Sleep Hygiene Practices and Exercise as Mediators (Self Care Practices) of the Relationship between Stressful Life Events and Academic Engagement in Undergraduate Students

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Abstract

[The abstract should be one paragraph of between 150 and 250 words. It is not indented. Section titles, such as the word Abstract above, are not considered headings so they don’t use bold heading format. Instead, use the Section Title style. This style automatically starts your section on a new page, so you don’t have to add page breaks. Note that all of the styles for this template are available on the Home tab of the ribbon, in the Styles gallery.]

The findings of this study will aid in maximizing academic engagement in college students (cognitive and behavioral functioning in children) by identifying areas for sleep interventions.

Keywords: [Click here to add keywords.]

**Specific Aim 1: To document the (relationship/effects) of stressful life events on academic engagement in undergraduate students.**

*We hypothesize that increased levels of life stressors will be associated with lower (negatively correlate with/result in lower) levels of academic engagement. We believe that academic engagement will be lower in undergraduate students who experience a greater number of stressful life events.*

**Specific Aim 2: To document the (relationship/effects) of sleep hygiene on academic engagement in undergraduate students.**

*We hypothesize that as sleep hygiene is impaired so will academic engagement in undergraduate students. We postulate that academic engagement will be lower in undergraduate students who experience reduced levels of healthy sleep hygiene practices.*

**Specific Aim 3: To determine if sleep hygiene moderates the relationship between stressful life events and academic engagement.**

*We hypothesize that students with higher levels of stressful life events will experience lower academic engagement (with increased deficits in) if they show poor sleep hygiene practices. We postulate that in students exhibiting the poorest sleep hygiene habits, we will see (a more pronounced/the strongest) relationship between reduced academic engagement (associated with) and high levels of stress. Sleep hygiene practices…*

***“Sleeping restfully may therefore be allowing individuals the rejuvenation needed to manage their stress adaptively”***

*Likewise, we postulate that in between-subjects analysis, increased stressful life events and lower sleep hygiene practices will be associated with reduced academic engagement. (No within-subjects analysis because only one point measure.) We believe that there will be an interaction effect of sleep hygiene, stressful live events, and academic engagement in undergraduate students. We believe that there will be an interaction effect of sleep hygiene practices as a moderator of the relationship between stressful live events and academic engagement in undergraduate students.*

**Specific Aim 4: To evaluate the impact of gender, ethnicity, exercise, and age on academic engagement.**

*We hypothesize that*

(Legget et al., 2003) “Multilevel models were run to examine between- and within-person variability in sleep disturbance and life event stress as predictors of depressive symptoms, and an interaction to test sleep disturbance as a moderator is included in a second step.”

Sleep hygiene has been shown to impact the quality of actual sleep **(check current research)**. Positive sleep hygiene practices are associated with improved sleep and consequently with improved performance in activities impacted by sleep. For instance, executive functioning including working memory tasks, reading and math performance, physical conditioning, and emotional regulation.

(Brown et al. 2002 )“Their findings suggest that knowledge of sleep hygiene is related to sleep practices, which, in turn, is related to overall sleep quality. The data from their regression modeling indicated that variable sleep schedules, going to bed thirsty, environmental noise, and worrying while falling asleep contribute to poor sleep quality.”

**Sleep Hygiene**

Research on sleep hygiene has shown that it exacerbates but is not the root cause of sleep disorders such as insomnia. Sleep hygiene includes behaviors related to improved sleep conditions, and, subsequently, sleep quantity and quality. According to Stepanski and Wyatt (2003) the behaviors (commonly? –check if this is the study for the survey I am using and specify if so) addressed in sleep hygiene include consistent/variable sleep bedtimes/waking; light and noise, naps/homeostatic pressure, impact of stimulants/depressives including alcohol, caffeine, and prescription medications; exercising close to bed time; spending time in bed while not sleeping, for example, watching television, reading, etc.; performing mental activities, planning, etc. in bed or just before bedtime; and poor sleep conditions/bedding.

