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NOTE: The Missouri Journal of Health, Physical Education, Recreation and Dance began using volume numbers with the 1991 issue, which was designated volume 1. Earlier issues do not bear a volume number.
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Creating Blue Zones: Global Perspectives in School Health and Physical Education

Therese Miller

Thomas Friedman’s 2005 international bestselling book, *The World is Flat*, introduced an economic theory describing how globalization and technology have “leveled the playing field”. With this shift in economic practice, countries and companies are able to compete for products, sales, and work while exploring opportunities, collaborating, borrowing ideas and practices - unrestricted by national boundaries (Friedman, 2005).

Ten years later, the October, 2016 edition of National Geographic applied this “flat world” approach of sharing to health information and practices in its analysis of healthy global lifestyles (Buettner, 2016). The first half of the publication examines the five cultures around world where people live longest, labeled Blue Zones. The author describes in detail the lifestyles of happy and healthy people of Mediterranean Greece, Okinawa Japan, the Italian island of Sardinia, Loma Linda California, and the Costa Rican peninsula. He concludes that their health successes are simply variations of nine basic Blue Zone principles. For example, while the people of each area embrace a plant based diet (Principle #5), the Greeks of Ikaria are especially partial to wild greens, while seaweed and mushrooms are a favorite of the Japanese in Okinawa, and tomatoes and chickpeas are the mainstay of dishes in Sardinia, Italy. In short, while the details of their lifestyles differ, the enduring and durable people of each Zone share a common predilection toward a classically balanced style of moving, eating, and relaxing in a supportive community environment.

The second half of the report explains ways that these principles can be adopted personally, at home, and in communities. The state of Iowa, in fact, has even launched a campaign to “Blue Zone the Hawkeye State” town by town.

Schools serve as the focal point of the community, engaging the energy of the next generation, their families, economic partners and local government. Health and physical educators are uniquely positioned to “color” their local wellness landscape “Blue”. Drawing from research and observations worldwide, teachers can tap into their local assets, behavioral styles, and infrastructure to design their own blueprint for health in their community. Their inspiration and leadership create a groundswell rippling from the school to families, tapping into the strengths of their communities. While many lifestyle behaviors in other countries are intimately linked to institutions and political philosophies different than our own, teachers and students, families and communities can strategically integrate and adopt ideas that serve them well. Careful
consideration of other’s ideas and philosophies enhance our “wins” and minimize our “losses” as we work toward personal, local, district, and eventually national health goals, e.g. Healthy People 2020.

My travels to Finland and Korea, two nations who have consistently scored high in international educational outcomes (OECD, 2012 & 2015), as well as my reading, and conversations with domestic and international students have allowed me to reimagine educational practice and community health. You are invited to consider these ideas related to the nine Blue Zone principles, but encouraged to craft your own school and community Blue Zones practices based on the personality and needs of your locale.

Blue Zone Principle #1: Move Naturally.

The pastoral wandering of shepherds in Sardinia best exemplify the optimal health benefits of moving regularly throughout the day. In the classroom, this is what happens in the time and space between and around the formal instructional moments. In our communities, this is what happens before and after school, in the evenings and weekends. A seemingly simple principle, it is often denied by daily schedules that are rigidly planned and overextended. Not only is the routine of school day problematic, Linda Putnam, in her book *Workplace Wellness that Works*, similarly explains the tension of corporate design that pits “what we are culturally being asked to do to against what we are biologically designed to do.” (Putnam, 2015). She explains that workplace wellness is really about “getting back to doing what we naturally do.” – which is move. In Finland, elementary students enjoy variable daily class schedules and frequent 15-minute play breaks during the day. Inspired by this model of learning and play blended throughout the day, fourteen schools in Texas are currently testing aspects of this model with impressive student outcomes (Rhea, 2017).

Blue Zone Principle #2: Purpose.

“What do I live for beyond work?” …Within the context of education, this principle asks, “Has education’s purpose shifted from developing individuals who contribute to a healthy society versus achieving educational outcomes? Conventional Finnish life philosophy is “Work to Live, Not Live to Work”. Similarly, teachers in Finland are not captive to a long list of learning outcomes, but instead to objectives that are individually implemented by the teacher. Witnessing the technologies and the activities of the Finland classroom, I watched students in first grade sew felt fruits and vegetables for their “farmer’s market” (with needle and thread) and sixth graders learn to knit, work with wood, do laundry and cook. Map reading and orienteering are a mainstay of Finland Physical Education curriculum. The activities seem to serve a greater purpose – to develop life skills, and encourage independence and responsibility. What could that look like in your school’s physical education and health curriculum? Soaring interest in archery has nearly 150,000 Missouri students participating in this new outdoor activity (NASP, 2015). Health classes are ideal places to discover challenging, yet relaxing recreations such as sewing, knitting, woodworking, etc. A local Jefferson City, Mo.
high school has introduced a new course in Life Skills for the 21st Century.

**Blue Zone Principle #3: Downshift.**

Teachers know too well the reality of pushing themselves and their students to a point of diminishing returns. Compounded by the uptick of being constantly “plugged in and turned on”, the need to downshift is greater than ever. Taking time to turn down the heat and disconnect surely releases the pressure. Rachael Kessler describes “classrooms that welcome soul” as having time and space for silence and solitude, as well as opportunities to go beyond perceived limits, experience joy & delight and tap into creative pursuits (Kessler, 2005). In the Blue Zones, this takes the form of few minutes each day to reflect, daydream, nap or pray. In schools, it may start as simply as a “deep breath” as young children in preschool learn yoga.

For children (and adults), play is the perfect anecdote to the pressures of daily life. The pragmatist may argue against the seemingly frivolous pursuit of play. However, play exerts enormous social, physical, emotional, and cognitive benefits (Brown, 2009). Play takes practice; and we are mistaken to believe that children who don’t play at school will make up for the lost playtime at home. Research shows that children who are sedentary at school actually are more sedentary at home than children who are active at school (Dale, Corbin, & Dale, 2000). Lest the utilitarian focus of education distract us from the basic needs of children, Article 31 of The United Nations Convention on the Rights of the Child “recognize the right of the child to rest and leisure, to engage in play and recreational activities appropriate to the age of the children and to participate freely in cultural life and the arts.” (United Nations General Assembly, 1990).

**Blue Zone Principle #4: 80: 20 Rule.**

According to Hara hachi bu rule of eating, one stops eating when he or she is 80% full. Full does not mean packed, stuffed or burdened. In the classroom, more is not necessarily better. Research found that 4th grade students who engaged in 10 minutes of pre-class walking before a 30-minute science class performed similarly to their peers who had the full 40-minute science class. Classroom behavior was also better in the active class (Miller, 2000). “Brain breaks” are one way that teachers tap into the healthy perspective of “not maxing out”.

While teaching a summer term at a university in Seoul, I witnessed the Korean ethic of hard work and focus on high academic achievement that has produced impressive national educational and economic outcomes in just a few decades. I also observed the strenuous demands on school children who commonly attend afterschool academies. Students commonly take classes in Math, Science, English and other subjects after school and well into the evening to improve their performance and set them up for future academic and professional opportunities. Some Korean young people and parents alike explained that the intense demands on students exerts a physical, mental, and emotional toll.
Blue Zone Principle #5: Plant Slant.

An overriding principle of robust living is a “plant slant” – a nutritional approach that is plant based, garnished with relatively small amounts of meat. The Blue Zone diet is nuanced by local varieties of greens, herbs, beans, tubers, and fresh fruits. Known the world over, good nutrition energizes and sets the tone for work and learning. Missouri students may not fancy seaweed or even have access to it, but a little nudging may help them budge from blah, beige corndogs and hamburgers on a bun to cooler varieties – “cool” as in bright green, yellow, and red fruits and vegetables. The Finnish students’ lunch of spinach pancakes with lingonberry jam, accompanied by red cabbage and mandarin orange slaw and diced potatoes with peas may not yet appeal to American students’ culinary sensibilities, but Midwest gardens boast of seasonal favorites such as snap peas, tomatoes, and radishes. The more adventurous may experiment with more native varieties. What about virgin dandelion greens in your salad? (I knew I had a coveted commodity in my yard).

The Southern Boone Learning Garden is an integrated model of school and community education and outreach (SBLG, 2017). The vital connection between students and families to nature and food cannot be underestimated. School and community gardens not only “color the ground”, but they add new tastes, interesting smells, and intriguing textures to the culinary scenery. Similarly, the health curriculum cannot help but be inspired by the integration of life cycle and senses afforded by plant life.

Blue Zone Principles #7 and #9: Right Tribe & Loved Ones First.

Two Blue Zone principles, strong social systems and intergenerational investments, blend and bind each person’s healthy lifestyle within a supportive community. For example, “moais” in Okinawa are five friends committed to each other for life. They celebrate each other’s joys and accomplishments. They count on each other during times of disappointment and loss. Equally powerful Blue Zone relationships are elders’ devotion to their children and children’s children; similarly, children care for their elders.

In Korea, parents lobbied for Green Zone legislation which prohibited the sale of fast food and soft drinks within 200 meters of school grounds. Such “Green Zones” signaled the dedicated efforts of Korean adults who addressed their concerns about the influence of unhealthy food marketing and sale to their children. Adults in Finland are said to similarly guide and protect their children by always obeying stop lights (even when there is no oncoming traffic) so that young people who are encouraged to be independent do not mistakenly walk into danger. The first of its kind, but perhaps a prototype for the future, an intergenerational school in Cleveland innovatively taps into the wisdom and life experiences of the rapidly growing retirement sector. Curriculum and instruction enhance health and educational outcomes for young and old alike (George, Whitehouse, & Whitehouse, 2011).

Truly the Comprehensive School Health Model gets to the core of community integration and support for wellness education and healthy behaviors. Likewise, the grounding and security of healthy friendships...
are powerful; and, peer health educators can be the wellness “moais” in schools.

**Blue Zone Principle #8 Community.**

A spirit of reverence, character and values are highlighted in this Blue Zone principle. In Chapter 3 of Pope Francis’ encyclical letter, *Laudato Si: On Care for Our Common Home*, he cautions that “our immense technological development has not been accompanied by a development in human responsibility, values and conscience.” (Pope Francis, 2015). The gravity and urgency of recognizing personal limitations and power in an interconnected world is essential. More important than ever is the ethical considerations of knowledge and technology. Schools in Finland provide a religion class for each faith in which two or more children practice; remaining students of each individual religion are combined into a single ethics class. The Liink program in Texas, previously described, also includes a character development and ethics component along with regular play breaks (Rhea, 2017). While the Pope’s discussion of compassion and care (for others) and regard for the natural world is theological, Richard Louv’s book, *Vitamin N* provides more practical strategies and activities for parents and communities to guard against the nature-deficit disorder that he had warned about in his previous book, *Last Child in the Woods* (Louv, 2016).

