. They used a cluster-randomized design that took place over a period of five weeks, and looked at autonomy supportive versus neutral conditions, and how they differed as a function of whether teachers offered students enhanced choice and acknowledged students' difficulties.

Conclusions indicated that students in the autonomy-supportive condition described stronger intentions to exercise during leisure-time and participated more frequently in leisure-time physical activities, compared with students in the neutral condition. Findings from another study executed at Brigham Young University, agree that to increase student self-determination, physical educators should provide students with an autonomy-supportive environment (Ward, Wilkinson, Graser, & Prusak, 2008). By allowing physical education students the opportunity of choice, we will see an increase in their intrinsic motivation levels (Miserandino, 1996; Prusak et al., 2004), which ultimately leads to more appropriate behavior outcomes within activity levels in class (Deci & Ryan, 1987; Grolnick & Ryan, 1987).

Self-determination theory referring to relatedness support via SNS, is growing stronger in the younger generations. One article suggests that when activities are done for interest or personal value, perceived autonomy is high (Ryan, Rigby, & Przybylski, 2006). Today, we see the world obsess over how many "likes" they can get on SNS to boost their confidence. Predictions were made that, if students could accumulate intrinsic motivation, to perform autonomy-supported activities, it would increase their PA levels.

Social Media and Relatedness Support

With the increase in technology and social networking sites (SNS), comes a wide array of concerning issues. Not only has the SNS eruptions caused students to spend more time on their Facebook, Instagram, Snapchat, or Twitter, but it has also changed the way we communicate. Educators and parents in the U.S. face difficult predicaments concerning students and SNS. As a result, many scholars suggest that students will learn in new ways using social media, and that educators should embrace these new platforms

(Ito et al., 2009; Jenkins, 2009). Limited studies have been done to asses if learning can cultivate by the use of SNS between student and teacher, and that is why more studies should be executed. Since most SNS provide a shared similarity including profiles and friend networks (Ahn, 2011), it would be interesting to see the effects of incorporating SNS with physical education, and observe any changes in the student's health as a result of this integration.

In April 2017, the *Journal of Physical Education, Recreation and Health*, published a new study by Sheri M. Treadwell and Neva Taylor about the use of photography in PE. The study was to get children in middle school more aware of their PA levels outside of school, by photographing 25 pictures of their daily lives. They uploaded them to a program called Photovoice, and analyzed their pictures from questions such as, what do you see here? what is really happening here? how does this relate to our lives? why does this situation, concern or strength exists? how can this image educate the community? and what can we do about it? Results concluded that children were suddenly conscious of how inactive they actually were. Taking the pictures was something fun for them to do, but the work they put into self-monitoring their PA levels made them realize they needed to do more. Concluding statements about the study informed readers that Photovoice can be an effective tool for physical educators to use to help their students reflect on certain behaviors and understand various issues in their lives relating to PA and living a healthy life (Treadwell & Taylor, 2017). Technology does not need to be a barrier to implementing a project of this sort, since more students today have cellphones equipped with cameras, and there are so many other SNS that could be substituted for Photovoice, to make the experimenting more diverse.

Since Instagram's launch in 2010, it has become the most popular way to share photos or videos with others, gaining more than 150 million active users (Instagram, 2013). Social currency is information that is shared to encourage further conversation, and Instagram's extraordinary success has become the key to this platform (Rainie, Brenner, & Purcell, 2012). This means that people love posting about what they are doing, or what they like, to spark conversation between themselves and others. In 2014, the site was compared to image sharing sites such as Flickr, and Twitter. Researchers found that Instagram was used more to share every day pictures with smartphones compared to the high quality images you might share on Flickr. The study also found that picture and video sharing was easier on Instagram verses Twitter, because there were no constraints on the number of characters for captions that Twitter enforces (Manikonda, L., Hu, Y., & Kambhampati, S., 2014). Overall, with Instagram's averaging over 55 million pictures being uploaded by users per day (Instagram, 2013), and 16 billion pictures shared so far, I believe physical educators could use this SNS to increase physical activity among individuals.

Summary

In conclusion, there is an epidemic regarding an absence of PA in the world, and something has to be done. Using SNS to connect with individuals to encourage and promote healthy lifestyles and PA, may be just one solution in the obesity crisis. Hopes for the long run is that SNS will help increase intrinsic motivation towards PA, and individuals will become healthier.

REFERENCES

Ahn, J. (2011) The effect of social network sites on adolescents' social and academic development: current theories and controversies. *JOURNAL OF THE AMERICAN SOCIETY FOR INFORMATION SCIENCE AND TECHNOLOGY, 62(*8), 1435 1445.