Sleep is essential to a variety of life’s activities. Sleep deprivation has been found to impair multiple tasks in the realms of motor performance, cognitive performance, and even mood (Pilcher & Huffcutt, 1996). Some of the areas of cognitive functioning that have been shown to be impacted by sleep disturbances include: working memory, attention, perseveration, cognitive flexibility/inflexibility, creative thinking, decision making, and long-term memory (Alhola & Polo-Kantola, 2007; Harrison & Horne, 1998; Horne, 1988; Redline et al., 2007). In Pilcher and Huffcut’s (1996) meta-analysis of 56 studies examining the impact of sleep loss on performance in adults, they found that cognitive abilities were more impaired than motor abilities. Interestingly, they found that a partial sleep deprivation versus long- or short-term deprivation had the most profound detrimental influence on cognitive performance tasks. This is significant in that, unlike adults, the majority of school age children do not experience full sleep deprivation as measured by above or below 45 total hours of total deprivation. Children of this age range are more likely to experience the partial deprivation of less than five hours of sleep in a 24 hour period. In this light, the findings of Pilcher and Huffcut’s meta-analysis have particular relevance to the functioning of the school age child/adolescent.

Although the research has not been as extensive as with the study of adults, multiple studies have evaluated the impact of sleep on the behavioral and cognitive functioning of children and adolescents (Dahl, 1996; Lavigne et al. 1999; Randazzo, Muehlbach, Schweitzer, & Walsh, 1998; Sadeh, Gruber, & Raviv, 2003; Touchette et al., 2007). Reinforcing the findings of the meta-analysis discussed above, Sadeh et al. (2003) found that even subtle changes in sleep can effect neurobehavioral functioning in children (mean age = 10.6). In this study, sleep habits were either altered by an average of 41 minutes decreased sleep over three nights (restricted sleep group) or by an average 35 minutes increased sleep over the same time period (extended sleep group). Individuals with an increased sleep time showed a better performance on neuropsychological tasks that include skills such as processing speed, attention, memory, and scanning.

Likewise, in another study addressing the relationship between sleep duration and behavioral/cognitive functioning in young children, Touchette et al. (2007) found that a one hour reduction in nightly sleep was correlated with a decreased performance on a picture vocabulary test (a measure of receptive vocabulary and verbal intelligence) and the Block Design subtest of the Wechsler Intelligence Scale for Children – Third Edition (WISC-III) (a measure of visual/spatial skills and nonverbal intelligence). Their results show that decreased duration of sleep may influence language acquisition by impairing the integration of new words into memory. Similar findings by Randazzo et al. (1998) demonstrated in young adolescents that restriction in just one night of sleep showed a decrease in executive function which they described as being involved in the “retrieval of knowledge from long-term memory” along with involvement in other functions (p. 866). Sleep impairments have a profound influence on the functioning of children in various ways but possibly the most significant effect is in the academic setting. One aspect of cognitive functioning that is essential for success in the classroom, and is significantly impacted by insufficient sleep, is working memory. (When transitioning to the college level, students acquire a new level of independence that often involves changes in responsibility and requirements for more self-motivation and self-control. Students need to be responsible for their own learning, engagement, and outcomes. As a result, academic engagement becomes more essential to the success of college students.)

Working memory is vital for academic learning and success, as it is the concurrent storage and manipulation of information that is used in more complex tasks (Baddeley, 1992). A number of key skills that comprise the foundation for scholastic achievement are dependent on this ability to retrieve and process information at the same time. These include reading acquisition, arithmetic fact retrieval, and language comprehension (Fabbri, et al., 2008; Gathercole & Baddeley, 1993; McLean & Hitch, 1999). Arcia, Ornstein, and Otto (1991) documented that working memory tasks such as digit span and symbol-digit coding were highly correlated with achievement scores in both reading and mathematics. They found a positive correlation between the two, in which students who were capable of longer digit sequences performed better on achievement tests. Mclean and Hitch (1999), in comparing arithmetic abilities and working memory tasks, found that those with poorer arithmetic skills also had decreased levels of performance on working memory items. To further support the influence of working memory on academic functioning there is evidence that phonological working memory is essential in learning new words and, subsequently, in reading development (Gathercole & Baddeley, 1993). Similarly, de Jong (1998) found that students with reading disabilities exhibited working memory deficits across the board, both in language memory tasks and numerical memory tasks. The findings of these studies suggest general working memory impairment in students that are underachieving academically.