Yet, is it possible that the simplest of actions could yield powerfully symbolic and virtuous outcomes? I couldn’t help but notice that students in both Finland and Korea drop their shoes off at the door outside their classroom at the start of each school day. They move throughout the day without shoes, unless they go outside. The classroom (and gym) is cleaner, quieter, more relaxed, …and less ripe for social comparison.

Attention to each separate principle of the Blue Zones contributes to the community health masterpiece. Similar to artists, health and physical educators look globally for inspiration and ideas, but think locally about how to creatively “paint” their community’s Blue Zone landscape. In the end, the blending and mixing of ideas and perspectives allows each school to create its own interpretation of a healthy and vibrant Blue Zone community. Metaphorically speaking, educators can adapt the lifestyle principles of the classic Blue Zones to reinvent their communities in their own unique “neo-classic” style.

**Addendum:** Please note that the omission of Blue Zone Principle #6: Wine @ Five has relevance in as much as dedicated teachers can responsibly relax and enjoy the fruits of their labors as they transform the health of their schools and communities. 😊
References


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An Examination of Differences of Academic Motivation Between Male and Female Collegiate-Student Athletes

Maggie Lee & Ryan Sten

Introduction: Previous research on academic motivation among collegiate student-athletes has focused on various influences such as peer relations and race. However, there is a need to examine academic motivation differences across gender due to an on-going stigma of academic disparity between male and female collegiate student-athletes. Purpose: The purpose of this study was to determine if male and female athletes at Missouri Western State University differ in levels of academic motivation. Methods: Participants were 40 collegiate student-athletes (20 male and 20 female students). Data was collected via a survey packet which included demographic questions, a developed original survey examining academic habits, and the Academic Motivation Scale (AMS-C 28; Vallerand, et al., 1992). Results: An independent t-test was conducted comparing gender and the sum of scores from the developed survey. The result of this test was significant (t (38) = -2.202, p < .05) indicating that female student-athletes had higher levels of academic motivation than their male counterparts. Additionally, a one-way ANOVA to determine if student-athletes’ post-graduation plans influenced academic motivation was also significant (F(3, 39) = 3.89, p < .05), indicating that athletes planning on pursuing a post-baccalaureate degree were more academically motivated. Conclusions: Female student-athletes had higher academic motivation compared to male student-athletes. Additionally, student-athletes who planned on pursuing a degree higher than a four-year degree had higher levels of academic motivation than student-athletes who planned on pursuing a professional career in sport and pursuing a job related to their degree of study. Implications: Identifying reasons for academic motivation disparities in collegiate student-athletes across gender may lead to better instructor preparation to ensure these student-athletes not only excel in their sport, but also in the classroom. Finding ways to motivate male and female collegiate student-athletes could lead to more post-graduation success and ultimately a better future.

The academic performance of collegiate student-athletes has been a topic of interest for years, due to a stigma of academic underperformance. However, collegiate student-athletes who participate in a sport sanctioned
by the National Collegiate Athletic Association (NCAA), among other governing bodies, are unable to academically underperform without athletic punishment (Christy, Seifried, & Pastore, 2008). Stringent rules on continuing eligibility have driven some student-athletes to attempt drastic and dysfunctional measures such as paying students or coaches to complete class work, cheating, plagiarism, and other academically unethical acts (Powers, 2007). With academic performance dictating athletic participation, the area of academic performance in student-athletes has warranted research interest.

The notion that student-athletes academically underperform is often associated with low academic motivation (Levine, Etchison, & Oppenheimer, 2014). Student-athletes’ lower academic motivation is often attributed to many factors including greater prioritization of athletic performance and athletic activities interfering with academic performance (Adler & Adler, 1985). Specifically, academic motivation is defined as, “a student’s desire (as reflected in approach, persistence, and level of interest) regarding academic subjects when the student’s competence is judged against a standard of performance or excellence” (Eccles & Wigfield, 2002, p. 111). Academic motivation is an important construct because it is often used as a predictor of academic success (Sherry & Zeller, 2014), and research has indicated that many athletes do not initially have low levels of academic motivation upon entering college (Adler & Adler, 1985). Yet, many athletes experience a systemic decline in academic motivation as they progress through their collegiate career (Adler & Adler, 1985; Levine, Etchison, & Oppenheimer, 2014). Declining academic motivation through a collegiate career is often attributed to the realization that academic work at the collegiate level is arduous compared to high school material and student-athletes’ inability to adequately manage time. The predictable decline in academic motivation from freshman to senior year suggests that methods aimed at maintaining level of academic motivation at the freshman level may have a positive influence throughout the student-athlete’s academic career.

Academic motivation is also thought to be affected by group norms adopted by athletic teams. The formation of an athletic team norm is highly likely due to the amount of time team members spend with each other during athletic events and outside of athletic events. Adler and Adler (1985) concluded that athletes who demonstrated high levels of academic motivation were often ridiculed by team members with lower academic motivation, and noted that athletes experienced social isolation from the general student population which may further lead to adoption of negative academic norms. Levine et al. (2014) discovered that many student-athletes possess high levels of academic motivation but are negatively influenced by perceived lower academic motivation by teammates and these student-athletes will lower their level of academic motivation in order to fit into their peer group. The results of these studies demonstrate the complexity of academic motivation and the importance of
assessing academic motivation in order to predict academic performance. 

Area of academic motivation is also important. Deci and Ryan (2000) proposed the Self Determination Theory (SDT) that indicates individuals have two approaches to motivation, intrinsic and extrinsic. It also suggests that supporting these motivational approaches with positive reinforcement leads to increases in self-determination resulting in more positive behavioral outcomes. Intrinsic motivation is defined as doing an activity for its inherent satisfactions rather than for some separable consequence. Extrinsic motivation is defined as having motivation due to some outside source such as award or praise from an individual and amotivation is defined as a lack of motivation (Ryan & Deci, 2000). Students with higher intrinsic motivation have deeper engagement in the activity, higher persistence in learning, and better conceptual learning when compared to students who are extrinsically motivated (Vansteenkiste, Lens, & Deci, 2010). This finding highlights the importance of assessing the area of academic motivation in order to provide services to students to alter area and level of academic motivation which may affect academic performance.

Measurement of academic motivation is often accomplished by assessing GPA and/or standardized test scores (i.e. American College Testing, ACT; Gaston-Gayles, 2004; Purdy, Eitzen, & Hufnagel, 1982; Sherry & Zeller, 2014); however, this approach may be flawed, as student-athletes may have a high academic motivation but take challenging coursework which may subsequently lower their GPAs and measured academic motivation. Furthermore, when assessing standardized test scores, individuals may not complete the test in time or have test anxiety, among other factors, which may lower their scores and measured academic motivation. The development of a tool in which academic motivation would be measured accurately is desperately needed.

Academic motivation and academic performance have also shown to be influenced by gender (Rankin, et al., 2016). Research indicates that female student-athletes may have higher levels of academic motivation and academic performance compared to their male counterparts (Kulics, Kornspan, & Kretovics, 2015; Purdy, Eitzen, & Hufnagel, 1982; Rankin et al., 2016); however, the underlying reasons are unclear. Sherry and Zeller (2014) found females often possess higher academic motivation due to lower levels of athletic identity and less opportunity to gain professional status within their sport. For example, male collegiate athletes, especially at the Division I level, have more professional sport career prospects than female athletes at the same level (Gaston-Gayles, 2004). Additionally, Gaston-Gayles (2004) concluded that the professional career prospect disparity across gender encourages male student-athletes to focus more on advancing in their sport while female student-athletes will focus more on academic work due to lack of potential post-graduation professional careers in sport. However, where there may be an array of motivational influences, university size and division (division I, II, or III) that athletes
attend may also be a factor in motivation. For example, athletes attending smaller universities are more likely to attend for reasons other than becoming a professional in their sport (Gaston-Gayles, 2004). Therefore, examining only motivational influences of student-athletes attending Division I universities is not representative of all collegiate athletes. Understanding that the aforementioned academic motivational factors, along with university size, are crucial to academic success for these collegiate athletes and ensuring schools across the country can effectively manage the academics of both male and female college athletes. Therefore, the purpose of this study was to determine if male and female athletes at a Division II institution differed in levels of academic motivation.

**Methods**

**Participants**

A convenience sample of 40 student-athletes (20 males and 20 females) from the Missouri Western State University athletic department were used for this study. In order to qualify for participation in the study, student-athletes had to be part of an NCAA recognized team during the time of survey collection. Student-athletes currently classified as injured were allowed to participate in the study, for the rationale that injured student-athletes were still attending practice, engaging in active rehabilitation, and would soon be returning to play. Some sports with competitive seasons during the fall had completed their season, however these athletes were allowed to participate in the study due to minimal time elapse between completion of competition and data collection.

In order to increase sample representativeness, an attempt was made to sample student-athletes from a variety of sports. As such, male student-athlete participants were sampled from the sports of baseball, basketball, football, and golf, while female student-athletes were sampled from softball, golf, volleyball, and soccer. The athletes’ year in school ranged from freshman to senior and age of participants ranged from 18 – 22 yrs ($M=20.15, SD=1.25$).

**Measures**

All data were collected via a survey packet. An original survey was constructed specifically for the purpose of this project that examined participants level of academic motivation. The survey packet consisted of a consent form, demographic items, an original constructed survey for this project, and the Academic Motivation Scale (AMS-C 28) College (CEGEP) Version (Vallerand, et al., 1992). The demographic items consisted of questions regarding the athlete’s age, gender, year in school, sport of participation, major, current overall GPA, and years of participation in their sport. This data was gathered in order to gather group data and to group the athletes for analysis of the main hypothesis.

The original survey developed for the purpose of this study contained
17 items which included 14 questions in a 7-point Likert-scale (five reverse scored items) which assessed the athlete’s level of academic motivation, one multiple choice question which asked what the athlete planned to do after graduation, and two open ended questions which assessed primary motivations for attending college and participation in sport at the collegiate level. The Likert-scale questions were scored on a seven-point scale where a value of 1 represented “does not correspond at all” and where a value of 7 represented “corresponds exactly”, and a higher overall score indicated higher levels of academic motivation whereas a lower score indicated a lower level of academic motivation. The highest score possible was 98 compared to the lowest score possible of 14. Examples of questions included, “I know the due dates for my assignments” and “I would not attend class if I could still make the grades to remain eligible for my sport”.