Bravata, D. M., Smith-Spangler, C., Sundaram, V., Gienger, A., Lin. N., Lewis, R., Stave, C. D., Olkin, I., & Sirard, J. (2007). Using pedometers to increase physical activity and improve health. *JAMA, 298*(19), 2296-2304.

Cameron, J., & Pierce, D. (1994). Reinforcement, reward, and intrinsic motivation: A meta-analysis. *SAGE, 64*(3), 363-423.

Chatzisarantis, N. L. D., & Hagger, M. S. (2009). Effects of an intervention based on self-determination theory on self-reported leisure-time physical activity participation. *Psychology and Health, 24*(1), 29-48.

Child Trend Data Bank. Vigorous Physical Activity by Youth. (2017). Retrieved from https://www.childtrends.org/databank-indicators/.

Deci, E. L., Koestner, R., & Ryan, R. M. (2001). Extrinsic rewards and intrinsic motivation in education: Reconsidered once again. *Review of Educational Research, 71*(1), 1-27.

Deci, E.l., & Ryan, R.M. (1987). The support of autonomy and the control of behavior. *Journal of Personality and Social Psychology, 53*(6), 1024-1037.

Dohle, S., & Wansink, B. (2013). Fit in 50 years: Participation in high school sports best predicts one's physical activity after age 70. *BMC Public Health, 13, 1100.*

Faigenbaum A. (1998). Fundamental fitness in children: recommendations for keeping kids healthy and fit. *ACSM Health & Fitness Journal*, 218–222.

Fryar, C. D., Carroll, M. D., & Ogden, C. L. (2014). Prevalence of overweight and obesity among children and adolescents: United States, 1963–1965 Through 2011–2012.

Grolnick, W. S., & Ryan, R. M. (1987). Autonomy in children's learning: An experimental and individual difference investigation. *Journal of Personality and Social Psychology, 52*(5), 890-898.

Hills, A. P., King, N. A., & Armstrong, T. P. (2012). The contribution of physical activity and sedentarty behaviours to the growth and development of children and adolescents. *Sports Medicine, 37*(6), 533-545.

Instagram. Instagram statistics. http://instagram.com/press/, 2013.

Ito, M., Baumer, S., Bittanti, M., Boyd, D., Cody, R., & Herr-Stephenson, B. (2009). Hanging out, messing around, and geeking out: Kids living and learning with new media. Cambridge, Massachusetts: MIT Press.

Jackson, A., Greenleaf, C., Martin, S., & Trent, P. (2011). The relations between health-related fitness and depression in middle school children. *Medicine & Science in Sports & Exercise 43*(5), 274.

Jenkins, H. (2006). Confronting the challenges of participatory culture: Media education for the 21st century. Chicago: The John D. and Catherine T. MacArthur Foundation.

Kelder, S. H., Karp, G. G., Scruggs, P. W., & Brown, H. (2014). Setting the stage: Coordinated approaches to school health and physical education. *Journal of Teaching in Physical Education, 33,* 440-448.

Kohn, A. (1996). By all available means: Cameron and Pierce's defense of extrinsic motivators. *Review of Educational Research, 66,* 1-4.

Lee, L., Kuo, Y., Fanaw, D., Perng, S., & Juang, I. (2011). The effect of an intervention combining self-efficacy theory and pedometers on promoting physical activity among adolescents. *Journal of Clinical Nursing 21,* 914-922.

Lepper, M. R., Keavney, M., & Drake, M. (1996). Intrinsic motivation and extrinsic rewards: A commentary on Cameron and Pierce's meta-analysis. *Review of Educational Research, 66,* 5-32.

Lombard, D. N., Lombard, T. N., & Winett, R. A. (1995). Walking to meet health guidelines: the effect of prompting frequency and prompt structure. *Health Psychology, 14*(2), 164-170.

Manikonda, L., Hu, Y., & Kambhampati, S. (2014). Analyzing user activities, demographics, social network structure and user-generated content on Instagram. Cornell University Library.

Margolis, S. (August 25, 2011). What is hyperlipidemia? Johns Hopkins symptoms and remedies: the complete medical reference. http://www.healthcommunities.com/high-cholesterol/what-is-hyperlipidemia.shtml.

National Health Center for Health Statistics (1997). Update: Prevalence of overweight

among children, adolescents, and adults—United States, 1988– 1994. *MMWR, 46*(09), 198–202.

National Center for Health Statistics (U.S.) (1999). Healthy people 2000 review 1998–99. Hyattsville, MD: U.S. Dept. of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, DHHS publication no. (PHS) 99–125.