Numerous studies have discussed the negative impact of impaired sleep on working memory. Turner, Drummond, Salamat, and Brown (2007) reported that specifically the span of working memory is associated with total sleep deprivation. In another study, working memory scanning speed showed no learning improvement when the participant was sleep deprived, whereas performance improved over time when the subject got adequate sleep (Casement, Broussard, Mullington, & Press, 2006). Casement et al. found a 58% increase in learning for adults who had 8 hours of sleep a night as compared to those that only had 4 hours. Perhaps the most significant aspect of the findings in this study is that the lower sleep group did not show deficits when compared to their baseline. It was only over the course of days and in the context of progressive learning that there appeared to be a differential impact. This effect may be due to other moderating features such as time of day for testing which will be discussed below.

In childreneven small sleep deficits have been found to impair working memory tasks (Sadeh, Gruber, & Raviv, 2003). Sadeh et al. (2003) documented increased memory performance in children with only a half hour sleep extension. Seventy-seven children in the fourth or sixth grade were evaluated using an actigraph watch (which measures motor activity and sleep-wake patterns in a child’s natural setting) and a sleep-wake diary (which documented self-reported assessments of daytime fatigue, perceived duration to fall asleep, etc.). The watch was worn by participants for five nights, two of which were meant to establish a baseline and three nights to evaluate the treatment conditions. In order to assess their neurobehavioral functioning, the children were given a series of six tests including three that involved working memory: symbol-digit substitution (where the child must identify a rearranged group of digits and symbols from a short presentation of a nine figure sequence), visual digit span (where the child must recall a visually displayed sequence of numbers), and serial digit learning (where the child must recall verbally presented sequences of numbers). Neurobehavioral functioning was first assessed on the second morning to establish baseline and then again on the sixth morning (at the same time of day) after the treatment of either one hour sleep restriction or extension had been in effect for three nights. The study found that with just a 35 minute sleep extension children showed a significant improvement in memory related activities such as digit span forward as compared to children with no change in sleep duration or sleep restriction.

**Sleep Habits in Adolescents and Young Adults**

**Stress/Stressful Life Events**

**Exercise**

Gender and exercise in college students: Buckworth & Niggs 2004.

Similar to sleep, exercise has been shown to positively impact a myriad of life’s functions including mood, mental health, telomere length, cognitive functioning, attention, cardiovascular health, stress levels, and self-esteem (Galper et al. 2006; Manger & Motta, 2005; Puterman et al. 2010; Spence et al. 2005; VanKim & Nelson, 2013; )

**Exercise and Academics/Achievement**

A study completed by Swedish researchers Kall et al. (2013) utilized a school-based physical activity intervention “School in Motion” program for a group of 5th graders in a cross-sectional design to determine whether it impacted the students’ odds of reaching the national goals in areas such as Swedish, English, and mathematics. Their findings indicate that “The results of this study showed that a school-based physical activity intervention program designed to make students more physically active during the school day significantly improved the children’s academic achievement.” And “However, our findings are in line with those of other previous studies,4,5,10,18-26 and thus, contribute to the body of evidence for a link between exercise and learning. Because time devoted to physical activity could instead be time devoted to academic work, physical education is sometimes seen as a competitor of academic studies. One could question whether school-based physical activity is provided at the expense of time dedicated to academic learning. However, previous studies have demonstrated that increases in time spent in physical education are not likely to detract from students’ academic effort.5,30,31 At the time of our study, the intervention school did not have a regulated time plan, and the play and motion activities did replace some academic time. Only a little extra time for some classes was added to the ordinary schedule.” The authors noted benefits to physical activity on academic achievement as potentially improved concentration and enhanced behaviors conducive to learning, increasing self-efficacy, reducing stress, and enhancing mental health.

From Kall “The author of a previous study38 suggested that increased physical activity during the school day may induce arousal and reduce boredom, which may result in increased concentration and an increased attention span. A more motivating school environment may have encouraged the students in the present study to engage more fully in schoolwork and may have thus been a mediating factor contributing to the results observed. However, all these effects may also have been the result of the intervention having a direct or indirect impact on the children’s academic achievement. Biological effects, such as increased cerebral blood flow and angiogenesis (a primer for neuronal plasticity), may also have contributed to enhancements of the prerequisites for learning. In combination or separately, these mechanisms may be the underlying factors mediating the link between exercise and academic achievement. The literature provides evidence that fitness and exercise may boost brain function and cognition.23,39,40”