The Academic Motivation Scale (AMS-C 28) (Vallerand, et al., 1992) is an accepted measure of intrinsic and extrinsic motivation in education and contains 28 questions on a 7-point Likert-scale. Specifically, the survey has seven subscales based on Self Determination Theory’s continuum of self-determined motivation categories and assessed the following: intrinsic motivation - to know, intrinsic motivation - toward accomplishments, intrinsic motivation - to experience stimulation, extrinsic motivation - identified, extrinsic motivation - introjected, extrinsic motivation - external regulation, and amotivation. Items represented responses to the question, “why do you go to college?” and examples of items included, “For the pleasure that I experience while I am surpassing myself in one of my personal accomplishments” and “To show myself that I am intelligent person”. The AMS-C 28 is used in many studies examining academic motivation and has demonstrated adequate validity and internal consistency (Fairchild, Horst, Finney, & Barron, 2005).

**Procedures**

Upon approval from the university Institutional Review Board, athletes were contacted directly in order to gain participants. The survey was directly administered to the convenience sample of volunteer participants outside of designated class or practice time and informed consent was obtained from participants prior to any data collection. All surveys were administered without coaching staff present and were completed in under 15 minutes.

**Data Analysis**

Data analysis was performed using SPSS (Version 23.0) for Windows. Descriptive statistics were computed for the demographic data. In order to examine the main hypothesis of whether levels of academic motivation differed between athlete genders, an independent $t$-test was used to analyze academic motivation as measured by the sum of scores reported on the 14-item Likert-scale. A separate independent $t$-test was used to analyze differences between male and female student-athletes on
self-reported GPA. Although not part of the main hypothesis, separate independent *t*-tests were also used to assess differences based on gender on the seven subscales on the AMS-C 28. Separate independent *t*-tests were also used to assess gender differences on each question in the original survey. Finally, a one-way ANOVA was used to determine the differences in academic motivation based on athletes’ post-graduation plans.

**Results**

Within the final sample of 40 athletes (*M* age =20.15 yrs, *SD* =1.25), there were 20 males and 20 females. The student-athletes ranged in grade level from freshman to redshirt senior: freshman (*n*=7), sophomore (*n*=4), junior (*n*=14), senior (*n*=10), redshirt freshman (*n*=1), redshirt sophomore (*n*=1), redshirt junior (*n*=2), and redshirt senior (*n*=1). In terms of sports represented, the following sports were included: baseball (*n*=5), men’s basketball (*n*=3), football (*n*=6), men’s golf (*n*=6), softball (*n*=10), volleyball (*n*=4), women’s golf (*n*=4), and women’s soccer (*n*=2). Finally, self-reported cumulative GPA averaged 3.39 (*SD*=0.39) on a 4-point scale for the overall sample. Self-reported academic majors included: biology/health science (*n*=2), health & exercise science (8), physical education (*n*=2), biochemistry/molecular biology (*n*=1), nursing (*n*=3), recreation sport management (*n*=4), elementary education (*n*=2), special education (*n*=1), digital animation (*n*=1), management/marketing (*n*=1), business finance (*n*=3), business management (*n*=4), psychology (*n*=1), electronic engineering technology (*n*=1), chemistry (*n*=1), manufacturing engineering (*n*=1), wildlife management (*n*=1), and undecided (*n*=3).

Two independent *t*-tests were used to determine if level of academic motivation differed between male and female student-athletes. The first *t*-test measured academic motivation via the sum of scores reported from the 14 questions on the original survey resulted in a significant difference (*t*(38) =-2.20, *p*<.05), indicating that female athletes had significantly higher academic motivation (*M*=73.1, *SD*=7.12) compared to male athletes (*M*=67.1, *SD*=9.89). The second *t*-test examining cumulative GPA across student-athlete gender was also significant (*t*(38) =-2.19, *p*<.05) and indicated female athletes had a significantly higher GPA (*M*=3.53, *SD*=.33) compared to male athletes (*M*=3.26, *SD*=.42).

Separate independent *t*-tests assessing differences in responses between male and female student-athletes in the seven AMS-C 28 subscales found only one statistically significant difference. Specifically, a significant difference was found in the extrinsic motivation - introjected scale (*p*<.05), with females averaging a significantly higher score a score of (*M*=22.1, *SD*=4.26) compared to males (*M*= 18.3, *SD*=6.84).

Separate independent *t*-tests assessing differences in individual items responses between male and female student-athletes on the 14 questions from the original survey found three significant differences. Item number 2 which stated, “I feel that it is important to maintain a high GPA,” was
significant \( t (38) = -2.316, p < .05 \), with females responding significantly higher \( (M=6.75, SD=.55) \) than males \( (M=6.05, SD=1.23) \). Item number 5 which stated, “I make time to study outside of designated class time,” was also significant \( t (38) = -3.206, p < .05 \), with females responding significantly higher \( (M=6.00, SD=.80) \) compared to males \( (M=4.75, SD=1.55) \). Finally, item number 9, which stated “I know the due dates for assignments” was statistically significant \( t (38) = -3.536, p < .05 \), with females responding significantly higher \( (M=6.80, SD=.52) \) than males \( (M=5.80, SD=1.15) \).

![Figure 1](image)

**Figure 1**

A comparison of reported plans after graduation versus sum of scores on the 14-item original survey.

Finally, a one-way ANOVA was used to determine academic motivation differences (the sum of the 14 original items created for this study) based on student-athletes’ post-graduation plans. The student-athletes plan after graduation was assessed by a separate question included in the
survey packet. Options for the post-graduation plans item included: (1) to obtain a job related to my degree of study \( (n=28) \), (2) to obtain a job not related to my degree of study \( (n=2) \), (3) to pursue a professional career in my sport \( (n=4) \), (4) to obtain a degree higher than a four year degree \( (n=6) \), and (5) other \( (n=0) \). The ANOVA results were significant \( F(3,39) =3.89, p<.05; \) see Figure 1) indicating academic motivation was different according to student-athletes’ post-graduation plans. Post hoc tests indicated that student-athletes who planned to obtain a job related to their degree of study had lower levels of academic motivation than student-athletes who planned on obtaining a degree higher than a four year degree \( (p=0.018) \). Student-athletes who reported wanting to obtain a job related to their degree of study averaged only 38.52 \( (SD=8.921) \) while those who planned of pursuing a degree higher than a four year degree averaged a score of 80.00 \( (SD=4.69) \). Additionally, student-athletes who planned on pursuing a degree higher than a four year degree were found to be significantly different when compared to student-athletes who aimed to pursue a professional career in sport \( (p=0.031) \).

**Discussion**

The purpose of this study was to determine if male and female student-athletes at a Division II institution differed in their academic motivation. The main hypothesis that female student-athletes would have higher levels of academic motivation compared to male student-athletes was supported. Due to their higher scores, it may be concluded that sampled female student-athletes have higher levels of academic motivation than the sampled male student-athletes. In an attempt to be consistent with other literature which measured academic motivation via GPA (Gaston-Gayles, 2004; Purdy, Eitzen, & Hufnagel, 1982; Sherry & Zeller, 2014), current results indicated that female student-athletes also had higher GPA levels than male student-athletes further providing indirect support that female student-athletes had higher levels of academic motivation which supports previous studies (Kulics, Kornspan, & Kretovics, 2015; Purdy, Eitzen, & Hufnagel, 1982; Rankin, et al., 2016).

Although not a portion of the original hypothesis, results from examining individual AMS-C 28 subscales across gender indicated that female student-athletes had higher levels of introjected extrinsic motivation than male student-athletes. Introjection (or introjected regulation) is a form of extrinsic motivation where behaviors are regulated by self-imposed pressure or sense of guilt. One possible explanation for females scoring higher in this area than males is the adoption of positive academic habits from their social environment such as teammates. Female student-athletes with high levels of academic motivation may impress these habits onto their teammates, thus increasing measured level of academic motivation within the female student-athlete population. This finding may also suggests that female student-athletes desire to fit in with their peers and
feel a greater sense of guilt over not maintaining a higher GPA compared to male athletes.

In addition to the aforementioned findings, a data analysis was conducted to determine if male and female student-athletes significantly differed in any of the individual 14 questions included in the original survey. Three questions were found to have significant differences. The three questions stated, “I feel that it is important to maintain a high GPA, I make time to study outside of designated class times, and I know the due dates for my assignments”. Female student-athletes scored significantly higher on these questions compared to male student-athletes. These statements described typical habits of academically-motivated individuals, and since female student-athletes were determined to be more academically motivated, it is not surprising that they scored higher than male student-athletes.

Finally, the results indicated that student-athletes who planned on pursuing a post-baccalaureate degree had higher academic motivation than students who plan on obtaining a job related to their degree and students who plan on pursuing a professional career in sports. The competitive nature of graduate school admission may encourage higher levels of academic motivation in student-athletes who aspire to this goal. Higher level of academic motivation likely means that students will have higher GPA and involvement in other activities than athletics which may increase their chances of graduate school admission.

There are several study limitations which should be noted. First, the sample size was small and was a convenience sample, both which limited generalizability of results. Second, student-athletes were limited to only one institution (NCAA Division II) and were constrained to only athletes from those sports offered at this particular institution which further limits the ability to generalize to student-athletes from a wider range of college sports. Finally, academic motivation was measured (in part) via an original survey for which psychometric properties were not assessed.

Academic motivation, in general, influences academic performance (Adler & Adler, 1985). For college athletes, academic motivation is of special concern because academic achievement levels dictate eligibility to participate in athletics. Current results suggest that female student-athletes have higher levels of academic motivation than their male counterparts. One implication of current results is that it may be beneficial for athletic administrators to develop programs aimed at increasing male student-athletes’ academic motivation, as such programs may decrease the burden of academically underperforming student-athletes. This study suggests that male athletes were less likely to know due dates for assignments, study outside of class time, or believe that maintaining a high GPA was important, and such programs could enhance these areas. For example, in order to increase knowledge of assignment due dates, athletic programs could teach student-athletes organizational and record-keeping skills.