Navas-Nacher, E.L., Colangelo L, Beam, C., & Greenland, P. (2001). Risk factors for coronary heart disease in men 18 to 39 years of age. *Annals Internal Medicine, 134*(6), 433–439.

Neufeld, H. N., & Blieden, L. C. (1978). Coronary artery disease in children. *Postgraduate Medical Journal, 54*, 163-169.

Nies, M., Hepworth, J., Wallston, K., & Kershaw, T. (2001). Evaluating of instrument for assessing behavioral change in sedentary women, *Journal of Nursing Scholarship, 33*(4), 349-354.

Ntoumanis, N. & Standage, M. (2009). Motivation in physical education classes, a self-determination theory perspective. *Theory and Research in Education, 7*(2), 194-202.

Miserandino, M. (1996). Children who do well in school: Individual difference in Perceived competence and autonomy in above average children. *Journal of Educational Psychology, 88* (2), 203-214.

Pelletier, L. G., Fortier, M. S., Vallerand, R. J., Tuson, K. M., Briere, N. M., & Blais, M. R. (1995). Towards a new measure of intrinsic motivation, extrinsic motivation, and amotivation in sports: The Sports Motivation Scale. *Journal of Sport and Exercise Psychology, 17*(1), 35-53.

Prusak, K. A., Treasure, D. C., Darst, P. W., & Pangrazi, R. (2004). The effects of choice on the motivation of adolescent girls in physical education. *Journal of Teaching in Physical Education, 23*, 19-29.

Rainie, L., Brenner, J., & Purcell, K. (2012). Photos and videos as social currency online. Pew Internet & American Life Project, http://pewinternet.org/Reports/2012/Online-Pictures/Main-Findings.aspx, 2012.

Rooney, B., Smalley, K., Larson, J., & Havens, S. (2003). Is knowing enough? Increasing physical activity by wearing a pedometer. *Wisconsin Medical Journal, 102*(4), 31-36.

Ryan, R. M., & Deci, E. L. (1996). When paradigms clash: Comments on Cameron and

Pierce's claim that rewards do not undermine intrinsic motivation. *Review of Educational Research, 66,* 33-38.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68-78.

Ryan, R. M., Rigby, S. C., & Przybylski, A. (2006). The motivational pull of video games: A self-determination theory approach. *Motivation and Emotion, 30*(4), 344-360.

Sallis J. F. (1991). Self-report measures of children's physical activity. *Journal of School Health, 61*(5), 215–219.

SHAPE America Society of Health and Physical Educators. SHAPE America. Retrieved from http://www.shapeamerica.org/.

Stephens M. (2002). Children, physical activity, and public health: another call to action. *American Family Physician, 65*(6), 1033–1035.

Taylor, I., Ntoumanis, N., & Smith, B. (2009). The social context as a determinant of teacher motivational strategies in physical education. *Psychology of Sport and Exercise, 19,* 235-243.

Treadwell, S. M., & Taylor, N. (2017). PE in pictures: using Photovoice to promote middle school students' reflections on physical activity during free time. *Journal of Physical Education, Recreation & Dance, 88*(4), 26-33.

Troiano, R. P., Berrigan, D., Dodd, K. W., Masse, L. C., Tilert, T., & Mcdowell, M. (2008). Physical activity in the United States measured by accelerometer. *Medicine and Science in Sports and Exercise, 40*(1), 181-188.

Tudor-Locke, C., Bassett, D. R. (2004). How many steps/day are enough? Preliminary pedometer indices for public health. *Sports Medicine, 34(1), 1-8.*

Tudor-Locke, C., Craig, C. L., Beets, M. W., Belton, S., Cardon, G. M., Duncan, S., Hatano, Y., Lubans, D. R., Olds, T. S., Raustorp, A., Rowe, D. A., Spence, J. C., Tanaka, S., & Blair, S. N. (2011). How many steps/day are enough? For children and adolescents. I*nternational Journal of Behavioral Nutrition and Physical Activity, 8*(78), 1-14.

Tudor-Locke, C., Hatano, Y., Pangrazi, R. P., Kang, M. (2008). Revisiting "How many steps are enough?". *Medicine & Science in Sports & Exercise, 40*(7), 537-543.

U.S. Department of Health and Human Services. 2008 Physical activity guidelines for Americans. Retrieved from https://www.hhs.gov/.

Ward, J., Wilkinson, C., Vincent Grasser, S., & Prusak, K. A. (2008). Effects of choice on student motivation and physical activity behavior in physical education. *Journal of Teaching in Physical Education, 27*(3), 385-398.