Physical exercise and fitness has been shown to have a myriad of beneficial impacts on cognition, executive control, learning, academic achievement, mood, self-esteem, and general health (Fedeway & Ahn, 2011; Hillman, Erickson, & Kramer, 2008; Kristjansson et al., 2010; Pontifex et al. 2009). In a meta-analysis looking at the effects of physical activity/fitness on children’s achievement, Fedewa & Ahn (2011) analyzed 59 studies from 1947 to 2009 and found a significantly positive effect on both achievement and cognitive outcomes. Their overall results were similar to previous meta-analyses that indicated a similar effect of exercise on cognitive outcomes (Sibley & Etnier, 2003; Etnier et al, 2006). Although most areas of evaluated physical activity yielded significantly positive results, the meta-analysis showed that aerobic exercises resulted in the largest impact on cognitive outcomes and academic achievement. One area of physical activity that did not show significant results was that of flexibility. A study completed by Pontifex et al. 2009 also found positive effects of aerobic activity. In their study aerobic exercise showed a larger reduction in response times for working memory than in those conditions with resistance exercises or seated rest. Additionally, the analysis by Fedewa & Ahn suggested an increase in achievement as activity levels increase. It is also interesting to note that the area of achievement most affected in these children was mathematics, followed by positive effects on reading achievement and IQ. Finally, the authors note that the effects were as significant or more so on children with learning or physically disabilities. Fedewa: “Physical education is therefore assumed to be a threat to academic subjects, as time spent in physical activity could be time devoted to learning reading, science, and mathematics.”

Fedewa pg 522 “smaller studies have associated time spent in physical activity and/or the level of children’s physical fitness with higher cognitive performance. Similar findings are reported throughout the literature in this area, suggesting that an increase in physical activity and fitness level is positively associated with higher cognitive functioning and achievement scores in elementary and middle school-age children (Burton & VanHeest, 2007; Sibley & Etnier, 2003).”

Fedewa: “, a number of recent studies have addressed the question of whether physical fitness enhances cognitive or achievement outcomes for children (e.g., Castelli, Hillman, Buck, & Erwin, 2007; Coe, Pivarnik, Womack, Reeves, & Malina, 2006; Eveland-Sayers, Farley, Fuller, Morgan, & Caputo, 2009). Thus, the inclusion of these recent studies is critical to inform the relationship between physical activity/ fitness and children’s cognitive functioning. Given budget constraints and increasing.” “the purpose of this study was to quantitatively synthesize the research on physical activity and children’s cognitive outcomes and to discuss implications for educators and other stakeholders in children’s academic achievement.”

**Exercise and Study Skills**

**Exercise and Classroom Participation**

**Exercise and self-esteem**

One of the factors of Academic Engagement is “perfomance engagement” and a component of that is “Being confident that I can learn and do well in the class”. Self-esteem is intrinsically linked to self-confidence (find supporting evidence). The effects of exercise on global self-esteem were evaluated in a study be Spence et al. 2005. They did a quantitative review of the research and found a small but significant increase in self-esteem associated with exercise and a larger effect size when there were significant changes in physical fitness.

**Amount of Exercise**

**Fedewa: “**In terms of how much physical activity to provide students, a related finding of the current analysis revealed that physical activity provided three times per week exerted the strongest effect on children’s cognitive outcomes and achievement. Although few researchers have examined the relationship between the amount of physical activity and children’s cognitive outcomes and achievement, there is evidence that more physical activity produces higher achievement scores (Coe et al., 2006; Shephard, 1997). One proposed reason for this is that increased activity may enhance arousal and minimize fatigue and boredom (Shephard, 1996). An alternative explanation by Shephard (1996) proposes that increased physical activity leads to higher levels of self-esteem, optimizing students’ academic achievement. Other, more neurological, theories tout that changes in brain structure, function, and neurotransmitter concentrations occur in individuals who are more physically active (Hillman et al., 2004; Hillman et al., 2006; see Trudeau & Shephard, 2010). All of these hypotheses could serve as possible explanations for the current findings, but more research is needed to investigate the complex relationship between physical activity dosage and cognitive outcomes in children.”