Female student-athletes could benefit from individualized programs
as well. Female student-athletes’ higher levels of introjected extrinsic motivation may imply that female student-athletes are more motivated by self-imposed pressure because their peers or teammates are academically motivated. Such self-imposed pressure could present a problem if the peer group norms change to low levels of academic motivation, or if student athletes develop greater maladaptive academic stress. If the peer group changes to have low levels of academic motivation the individual student-athletes may present low levels of academic motivation as well. A program should be developed to increase levels of intrinsic academic motivation. Intrinsic motivation is motivation determined by the individual person and normally does not fluctuate with differences in peer groups. Increasing intrinsic motivation would decrease the likelihood of drastic changes in level of academic motivation if the overall academic motivation of the group changed.

Finally, student-athletes who planned on pursuing a degree higher than a four year degree had higher levels of academic motivation than student-athletes who planned on pursuing a job related to their degree and athletes who planned on pursuing a career in professional sport. In order to increase academic motivation of the two latter groups, it may be beneficial for athletic administrators to hold an informative meeting discussing the competitive nature of the entry-level job market and the often short-lived careers of professional athletes. If student-athletes who plan on pursuing a job related to their field of study understand the competitive nature of the job market, they may increase their level of academic motivation in order to stand out relative to other job seekers. Additionally, student-athletes who plan on pursuing a professional sports career may never reach the professional level or have a very short career. It is important for these athletes to have a back-up plan which may include ability to ensure an entry level job. Student-athletes’ academic motivation may increase if they are educated on the importance of maintaining a competitive resume regardless of graduation plans.

Future research should directly compare a larger sample of student-athletes’ academic motivation across different NCAA Divisions. In addition, research needs to determine specific factors which cause higher levels of academic motivation in female student-athletes. Researchers have suggested that female student-athletes have higher levels of academic motivation due to low levels of athletic identity and fewer opportunities to reach professional status within sport (Sherry & Zeller, 2014), and future research should examine these areas with larger samples of student athletes across all NCAA divisions. Future research should also identify interventions to increase male student-athletes’ academic motivation. It is important to increase male student-athletes level of academic motivation because a higher level of academic motivation is associated with higher graduation rates (Sherry & Zeller, 2014). Researchers should attempt to develop a program aimed at increasing male student-athletes level of academic motivation in an attempt to increase graduation rates.
Acknowledgements
The authors would like to thank Dr. William Russell for his guidance and direction through this research project.

References


**MAGGIE LEE and RYAN STEN** are 2016 graduates of the Health, Physical Education, and Recreation Department at Missouri Western State University. Maggie is currently a first year master of occupational therapy student at the University of Kansas Medical Center. Ryan is currently working as a full time Physical Therapist Assistant in Northwest Missouri.
An Analysis of the Factor Structure of The Leisure Education Scale (LES): A Sample From California

Suleyman Munusturlar

The present study aimed to analyze the factor structure of the Leisure Education Scale (LES) developed by Munusturlar and Bayrak (2014, 2016) for measuring leisure education levels of individuals in Turkey, for a sample group from California. The study sample group consisted of 607 students from the Chico Campus of the California State University in the fall semester of the 2015-2016 education year, who were sampled through the easily accessible method for the exploratory (n=297) and confirmatory (n=310) factor analyses. To meet the objectives of the study, statistical analyses such as exploratory and confirmatory factor analyses, Pearson correlation coefficient, Cronbach’s Alpha reliability, convergent, divergent, structural and nomological validity analyses were used in order to assess validity and reliability. As a result of the psychometric analyses, the leisure education concept explained by Munusturlar and Bayrak (2014, 2016) was applied for seven factors and 36 items with the sample group from Turkey. It was observed that the U.S. sample was explained by six factors, as a result of combination of awareness and intrinsic motivation factors by dismissal of items with low factor-loading value. It was determined that the structure consisted of six factors, intrinsic motivation and awareness (α = .93), extrinsic motivation or de-motivation (α = .83), social interaction skills (α = .80), time management (α = .71), problem solving (α = .91) and boredom (α = .82) and was capable of explaining determined variance by 66.7%. The Cronbach’s Alpha reliability coefficient was estimated at .91. As a result of the analysis, it can be concluded that the version of the LES with six factors and 31 items could be employed as a measurement tool empirically proven in terms of its psychometric qualities for the sample from California.

Keywords: Leisure education, Leisure Education Scale, scale adaptation

Leisure education that supports individuals’ education processes in addition to formal education, both directly and indirectly, has a significant role in enhancing the functionality of the education process in the ever-changing sense of education (Sivan, 2000). Combining concepts of leisure and education is not a recent development. Distinguished philosopher Dewey (1916) claims that leisure and education concepts are strongly correlated and share a number of common points. It is also possible to
observe that leisure and education concepts come together in various forms. The most commonly encountered versions of such combinations within education are leisure, education through leisure and leisure education. The precursor example of combining of education and leisure concepts appears in the literature in the work of Bull, Hoose, and Weed (2003). These authors claim that leisure is to be utilized for self-development and self-support for persons in both the professional and academic aspects of their lives. Throughout history, philosophers such as Aristotle, Plato and Socrates considered leisure part of personal education and development (Goodale & Godbey, 1988).

Another example of the association between leisure and education is that the ancient Greek word of *schole*, which means leisure, is the etymological origin of the English word of *school* (Hemingway, 1988; McLean & Hurd, 2012). On the other hand, *education through leisure* is related to the appreciation of the importance of leisure through informal learning experienced during leisure activities (Dieser, 2013; Bull et al., 2003). However, there is no particular word or term to describe education for leisure, in other words *leisure education*. Johnson, Bullock, and Ashton-Shaeffer (1997) describe *leisure education* as a process of teaching skills, attitudes and values related to recreation and leisure activities of individuals. Sivan (2007, p. 52), on the other hand, describes *leisure education* as a life-long process in which individuals make assumed changes in their behaviors about the appropriate usage of leisure by appreciating themselves, their skills and significance of leisure in their lives. Leisure education could be described as gaining pedagogical, empirical and recreational experiences that contribute to the actualization of learning objectives in cognitive, sensual and physical domains related to the appropriate usage of leisure (WLRA, 2001, p. 203). Formal leisure education applications could be possible by means of leisure education programs with smooth design (Sivan, 2007; Ruskin & Sivan, 2002).

According to the current relevant literature, it could be observed that there are a number of leisure education programs, approaches and models that improved the quality of curricula by deconstructing leisure education into its constituent parts. Primary leisure education with systematic approaches and models include the Leisure Education Advancement Project (LEAP; Mundy, 1998, p. 54; Edginton et al., 2004, p. 480; AAPAR, 2011, p. 26); the Mundy-Odum Leisure Education Model (Mundy, 1998, p. 58); Florida State University Scope Model (Mundy & Odum, 1979, p. 44-51); Dattilo and Murphy’s Leisure Education Model (Edginton et al., 2004, p. 470-491); Israel Leisure Education Curriculum Model (AAPAR, 2011 p. 21); Cross-Cultural Leisure Education Model (Edginton et al., 2004, p. 470-491); School – Society Leisure Connection (Sellick, 2002, p. 8-9); Time Wise (Learning Model for Life Long Leisure Skills; Caldwell, Baldwin, Walls & Smith, 2004); Leisure Education Content Model (Edginton et al., 2004, p. 470-491), Leisure Education Rejuvenation Project (Bedini, Bullock, & Driscoll, 1993); and the Leisure Education Model as Therapeutic Recreation Program (Bullock & Howe, 1991).

Although the international literature could be considered rich in terms of the number of studies on leisure education approaches and models, it is remarkable that a measurement tool to determine the leisure education
levels of individuals is lacking. Although some studies on leisure education employed qualitative research methods to determine the impact of leisure education applications (Clark & Anderson, 2011; Carter, Nezey, Wenzel & Foret, 1999; Bedini et al., 1993; Edwards & Bloland, 1980), another significant portion of these studies employed quantitative methods utilizing the scales for implicit variables (satisfaction, attitude, motivation etc.) of the psycho-social domain in singular or multiple combinations (Bedini et al., 1993; Caldwell et al., 2004; Carbonneau, Caron, & Desrosiers, 2011; Dunn & Willhite, 1997; Mahon, Bullock, Luken, & Martens, 1996; Rancourt, 1982; Robertson & Shannon, 2002; Weber, 2010). The lack of a measurement tool that could be used to measure elements of leisure education directly in the United States, the most prominent country in terms of comprehension of leisure and studies on leisure, was determined from the relevant literature. Therefore, considering that the Leisure Education Scale (LES), developed by Munusturlar (2014) and reported by Munusturlar and Bayrak (2016), is a direct measurement tool for elements of leisure education, but the question “is the LES a measurement tool satisfying psychometric requirements and capable of measuring level of leisure education for populations of other countries?” shaped the objectives of the present study. Such research not only helps to determine leisure education levels of individuals but also facilitates assessment of achievement of leisure education interventions using pretest-posttest designs. The purpose of this research was to conduct validity and reliability analyses of the LES (Munusturlar, 2014; Munusturlar & Bayrak, 2016) for a sample group from California, to determine whether it was a measurement tool satisfying psychometric requirements. This study is important for the development and adaptation of scales directly focusing on assessing components of leisure education for different cultures including the United States.

Method

This section includes steps followed to conduct reliability and validity analyses for the LES (Munusturlar, 2014; Munusturlar and Bayrak, 2016) for a sample group from California.

Preparatory Operations Before the Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) for the LES

Even though the LES was published in English in 2016, it was developed for a Turkish sample as a doctoral thesis. Therefore, regarding the validity and reliability analyses of the LES on a California sample, items and expressions of the scale were translated into English by a faculty member of Turkish origin who studies the leisure and recreation domains in the U.S. and by another Turkish faculty member from the department of Modern Languages – English at the Anadolu University in order to ensure language validity. Then, items of scale were translated back from English to Turkish to ensure items were accurately translated and language validity was acquired.

In order to ensure language validity of the LES and to analyze its scope validity, seven factors and 36 item expressions were given to eight different faculty members in the U.S. who have published articles on leisure and
recreation majors in order to receive their expert opinions. They were expected to evaluate according to the form prepared on the basis of a 4-point Likert scale (“item measures aimed structure”, “item serves the purpose/measures but needs to be amended”, “item is relevant with the structure but it is unnecessary”, and “item could not measure aimed structure) in terms of appropriateness to the themes of leisure education, clarity, fluency, conformance to the purpose, proper usage of language, written expressions and comprehensibility criterions (Lawshe, 1975).