**Exercise and Stress**

Exercise has been shown to improve emotional well-being in a variety of ways. For instance as a study by Manger & Motta (2005) indicated, a 12-session aerobic exercise intervention improved the symptoms of Post-traumatic Stress Disorder (PTSD), anxiety, and depression. Puterman et al. (2010) found a significant moderating effect of exercise on the impact of perceived stress levels on telomere length (TL), stating that, “Vigorous physical activity appears to protect those experiencing high stress by buffering its relationship with TL (telomere length).” Another study (VanKim & Nelson, 2013) showed that in a sample of over 14,000 undergraduate students those that met the most vigorous levels of physical activity were less likely to indicate perceived stress and poor mental health. No differences based on sex or ethnicity were identified. They discussed how poor mental health and perceived stress are highly correlated so consequently showed similar magnitude and directionality for the association with vigorous physical activity. Additionally, their study suggests that socializing partially moderates the relationship between mental health/perceived stress and physical activity. Vankim and Nelson discussed the following “Approximately a third of young adults (ages 18–24 years) in the United States attend college, representing a critical mass of the young adult population.11 In addition to decreased PA, the transition to college can be academically and socially stressful for students.12 In a study assessing cardiovascular health among college students, nearly 60% of participants reported high or very high stress.13 Increases in reported stress could be attributed to the set of academic and social stressors within the college setting, such as examinations, interpersonal relationships, and the transition to living independently.12 Relatedly, college can also be a period of increased risk for poor mental health and depression.14,15 A nationally representative study of college students found that 4.8% reported symptoms of poor mental health and depression,14 and a study of adolescents and young adults (ages 15–24 years) from the National Comorbidity Survey found that 5.8% met Diagnostic and Statistical Manual of Mental Disorders (Third Edition Revised) criteria for major depression and 2.1% met criteria for minor depression in the past 30 days.15 Recent national data from the Behavioral Risk Factor Surveillance System indicates that compared to other adult age groups, young adults (ages 18–24) have the highest prevalence of depressive symptoms that do not meet the criteria for major depression.16 The ability to cope with the stressors associated with the college environment is important for maintaining both mental and physical health.” And for discussion: “Interventions aiming to improve mental well-being of college students should also consider promoting physical activity. At least some of the positive benefits of physical activity may arise from social interactions.” It has also been noted that physical activity shows a decline as students advance in age with less likelihood of participating in vigorous exercise at the college level than in earlier years (Vankim & Nelson, 2013; Nelson et al., 2007; Troiano et al. 2007). Consequently, research such as this can help identify the areas of personal care that will have the greatest impact on undergraduates academic engagement and subsequent college outcomes. Understanding the pathways for student achievement and engagement can help focus intervention efforts to highlight areas that will be the most beneficial and effective. Nelson et al.: “Vigorous physical activity (VPA) declines from adolescence into adulthood and social disparities in VPA exist. Physical activity is understudied in the college setting. Fewerstudents engaged in VPA in college compared with high school (males 74% to 52%; females 68% to 44%). Athletics was associated with VPA, but 51% participated in high school and 15% in college. Among females, African Americans, Asians, and students of lower socioeconomic position (SEP) were less likely to engage in VPA in college, adjusting for high school VPA. Among males, Asians and older students were less likely to engage in VPA.”

**Exercise – Discussion:**

Buckworth & Niggs found that different sedentary behaviors were negatively correlated with exercise or physical activity, (showing that discretionary time of college students is often utilized based on gender), with females more likely to watch television and males more likely to spend time on the computer versus exercising. However, “Time spent studying was positively correlated with days per week of strength training for females, and with typical duration of exercise for both males and females.”

Buckworth & Niggs 2004: “Participation in exercise during college students’ discretionary time may be positively modified by targeting sedentary activities, as has been demonstrated in studies with children in which increased physical activity was an outcome of strategies to reduce time in sedentary behaviors.20 Based on our findings, college health promotion specialists should consider designing interventions that pose physical activities as more accessible and more rewarding than using the computer for male students and watching television for female students. Future research should include the development of instruments to detect a more extensive range of sedentary activities typical of college students, as Lee and King30 have done for older adults, that can be evaluated in terms of perceived choice and reinforcement value. Decreasing accessibility and rewards from major competing sedentary activities while increasing the accessibility and reinforcement values of exercise and physical activity can have immediate and long-term health benefits for college students.”

Trost et al. 1999 stated the following based on their research on 6th grade students: “These findings are consistent with previous studies using self-reported physical activity and suggest that interventions to increase physical activity in preadolescent youth should endeavor to boost physical activity self-efficacy by offering a wide selection of enjoyable, developmentally-appropriate physical activity options.”