Lawshe (1975) suggests that an item validity value assessed by eight experts is required to be a minimum of .75 based on the scope validity formula. In line with this theory, it was observed that values determined for 36 different scale items were in the range of .79 and .86. According to the Lawshe content validity equation, it is possible to conclude that scale items satisfied the requirements relating to content validity.

Data Collection
The LES was created for a Turkish sample group. The original form of the LES consisted of 7 factors and 36 items. Some items (1, 2, 3, 4, 5, 6, 7, 24, 25, 26, 27, and 28) were reverse coded before statistical analysis. The LES was first translated into English, ensuring that the 36-item scale satisfied the conditions of content, discrimination, convergent, validity and reliability conditions. Then it was employed after ensuring its language and content validity. The scale reached a total of 950 students either in person or through e-mail at two different times (the EFA and the CFA). Finally, a total of 690 appropriate forms were returned to the researcher for further analysis.

Universe and Sample
The population of the research was composed of 17,287 students from the Chico Campus of California State University during the academic year of 2014-2015. In recent studies, based on the view that a new data set displaying similar characteristics must be utilized in accuracy analysis of factor structures explored or revealed by means of the Exploratory Factor Analysis (EFA) through the Confirmatory Factor Analysis (CFA; Henson & Roberts, 2006; Osborne & Fitzpatrick, 2012), two individual study groups were utilized for EFA and CFA. With regard to normality tests harnessed to determine appropriateness of data set to the EFA and CFA, the sample group in total consisted of 607 students (297 for EFA; 310 for CFA) determined by easy access method, which was taken into consideration for statistical analyses during determination of extreme values with single- and multiple-variables.

Data Analysis Methods
Whereas the EFA (SPSS 19) was utilized to determine factor patterns for developing the measurement tool, the CFA was utilized for reliability analyses and factor structure (LISREL 8.8). Moreover, statistical tests and equations were utilized concerning assessment of the reliability, structure, content, convergent, discrimination and nomological validity of the scale.
Findings

After the forms with invalid or missing information were determined, in order to determine appropriateness of 639 (EFA + CFA) scale data sets to the factor analysis, prepared for statistical analyses for the EFA and CFA at different times, collected data were analyzed for finding missing values, normality, extreme values, multiple linearity and singularity before continuing with the scale validity analysis. In order to determine extreme values with single-variables, the z score of each item was estimated and single-variable extreme values were estimated by considering a “−3, +3” standard deviation interval. In order to determine multiple-variable extreme values, a Mahalonobis distance was calculated. As a result of these operations, 32 observations (EFA, 17 observations; CFA, 15 observations) were removed from the data set, so in total, 607 data pieces were prepared for the factor analysis.

Before the EFA, the Kaiser-Meyer-Olkin (KMO) test was conducted to determine appropriateness of sample size to analysis and the Bartlett’s Sphericity test was utilized to test the correlation between variables. As the KMO value was estimated at .855 for the scale, it was revealed that this value indicated that the adequacy of the sample size was “good” for factor analysis (Leech, Barnett, & Morgan, 2005). The result of the Bartlett’s Sphericity test evaluating appropriateness of data to the factor analysis scale was estimated at $\chi^2 = 5740.61$, $df=630$ and $p<0.001$; the chi-square value was found significant at .01 level. These results suggest that the collected data was normally distributed, multiple-variable and that the data structure was appropriate for factor analysis (Pallant, 2001).

In the EFA conducted to determine dimensions of the scale, the factor structure of collected data was analyzed through the principle component method by using Varimax rotation. Orthogonal rotations suggested conditions where high correlations are not seen between factors (DeVellis, 2003) and Varimax rotation is the most known orthogonal rotation style, because it helps to investigate factor structures in maximum possibility (Tabachnick & Fidel, 2001). First of all, attention was paid to avoid difference between items under single or multiple factors greater than 0.1, and items not satisfying this requirement were removed from the scale (Pallant, 2001). From a theoretical point of view, the acceptance level for the factor-loading values was determined as .40 to allow significant structures to arise. Accordingly, items with a factor-loading value of less than .40 were removed from the scale (Hair, Anderson, & Tatum, 1998, p. 111). As a result of comparing overlapping and factor-loading value acceptance levels, 36 items in the original scale were reduced to 31 items. The first item from the extrinsic motivation dimension, the ninth and tenth items from the social interaction dimension and the twenty-fourth and twenty-eighth items from the boredom dimensions were removed from the original LES scale (Munusturlar & Bayrak, 2016) conducted for the Turkish sample group.

During the EFA, as a result of simplifications performed based on factor-loading values and overlapping principles, a structure composed of 31 items under six dimensions was determined. It was observed that the minimum and maximum factor-loading values found as a result of the
EFA were found: with awareness and intrinsic motivation (10th item) in the range of .65 and .84; with extrinsic motivation and amotivation (5th item) in the range of .49 and .79; with social interaction skills (5th item) in the range of .60 and .76; time management (4th item) in the range of .61 and .82; problem solving (5th item) in the range .67 and .86; and boredom (3rd item) in the range of .75 and .83. These six factors could explain 66.73% of total variance on average (Table 1). Since some items have a negative influence on the leisure education level concept, these items (11, 12, 13, 14, 15, 16, 29, 30 and 31) were reverse coded.

As a result of the Cronbach’s Alpha test conducted to determine internal consistency reliability of factors comprising of the Leisure Education Scale, Cronbach’s Alpha coefficients were estimated in the range of .71 and .93 (Table 1). Whereas coefficients in the range of .70 and .90 suggest high reliability, .91 and higher levels suggests perfect reliability (Bagozzi & Yi, 1988; Nunnally & Bernstein, 1994). In the scale development and adaptation studies, coefficients equal to and greater than .60 are considered acceptable values (Nunnally & Bernstein, 1994). Therefore, it was observed that internal consistency reliability coefficients concerning factors and scale reliability fulfill the acceptance level.

Table 1
Exploratory Factor Analysis Results of the Leisure Education Scale on California Sample

<table>
<thead>
<tr>
<th>Factors and Cronbach’s Alpha</th>
<th>Factor Load</th>
<th>Eigenvalues (% of variance)</th>
<th>AVE (CR)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor 1. Awareness and Intrinsic Motivation</strong></td>
<td></td>
<td>6.725 (21.699)</td>
<td>.51 (.88)</td>
</tr>
<tr>
<td>1- I know the benefits of leisure activities.</td>
<td>.743</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2- Leisure activities contribute to my mental health.</td>
<td>.755</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3- Leisure activities contribute to my physical health.</td>
<td>.843</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4- Being at leisure helps me to be healthy.</td>
<td>.811</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5- Being at leisure provides me with social benefits.</td>
<td>.721</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6- I participate in leisure activities because they make me happy.</td>
<td>.752</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7- I participate in leisure activities because they help to reduce stress in my life.</td>
<td>.756</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8- I participate in leisure activities because they help me relax.</td>
<td>.743</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9- I participate in leisure activities to have fun.</td>
<td>.793</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10- I feel freedom during leisure activities.</td>
<td>.651</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factor 2. Extrinsic Motivation and Amotivation (α = .91)</td>
<td>2.999</td>
<td>.53</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------</td>
<td>-------</td>
<td>----</td>
<td></td>
</tr>
<tr>
<td>11- I don’t want to do anything in my free time.*</td>
<td>.504</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12- In my free time I usually don’t like what I’m doing, but I don’t know what else to do.*</td>
<td>.492</td>
<td>(9.674)</td>
<td>(.87)</td>
</tr>
<tr>
<td>13- I participate in my leisure activities because I want people to think I am a social person in my life.*</td>
<td>.662</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14- The people around me decide what to do in my free time. *</td>
<td>.798</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15- I participate in leisure activities because of feeling an obligation.*</td>
<td>.797</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Factor 3. Social Interaction Skills (α = .84)</th>
<th>2.958</th>
<th>.53</th>
</tr>
</thead>
<tbody>
<tr>
<td>16- I won’t participate in some leisure activities if I think someone will make fun of me.*</td>
<td>.603</td>
<td></td>
</tr>
<tr>
<td>17- Even being around groups of new people, I feel comfortable during leisure activities.</td>
<td>.723</td>
<td>(9.533)</td>
</tr>
<tr>
<td>18- I can say whatever I want to others during leisure activities.</td>
<td>.652</td>
<td></td>
</tr>
<tr>
<td>19- During my leisure activities, I can make friends easily.</td>
<td>.763</td>
<td></td>
</tr>
<tr>
<td>20- During my leisure activities, I am not embarrassed to ask for help.</td>
<td>.677</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Factor 4. Time Management (α = .78)</th>
<th>2.929</th>
<th>.60</th>
</tr>
</thead>
<tbody>
<tr>
<td>21- I plan my day in advance</td>
<td>.735</td>
<td></td>
</tr>
<tr>
<td>22- I schedule what I am going to do in my free time.</td>
<td>.829</td>
<td>(9.460)</td>
</tr>
<tr>
<td>23- I finish my work and chores on time.</td>
<td>.611</td>
<td></td>
</tr>
<tr>
<td>24- I make a list of what I have to do during the day.</td>
<td>.702</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Factor 5. Problem Solving (α = .79)</th>
<th>2.744</th>
<th>.59</th>
</tr>
</thead>
<tbody>
<tr>
<td>25- I participate in leisure activities even if I don’t feel good.</td>
<td>.678</td>
<td></td>
</tr>
<tr>
<td>26- Even if I am busy, I will continue to participate in leisure activities.</td>
<td>.869</td>
<td>(8.565)</td>
</tr>
<tr>
<td>27- Nothing can stop me from participating in leisure activities.</td>
<td>.798</td>
<td></td>
</tr>
<tr>
<td>28- Even if I encounter some obstacles, I will continue to participate in leisure activities.</td>
<td>.701</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Factor 6. Boredom (α = .77)</th>
<th>2.469</th>
<th>.51</th>
</tr>
</thead>
<tbody>
<tr>
<td>29- My friends and I often talk about how bored we are.*</td>
<td>.856</td>
<td></td>
</tr>
<tr>
<td>30- Because boredom is very common for everyone, it makes sense that I am bored as well.*</td>
<td>.822</td>
<td>(7.839)</td>
</tr>
<tr>
<td>31- I usually get bored during a typical day.*</td>
<td>.720</td>
<td></td>
</tr>
</tbody>
</table>

Scale Reliability (Cronbach's Alpha) α = .91

Total Variance Explained % 66.7

*Reverse coded items.
In order to analyze convergent validity and divergent validity, when Average Variance Extracted (AVE) values are taken into consideration (see Table 1), it was observed that AVE values relevant to all sub-dimensions were greater than .50. Since the AVE value is required to be equal to or greater than .50 to establish divergent validity, and additionally since composite reliability values are required to be greater than both the AVE and then .70 to fulfill convergent validity (Hair et al., 1988; Fornell & Larcker, 1981), then it is possible to state that the scale fulfills divergent and convergent validity conditions. As one of the indicators of divergent validity, correlation coefficients were investigated to reveal the rule that factors were independent of each other (see Table 2).

In the correlation matrix revealing the correlation between the six factors that arose in the Leisure Literacy Scale, it was observed that Pearson correlation coefficients among factors were in the range of 0.10 to 0.59 (Table 2). The analysis and confirmation of the six-factor structure that arose through the EFA and to exhibit psychometric characteristics, the first and second level Confirmatory Factor Analysis (CFA) was conducted on a new series of data and a different sample group.

Table 2
Correlation Matrix Among Factors of LES-USA

<table>
<thead>
<tr>
<th>Factors</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>$\chi^2$</th>
<th>sd</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Awareness and Intrinsic motivation</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.68</td>
<td>0.60</td>
</tr>
<tr>
<td>2. Extrinsic and Amotivation</td>
<td>-.27**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.12</td>
<td>0.55</td>
</tr>
<tr>
<td>3. Social interaction skills</td>
<td>.19**</td>
<td>.42**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td>4.19</td>
<td>0.57</td>
</tr>
<tr>
<td>4. Time management</td>
<td>.25**</td>
<td>-.14**</td>
<td>.23**</td>
<td>1.00</td>
<td></td>
<td></td>
<td>2.32</td>
<td>0.68</td>
</tr>
<tr>
<td>5. Problem solving</td>
<td>.32**</td>
<td>-.11**</td>
<td>.28**</td>
<td>.59**</td>
<td>1.00</td>
<td></td>
<td>2.94</td>
<td>0.76</td>
</tr>
<tr>
<td>6. Boredom</td>
<td>-.32**</td>
<td>.10**</td>
<td>.12*</td>
<td>.19**</td>
<td>-.10**</td>
<td>1.00</td>
<td>2.79</td>
<td>0.79</td>
</tr>
</tbody>
</table>

*p < 0.05; **p<0.01

The first and second level CFAs were conducted in order to expose whether the structure with six factors and 31 items was confirmed or not at the end of the EFA. As a result of the first level CFA, conducted using 310 university students, and determined according to the easily accessible sample method, it was observed that all items included in the scale yielded statistically significant $t$ values in explaining implicit variables and error variances of all observed variables were below .90 (see Figure 1).
Figure 1
The First Level Confirmatory Factor Analysis of the Leisure Education Scale-USA
As a result of the first level CFA, $\chi^2 / \text{sd}$, RMSEA, CFI, NNFI, RMR, NFI, GFI and AGFI fit index values were investigated. It was observed that $\chi^2 / \text{sd}$ was estimated at $650.94 / 419 = 1.55$ ($0 \leq \chi^2 / \text{df} \leq 5$), the RMSEA index was 0.061; the RMR was 0.083; the NNFI and CFI indexes were greater than 0.90; and thus, it was observed that they fulfill fit values (Raykov & Marcoulides, 2000, p. 38; Steiger, 2007). It is possible to state that the GFI was close to .90 and the AGFI index was greater than .90; and therefore, fit the index close to the acceptance level. In this scope, it could be stated that the six-factor structure obtained as a result of the EFA was confirmed and factor structure was valid model.

As a result of the second level CFA conducted to reveal an evidence for six-factor structure of the Leisure Literacy Scale, the relationship between each implicit variable and observed variables was exhibited in Figure 2 as well as the error variance of each observed variable.

### Table 3

#### Fit Indices Concerning the Confirmatory Factor Analysis of the Leisure Education Scale on California Sample

<table>
<thead>
<tr>
<th>Index</th>
<th>Goodness of Fit</th>
<th>First Level DFA</th>
<th>Second Level DFA</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\chi^2 / \text{df}$</td>
<td>$0 \leq \chi^2 / \text{df} \leq 5$</td>
<td>$650 / 419 = 1.55$</td>
<td>$1392 / 658 = 2.11$</td>
<td>Tabachnick &amp; Fidel, (2001); Schumacker &amp; Lomax, (2004)</td>
</tr>
<tr>
<td>RMSEA</td>
<td>$0 \leq \text{RMSEA} \leq 0.07$</td>
<td>0.061</td>
<td>0.064</td>
<td>Steiger, (2007)</td>
</tr>
<tr>
<td>SRMR</td>
<td>$0 \leq \text{SRMR} \leq 0.10$</td>
<td>0.075</td>
<td>0.084</td>
<td>Hu &amp; Bentler, 1999; Kline, 2005</td>
</tr>
<tr>
<td>RMR</td>
<td>$0 \leq \text{RMR} \leq 0.10$</td>
<td>0.083</td>
<td>0.083</td>
<td>Hu &amp; Bentler, 1999; Kline, 2005</td>
</tr>
<tr>
<td>NFI</td>
<td>$0.90 \leq \text{NFI} \leq 1.00$</td>
<td>0.88</td>
<td>0.89</td>
<td>Steiger, 2007</td>
</tr>
<tr>
<td>NNFI</td>
<td>$0.90 \leq \text{NNFI} \leq 1.00$</td>
<td>0.94</td>
<td>0.93</td>
<td>Steiger, 2007</td>
</tr>
<tr>
<td>CFI</td>
<td>$0.90 \leq \text{CFI} \leq 1.00$</td>
<td>0.95</td>
<td>0.94</td>
<td>Raykov &amp; Marcoulides, 2000</td>
</tr>
<tr>
<td>GFI</td>
<td>$0.90 \leq \text{GFI} \leq 1.00$</td>
<td>0.87</td>
<td>0.89</td>
<td>Hooper et al., 2008</td>
</tr>
<tr>
<td>AGFI</td>
<td>$0.90 \leq \text{AGFI} \leq 1.00$</td>
<td>0.91</td>
<td>0.92</td>
<td>Hooper, et al., 2008</td>
</tr>
</tbody>
</table>

In general, according to the second level CFA results, $\chi^2 / \text{sd}$ was estimated at $722.06 / 428$ ($p<.05$) at 1.68. It was also observed that whereas the RMSEA was at 0.064; the RMR was 0.083; the NNFI and CFI index values were greater than .90. Thus, they satisfied coherence values (Raykov & Marcoulides, 2000, p. 38; Steiger, 2007). It is possible to state that the GFI was close to .90 and the AGFI index was greater than .90; and therefore, fit the index close to the acceptance level. In this scope, it could be stated that the six-factor structure obtained as a result of the EFA was confirmed and factor structure was valid model.
Figure 2
The Second Level Confirmatory Factor Analysis of the Leisure Education Scale
In an analysis of divergent validity, it is necessary to consider dual correlation coefficients between variables and to avoid exceeding .90 (Hair et al., 1998). When correlation coefficients among implicit variables are considered, it could be observed that values were in the range of .10 to .59. Moreover, in order to ensure divergent validity, the AVE value needs to be equal to or greater than .50; the composite reliability values are required to be greater than both the AVE and then .70 to ensure convergent validity (Hair et al., 1988; Fornell & Larcker, 1981), it is possible to conclude that the scale fulfills divergent and convergent validity conditions.

**Discussion And Results**

The present study was conducted on a sample group determined through convenience sampling method from the Chico Campus of the California State University so as to conduct validity and reliability analyses for the Leisure Education Scale (LES) developed originally for a Turkish population. As a result of the study, it was seen that while the leisure education concept was explained by 36 items in seven dimensions for the Turkish sample group, the same scale was explained by 31 items in six dimensions for the California sample group, named as Leisure Education Scale for USA (LES-USA). Dimensions comprising factor structure of the scale for the California sample were referred as “awareness and intrinsic motivation”, “extrinsic motivation and amotivation”, “social interaction skills”, “boredom”, “problem solving” and “time management”.

It was observed that “awareness and intrinsic motivation” dimensions in the LES Turkish version combined in the California sample and displayed single-dimensional structure. It was determined that this finding was closely related to results of the studies on intrinsic motivation personal awareness (Mundy & Odum, 1979, p. 53; Plant & Ryan, 1985) and on leisure awareness (Barnett, 2005; Csikszentmihalyi & Figurski, 1982; Witman & Munson, 1992). Deci (1980; Deci & Ryan, 1985; Ryan & Deci, 2000) claimed that when the intrinsic motivation process is conceptualized, awarness needs to be placed before leisure participation. Dattilo (2008, p. 98) states that the intrinsic side of the motivation concept that allows participation in leisure activities is directly influenced by the knowledgeable part of personal awareness comprised of preferences and tastes relevant with leisure activities. Personal awareness is a phenomenon related to intrinsic motivation and decision making gather under the roof of self determination skills (Dattilo, 2008, p. 100). Efforts to develop awareness levels of individuals within the content of a leisure education program would be directly proportional to the personal intrinsic motivation (Weissinger, Caldwell & Bandalos, 1992). Deci & Ryan (1985) emphasized that intrinsic motivation is related to personal tastes, interests and participation in leisure activities for one’s own benefit, which were considered under the awareness concept. Flood and Parker (2014) reported that leisure awareness is significantly effective for motivators allowing participation in leisure activities. The awareness and intrinsic motivation dimensions are indeed related to the realized leisure participation based on the idea that it would be personally beneficial with respect to the personal and leisure awareness. It is observed that there
are leisure education approaches which include awareness and intrinsic motivation at the same time. In the second updated version of the Mundy-Odum Leisure Education Model (Mundy, 1998, p. 58) and in the School and Society Relationship Leisure Education Model (Sellick, 2002:8-9), it is observed under the intrinsic motivation awareness dimension as a significant component. It is possible to conclude that this situation has characteristics indicating the close relationship between the two concepts. In the Time Wise Life Long Leisure Skill Learning Model (Caldwell et al., 2004), it is observed that awareness and intrinsic motivation are considered as two individual dimensions. Similarly, although awareness and motivation are different individual dimensions according to Bullock and Howe (1991), it was emphasized that they are important concepts that need to be considered to provide people with leisure education.