**Academic Engagement**

***Quote from Legget article 2016 pg 125 “Consistent with existing work (Devanand et al., 2002; Kessler, 1997; Kraaij et  al., 2002), stressful life events were associated with higher levels of depressive symptoms, and a time when individuals were experiencing above average levels of stress was also associated with more depressive symptoms. Similarly, restless sleep was associated with more depressive symptoms, and times when individuals reported worse sleep than was typical for them were associated with increased depressive symptoms. We uniquely find that variability over time in stress and sleep, and not just the average level of these factors, appeared to be related to depressive symptoms. In addition, we found a significant interaction between stressful life events and restless sleep at the within-person level showing that restless sleep strengthens the association between life events and depressive symptoms. In other words, those experiencing stress above what is typical for them are at particular risk for elevated depressive symptoms if they are sleeping more restlessly than usual. Sleeping restfully may therefore be allowing individuals the rejuvenation needed to manage their stress adaptively. Further, this association shows that stressors and risk factors may not always act independently of one another, and intervening on one risk factor, such as sleep disturbance, may have a positive impact on the entire pathway of biopsychosocial risk to depressive symptoms.”***

The current study looks at how sleep, exercise and positive executive functioning study habits mediate the relationship between stress and coping strategies. Research has shown that certain coping strategies are correlated with more positive outcomes, while other coping strategies can result in more deleterious outcomes for adolescents. In a study completed by Sulkowski et al. in 2010, they found that of the four evaluated coping strategies (Denial, Emotional, Reactive, and) the tendency towards behaviors associated with bulimia were higher in those students with the purportedly less functional emotional coping strategy. The other coping strategies were not found to be mediating factors in the relationship between stressful life events and bulimic behaviors. It calls into question whether the impact of other protective factors such as positive sleep behaviors, regular exercise, and if faced with similar stressors are the listed preventative factors associated or impact the likelihood of utilizing a more positive coping strategy. The implications of providing a predictive model of the likelihood of utilizing positive coping strategies can be seen in being able to tease apart the protective factors that can be most highlighted for intervention.

Coping:

Coping is the response to perceived threat. The oft cited “fight or flight” **saying** is a simplification of the tendency to respond in different ways when a situation is perceived as threatening. Carver and his colleagues (1989) created a coping inventory to help identify the various ways in which people tend to respond in situations of stress. They built on the initial writings of Lazarus (1966) who explained the relationship of stress and coping as having three steps including: primary appraisal, secondary appraisal, and coping **(Expand on the three steps of coping – find original study)**. Lazarus and Folkman’s (1980) development of a coping measure called Ways of Coping. This measure was revised in 1985. **Highlighted** **(use a word similar to found/embedded)** in the Ways of Coping measure is a distinction between problem-focused coping and emotion-focused coping. Taking action and problem solving are the focus of problem-focused coping, while emotion-focused coping is more of a tendency to place emphasis on ways to diminish emotional distress. Carver et al.’s inventory was in response to the conflicting research indicating that coping strategies were more complex than a two-pronged concept and that other proposed coping characteristics (denial, social support) were not falling under emotion-focused coping like several researcher proposed they belonged. Their inventory evaluated and broke down coping into several major factors including a four-factor pattern: Factor 1 included active coping, planning, and suppression of competing activities; Factor 2 included seeking social support and focus on emotions; Factor 3 included acceptance, restraint coping, and positive reinterpretation and growth; and finally, Factor 4 included denial, mental disengagement, behavioral disengagement, and turning to religion.

**Look at Carver study to explain personality characteristics linked to the various types of coping – see discussion. Also, look at page 12 to discuss differences between women and men in coping strategies. This page also looks at the benefit of seeking social support across multiple types of strategies. Page 13 addresses the coping style as dictated by their belief that the situation is amenable to change. “Ways to deal with life’s adversity” Discussion states “It is time to give more thought to what self-regulatory functions are implicit to people’s coping efforts.” (Page 15)**

Methods

**Exercise – Methods**

In research by Galper et al. they classified physical activity into four groups including inactive (< 1), insufficiently active (1-10), sufficiently active (11-19), and highly active (>=20) based on miles per week of walking, jogging, and running. They found no significant differences between the sufficiently active and highly active groups when it came to the impact on depressive symptoms and emotional well-being. Galper et al.: “The analyses presented here show that depression and emotional well-being reached a plateau at 11–19 miles per week of walking, jogging, and running on the PAI (see Figs. 2 and 4). It is noteworthy that this weekly dose of physical activity is equivalent to 1100 –1900 kcal·wk1 , or approximately 2–3 miles or 30 min of aerobic activity on most days of the week, which is “sufficiently active” to attain most health benefits according to current public health recommendations for physical activity in adults (22,32). However, some research suggests that the intensity, frequency, or duration of physical activity may be independently associated with health outcomes (7,16). We were not able to examine these parameters because they are not part of the PAI. If we had been able to investigate other measures or categories of physical activity, we may have found different dose–response relationships. For instance, our results may have been more consistent with evidence of a nonlinear dose–response relationship (7)”

**(Sulkowski et al.) My current study: “2.1. Participants and procedures**

**Participants included 147 female undergraduates from a large**

**university in the Southeastern United States. All participants were**

**enrolled in educational psychology classes and received course credit**

**for their participation. Students were offered an alternative activity**

**for earning extra credit if they preferred not to participate in the**

**study. Participants ranged in age from 18 to 25 years. Due to missing**

**data or failure to meet age criteria (older than 25 years), 12 of the**

**participants (8% of the initial sample) were omitted from the study.**

**Participants were ethnically diverse, as 64% listed their ethnic**

**background as White/Caucasian, 19% as Black/African American, 10%**

**as Hispanic/Latino, 3% as Asian, and 4% as Mixed/Other. A university**

**institutional review board approved all study procedures.**

**2.2. Measures**

**2.2.1. Stress**

**The Undergraduate Stress Questionnaire (USQ; Crandall, Preisler,**

**& Aussprung, 1992) contains a list of 82 common life stressors that**

**undergraduate students may encounter. Participants are instructed to**

**indicate whether they have experienced each life event within the**

**past semester by checking “yes” or “no.” The USQ demonstrated good**

**reliability in the current study (α=.89).”**

(Legget et al., 2003) “The sample includes 3,597 adults aged 25 years or older who were surveyed up to five times over 25 years. Multilevel models were run to examine between- and within-person variability in sleep disturbance and life event stress as predictors of depressive symptoms, and an interaction to test sleep disturbance as a moderator is included in a second step.”

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# [Heading 1]

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## [Heading 2]1

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[Heading 3]. [Include a period at the end of a run-in heading. Note that you can include consecutive paragraphs with their own headings, where appropriate.]

[Heading 4]. [When using headings, don’t skip levels. If you need a heading 3, 4, or 5 with no text following it before the next heading, just add a period at the end of the heading and then start a new paragraph for the subheading and its text.] (Last Name, Year)

[Heading 5]. [Like all sections of your paper, references start on their own page. The references page that follows is created using the Citations & Bibliography feature, available on the References tab. This feature includes a style option that formats your references for APA 6th Edition. You can also use this feature to add in-text citations that are linked to your source, such as those shown at the end of this paragraph and the preceding paragraph. To customize a citation, right-click it and then click Edit Citation.] (Last Name, Year)

Discussion

Fedewa: may be useful as part of discussion: “It is interesting that individualized physical activity interventions showed no significant impact on children’s cognitive outcomes or academic achievement. However, the effect of physical activity programs was largest when a small-group intervention was conducted, followed by a moderate effect for a medium-group intervention (10–30 children). This finding was not surprising given the effectiveness on children’s outcomes when provided smallgroup instruction and intervention. Research investigating the promotion of physical activity in children point to the effect of peer influence—perhaps a reason for the small group effect found in this analysis. Salvy and colleagues (2009) showed that the presence of a peer increased the motivation of overweight youth to be physically active. This finding has been consistent in the literature, emphasizing the importance of peer influence for youth’s involvement in physical activity, particularly for elementary and middle-school youth (Beets, Vogel, Forlaw, Pitetti, & Cardinal, 2006; Bukowski, Hoza, & Boivin, 1994). These findings have several implications, as individualized physical activity interventions for children can be both costly and time consuming. According to these findings, using small group physical activities will result in higher cognitive and achievement outcomes than even medium group (i.e., classroom size) interventions. Thus, an effective means of using limited school resources may be to target children who could most benefit—both academically and physically. Implementing physical activity interventions for those children most at risk will allow for both a smaller group size and significant achievement gains.”

Troiani et al 2007: “However, 'adherence to physical activity recommendations according to accelerometer-measured activity is substantially lower than according to self-report. Great care must be taken when interpreting self-reported physical activity in clinical practice, public health program design and evaluation, and epidemiological research.”

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Tables

Table 1

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