The extrinsic motivation and amotivation areas constitute the second dimension of the LES-USA. Amotivation expressions concerning a lack of desire to participate in leisure activities and extrinsic motivation expressions concerning participation in leisure activities because of surrounding effects are the concepts that had a negative effect on the LES. Caldwell et al. (2004) suggested that appropriate leisure participation behavior could only be possible with described forms of intrinsic motivation or motivation, and that it could not be possible with extrinsic motivation or amotivation statuses. In other words, it is expected that a person with high leisure education level must be eliminated as much as possible, and participation in leisure activities must be minimized caused by extrinsic factors. Within the self determination theory, Deci and Ryan (1985) reported motivation types which give people autonomy and which allow them to experience real leisure as intrinsic motivation, extrinsic motivation and amotivation respective to their significance. As a result of Parish and Treasure’s (2003) study, it was observed that amotivation and extrinsic motivation were classified as situational motivation, which decreases the effective autonomy level on leisure participation. Amotivation could be the result of insignificance or indifference attached to an activity (Ryan, 1995), a sense of failure in performance of this activity (Deci, 1975), or of an individual’s consideration about that there is no satisfactory result (Seligman, 1975).

The social interaction skills dimension is the dimension in which social interaction skills and knowledge that assists the realization of appropriate and expected leisure behavior are analyzed (Dattilo, 2008). It is an essential element of a number of leisure education models and approaches. Social interaction skills is a substantive component for ensuring participation or attendance of an individual into a leisure activity (Auld & Case, 1997) and for acquiring the optimum benefit from leisure experiences (Leitner & Leitner, 2004, p. 24). The “Social Interaction Skills” dimension is encountered as an individual dimension in the Mundy-Odum Leisure Education Model (Mundy & Odum, 1979, p. 53; Mundy, 1998, p. 58), in the Florida State University Content Model (Mundy & Odum, 1979, p. 44-51), in the Peterson and Gunn Leisure Education Model (Peterson & Gunn, 1984) and in the Leisure Education Content Model. Additionally, it could be observed in the Cross-Cultural Leisure Education Model, the Dattilo and Murphy Leisure Education Model (Edginton et al., 2004, p.
and the School-Society Connection Leisure Education Model that it is included as an independent dimension under the reference “communication skills” (Sellick, 2002, p. 8-9). Williams and Dattilo (1997) reported that social interaction skills are seen as a significant element in a number of leisure education approaches and it is a concept with a critical role in creation of desired leisure behavior.

The time management dimension consisted of expressions for measuring time management skills, a significant indicator of leisure education, which was determined as the fifth dimension of the LES-USA. Although time management is usually encountered as a sub-dimension under other basic dimensions in leisure education approaches, it is viewed as one of the constant elements of the majority of leisure education approaches. This is encountered as a sub-dimension in the preliminary (Mundy & Odum, 1979, p. 53) and updated (Mundy, 1998, p. 58) versions of the Mundy-Odum Leisure Education Model, under the leisure skills dimension of the Time Wise Leisure Education Program (Caldwell et al., 2004), Leisure Education Rejuvenation Project (Beddini et al., 1993) and under the planning dimension of the School-Society Leisure Connection Model (Sellick, 2002: 9). Time management is also an expected skill within appropriate leisure behavior and increases benefits expected from leisure (Mannel & Stynes, 1991, p. 466; Leitner & Leitner 2012, p. 103). Time management skills concerning overcoming an obstacle before leisure is positively correlated with leisure satisfaction (Mannel & Stynes, 1991, p. 466) and life quality (Wang & Kao, 2006).

Boredom, one of the prominent negative factors effective on leisure participation and which is considered as one of the essential problems of our society, is found as the last dimension of the Leisure Education Scale for United States. Patterson (2007, p. 112) reported that leisure education could be viewed as a precious option to mitigate the adverse impact of boredom on people. Boredom is mostly encountered as a sub-dimension instead of a main dimension in leisure education models and approaches. Although there is research emphasizing that it is a concept relevant to extrinsic motivation and amotivation (Ntoumanis, 2001) or with intrinsic motivation (Weissinger, Caldwell & Bandalos, 1992), Caldwell et al. (2004) highlighted that boredom itself is a dimension effective on leisure behaviors of persons in the Time Wise Leisure Education Model and that it should be taken into careful consideration. One of the most prominent reasons for making boredom one of the dimensions of the LES is that boredom is seen as an indicator of an undesirable leisure attitude. Caldwell et al. (2004) were concerned that leisure education programs exhibit a characteristic which prevents individuals from risk of having bad habits and committing crimes in their leisure time. There are numerous studies that suggest that high levels of boredom and usage of boredom-related sentences intensively in speeches are significantly correlated with alcohol and substance abuse (Caldwell & Smith, 1995; Iso-Ahola & Crowley, 1991), increasing school absenteeism (Farrell, Peguero, Lindsey, & White, 1988), vandalism (Caldwell & Smith, 1995), obesity (Ganley, 1998), gambling (Blaszczynski, McConaghy & Frankova, 1990) and depression (Goldberg & Danckert, 2013). Accordingly, it is considered that individuals’ expressions of boredom could provide information that
could be predictor of their leisure education levels.

Finally, it is possible to conclude that the LES found to be structured with 36 items in seven dimensions with the Turkish sample group could be employed as measurement tool with proven psychometric characteristics on the California sample group under the title of “Leisure Education Scale for the US (LES-USA)” with 31 items in six dimensions.

References


PA: Ventura.


Sleep Duration and BMI Percentile in Adolescents: An Analysis of the 2013 National Youth Risk Behavioral Survey

Timothy Makubuya

Sleep is increasingly gaining attention in the research literature for its role in body weight. Sleep deprivation can impact multiple aspects of metabolism. This study examined the relationship between sleep duration and Body Mass Index (BMI) percentiles, a common measure of weight status. Data from the 2013 National Youth Risk Behavior Survey (YRBS) from the U.S. Center for Disease Control and Prevention (CDC) were analyzed for 9th to 12th grade boys and girls. Spearman Rho correlations were calculated on sleep deprivation and BMI percentiles. Significant indirect associations between sleep duration with BMI percentiles were found in high school boys but not girls. Longer sleep duration was associated with lower BMI percentiles in boys. Future research should consider non-subjective measures of sleep deficits and disorders. The inclusion of additional YRBS questions targeting more aspects of sleep, such as sleep quality, is recommended.

Key Words: sleep deprivation; adolescent overweight, Youth Risk Behavior Survey

Adolescent sleep habits are a challenge to many parents, especially with the increasing use of technology. Adolescents tend to shift sleep hours to hours texting, viewing, gaming, web surfing and the like. Concern is not only focused on the total number of sleep hours lost, but also on quality of sleep and how these aspects of sleep are related to overweight and obesity.

How would sleep deprivation be associated with overweight and obesity? At first glance, one might think that additional waking hours result in an increase in calories burned. This is not necessarily the case. Sleep deprivation leads to a breakdown of metabolism. “Sleep deprivation is associated with altered transcription or translation of a wide range of molecules involved in a wide range of other fundamental physiological processes” (Vyzovskiy, 2015, p. 172; see also Bass & Takahashi, 2010). Lack of sleep alters the hypothalamus-pituitary-adrenal (HPA) axis, delaying recovery of HPA and altering negative glucocorticoid feedback regulation. Chronic sleep deprivation also impairs glucose tolerance, increasing the chances of developing diabetes and cardiovascular disease. When the body does not take glucose into the cells properly, one feels tired.
and hungry and eats more (Leproult, Copinschi, Buxton, & Van Cauter, 1997). Leproult et al. also found that cortisol was elevated the evening following sleep loss. Chronic sleep deprivation, then, could cause higher insulin levels, with blood sugar dropping and eventually craving of sugary, fatty foods.

Sleep deprivation lowers leptin, an appetite-suppressing hormone that is produced at night. Also, ghrelin, a hormone that stimulates hunger, is increased (Leproult et al., 1997). Sleep, then, has many complex effects on body regulation and loss of sleep can contribute to overweight and obesity in a number of ways. Cauter and Knutson (2008) cited epidemiological studies that additionally point towards chronic sleep deprivation as a contributor to overweight and obesity.

There are suggested recommendations from the National Sleep Foundation as well as the National Institute of Health regarding the recommended sleep durations. Albeit these recommendations slightly differ, they all point towards 8 to 10 hours of sleep for children and adolescents. The total number of sleep hours per night can be reduced by lifestyles that encourage increased social media usage, television viewing, time on computers, and time on other internet powered games or devices.

Understanding the effect of sleep duration on adolescent weight status and BMI percentiles in adolescents is important in discussions of reducing the incidence of overweight and obesity in children and adolescents. These discussions have been shaped by numerous findings including those of Cauter and Knutson (2008) who noted that there is increasing information on chronic partial sleep from both epidemiological and clinical studies indicating its link to obesity risk and weight gain. Patel and Hu (2006) also conducted a review of literature that supports this finding.

Lowry et al. (2012) conducted an analysis of national Youth Risk Behavior Survey (YRBS) data and examined the association between self-reported obesity and self reported sleep duration and found gender differences, with girls having significant association between sleep loss and obesity compared to boys who had no significant association. They cautioned against any suggestions of abrupt sleep adjustment without further studies.

Aspects of sleep, rather than just mere sleep duration, need to be acknowledged. Jarinn, McGrath and Drake (2013) conducted a study of about 240 healthy children and adolescents with an average age of 13 years. They looked at factors beyond sleep duration, such as sleep disturbances and sleep quality and pattern, and subjectively measured them. Sleep duration was significantly associated with obesity; however, the link depreciated after adjustments of covariates. Their results suggested that these other aspects of sleep might indicate or suggest influences that drive the negative associations between sleep deprivation and obesity more precisely. The researchers recommended that more longitudinal and prospective research designs be used in future research.

Lytle et al. (2013) conducted a longitudinal study that included 723 adolescents from Minnesota with an average age of 14.7 years at baseline. Their 24-hour recall of food intake, activity levels and sedentariness were among the behaviors assessed in both boys and girls, whose average body composition measures and sleep duration decreased slightly at the end of
two years. This study suggested that the decline in sleep duration has less impact on obesity, and is contrary to other studies. Drescher, Goodwin, Silva and Quan (2011) investigated the association between sleep duration and obesity risk factors among 319 Caucasian and Hispanic children aged 10-17 years. Lifestyle factors were measured through surveys that included electronic screen time, dietary and caffeine intake, exercise, and sleep habits as reported by parents. In addition, they also recorded anthropometric measures such as height and weight from which BMI could be calculated. Parental input in reporting sleep times was a factor for Hispanic participants, where ethnicity was significantly associated with lower reporting in terms of sleep duration and BMI z score. Age group differences were also evident, especially between younger and older adolescents in relation to dietary and sedentary behaviors. Caffeine consumption factored in sleep duration among older adolescents whereas young adolescents were more affected by electronic screen time.

Other studies have linked lack of sleep to adolescent and adult weight issues. Cappuccio et al. (2008) conducted a meta-analysis of short sleep duration using a literature search and found an “increased risk of obesity amongst short sleepers in children and adults”. Lowry et al. (2012) suggested that in order to recommend sleep time alterations as a remedy for addressing the adolescent weight problem, better knowledge of factors regarding the obesity and sleep duration relationship is warranted. To thoroughly investigate healthy eating among high school students, studies like Lowry et al. (2012) suggested that sleep education should be considered, particularly in this technological and social media era. Teaching adolescents about topics such as late night snacking would be an addition to other topics related to health such as the importance of daily breakfast.

The purpose of this study was to obtain additional information about the sleep duration-overweight link by examining the relationship between sleep duration and overweight/obesity, as indicated by BMI percentile, in a large group of adolescents who took the 2013 YRBS.

Methods

Subjects and Setting

The data used in this study was from responses to the 2013 national Youth Risk Behavioral survey (YRBS) collected by the U.S. Center for Disease Control and Prevention (CDC) using a three stage cluster sample design. Responses by 9th to 12th grade high school students from items about physical activity, food and other related health topics were selected. Participants were from selected private and public schools that were in the representative pool. Some of the schools chosen for the national sample might also have participated in the statewide YRBS and others might not. Initially 15,480 students were sampled. Of those 13,633 submitted their questionnaires and after data editing 13,583 were usable. The participants were both boys and girls with a varying racial and ethnic make-up. YRBS samples estimates are set at ±5% range at the 95% confidence level. The response rate for the 2013 National YRBS was 77% for schools, 88% for students and an overall response rate of 68%. In this study, elimination of
missing cases was by listwise, which meant eliminating those participants’ records who had a record of missing values. In addition, outliers at three standard deviations from the mean were also removed. There were 12,335 participants who were categorized in three main sleep categories.

Reliability and Validity

Internal reliability checks only identified low and acceptable percentages of untruthfulness among respondents. The CDC argues that truthfulness is based on the students’ perception that the survey is important and that they are knowledgeable of devised measures to protect their privacy and allow anonymity. Test-retest reliability tests were conducted on the 1991 to 1999 questionnaire versions after the questionnaires were subjected to laboratory and field testing. Brener, McManus, Galuska, Lowry, and Wechsler (2003) conducted reliability and validity tests on self-reported variables of height, weight and sleep from YRBS. Flisher, Evans, Muller, and Lombard (2004) conducted a two-week test-retest on reliability of adolescent behaviors on two occasions within two weeks, and found consistency in the measures of agreement and thus reliable reporting. Though the self-reported sleep hours and the measures of BMI were very reliable, there were some discrepancies especially in estimating overweight in youth populations from the self-reported height and weight as measures of BMI. This was due to under-reporting of weight and over-reporting of height that are common in many self-reported data.

Brener et al. (2003) also conducted reliability tests using the kappa statistic on the 1999 YRBS items and found that most of the YRBS questions were reliable. The physical activity and dietary behavior questions specifically were also reliable with kappa values greater than .60. Items that had very weak kappa values have since been replaced from the recurring YRBS. Landis and Koch (1977) argued that the higher the kappa value, the more reliable the question. On the other hand, Troped et al. (2007) insisted that YRBS questions underestimate the actual physical activity involvement in middle school children, but according to Brener et al. (2003), high school students were more likely to reliably report on health risk behaviors.

Permissions

Approval for conducting the study was obtained from the University of Missouri – St. Louis Institutional Review Board. The CDC provided the researcher with the YRBS data for further analysis. There were no human participants to be engaged directly for this study, and therefore no need for informed consent to conduct the study, since the study only involved analysis of an existing database.

Sleep Scores and Categories

YRBS contains a single item on sleep, asking only about sleep duration. The National Institute of Health (NIH) recommendations for adolescent health are in line with the CDC recommendations for healthy sleep. According to Hirshkowitz et al. (2015), The National Sleep Foundations (2015) recommends that for good health teens get 8 to 10 hours of sleep daily. This study categorized sleep into three categories: 8 to 10+ hours as Recommended Sleep; between 6 and 8 hours as Close to Recommended;
and less than 6 as *Far from Recommended*. The YRBS responses for these corresponding sleep durations were assigned 5-7 for the 8 to 10+ hour category (Recommended), 4 for the 6 to 8 category (Close to recommended), and <4 for the less than 6 hours category, as indicated in Table 1. From the above characterization of the different sleep categories, Recommended would be considered as the positive behavior while Close to Recommended and Far from Recommended were both considered negative behaviors. Only those who reported 8 to 10+ hours of sleep were considered to have engaged in a positive behavior, as this was in line with the sleep duration guidelines.

![Table 1](image)

**Table 1**

*Categorization for Sleep (N=12,335)*

<table>
<thead>
<tr>
<th>Sleep Score</th>
<th>Score Categories</th>
<th>Frequency</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 to 7</td>
<td>Recommended (8-10+ hours)</td>
<td>3,771</td>
<td>Positive Behavior</td>
</tr>
<tr>
<td>4</td>
<td>Close to Recommended (&lt;8 hours)</td>
<td>6,119</td>
<td>Negative Behavior</td>
</tr>
<tr>
<td>&lt; 4</td>
<td>Far less than Recommended (&lt; 6 hours)</td>
<td>2,445</td>
<td>Negative Behavior</td>
</tr>
</tbody>
</table>

**Results And Discussion**

To examine the relationship between sleep duration and BMI percentiles, Spearman’s Rho correlation was calculated. In addition, other factors such as physical activity and dietary behaviors were considered with sleep duration in examining the relationship with these multiple factors using multiple linear regression. The hypothesis was that the more hours of sleep averaged by high school boys and girls, the lower their BMI percentiles. Upon conducting correlation analysis, 854 missing value cases were eliminated, such that data was available from 11,481 adolescents.

In order to test the hypothesis, Spearman’s Rho correlations were performed first for the high school general population, irrespective of gender, then subsequently for the gender categories of male and female.
Spearman’s Rho yielded an inverse, negative and weak correlation that was yet significant at the set \( p \) value (\( r = -0.031, \ p = .001 \)). This result suggests that the longer the sleep duration, the lower the BMI percentiles of high school students. In order to examine this association for boys and girls, the data were split by gender.

Spearman’s Rho correlations for the relationship between sleep score and BMI percentile yielded gender differences between boys and girls (see Table 3). For boys, higher sleep scores were associated with lower BMI percentiles (\( r = -0.047, \ p = .000 \)) but in girls, although there was a similar relationship, the results were not significant (\( r = -0.19, \ p = .148 \)).

The differences in correlations between boys and girls were tested for significance of the difference using a z-test, and at a \( p \) value of 0, this result was significant at \( p < .05 \). The results implied that the longer the sleep duration by high school boys, the lower their BMI percentiles, unlike their female counterparts. The hypothesis that the longer the sleep duration by high school boys and girls, the lower the BMI percentile was only partially supported.

From the results of the current study, there were noticeable gender differences in correlation coefficients in sleep score computations. First,
Spearman’s Rho yielded correlations between high school students sleep scores and BMI percentiles that depicted considerable shifts after gender categorization. Spearman’s Rho reported significant inverse relationships between sleep score and BMI percentiles among boys ($r = -.047, p < .05$), and non-significant indirect relationships among girls.

The results from the bivariate association between sleep score and BMI percentiles are equivocal with an implication that further research on sleep duration within different weight status categories is needed. This vagueness may also originate from the fact that there is merely a single question on the YRBS on sleep. Other studies have found associations between children’s weight status and sleep. These studies have also addressed other aspects of sleep, rather than just mere sleep duration. Snell et al. (2007) found correlations between sleeping less than 8 hours with higher BMI in adolescents regardless of gender. The current study found that boys’ longer sleep is associated with lower BMI percentiles, but girls’ is not. This result was similar to that of Reither, Krueger, Hale, Reiter and Peppard (2014).

**Recommendations**

The guidelines for recommended sleep duration for adolescent and other individuals across the lifespan slightly differ between the National Sleep Foundation and the National Heart Lung and Blood Institute, which is grounds for misconceptions. An expert panel from these two organizations is required to clarify the confusion. In addition, CDC needs to reconsider designing the question on sleep to include aspects of sleep other than duration that are attracting more attention in the literature. Questions that address both sleep quality and quantity are necessary in future YRBS administrations.

The insights gained by this examination emphasize that sleep might have strong influence on adolescent BMI percentiles. This study was able to establish and emphasize previous findings from similar research studies that have been highly contentious in terms of establishing links to weight status. The insights gained from this particular study might provide the needed guidance to understand the role of *more* versus *less* number of sleep hours on BMI percentiles particularly in adolescents. In addition, parents might be further informed of the role they need to play in promoting adequate adolescent sleep and general wellbeing, and more health educators to emphasize the need for youths to get the recommended sleep hours on a daily basis.

**References**


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Fighting Obesity and Cardiovascular Disease in our Universities: Using Practicum Students to Run a Fitness Club for Faculty and Staff

Britton Johnson
and Greg Kriewitz

Obesity and cardiovascular disease have become a large problem for people in the United States. Increased opportunities for sedentary lifestyles allow for people to become less physically active and at greater risk for cardiovascular diseases, such as diabetes, heart attack, stroke and other heart related diseases (Hoeger & Hoeger, 2010; Liguori, 2012). In addition to decreased physical activity, most people consume amounts of calories exceeding the amount required for daily consumption (Donatelle, 2009). Thus, decreased activity, and increased caloric intake leads to increased risk of overweight and obese individuals in the United States (Centers for Disease Control and Prevention, 2005). This growing issue is addressed in Physical Education classes at many different Universities.

Universities educate students for careers in many different majors, from liberal arts such as History, Biology and English (among others) to professional studies such as Business, Education, and Physical Education. Departments of Health, Physical Education and Recreation (or of similar names) educate students how to become future Physical Education and Health teachers in both Elementary and Secondary schools, coaches, personal trainers, strength and conditioning coaches, cardiac rehabilitation specialists, facility managers, as well as many other physical skill related professions. These departments and their majors are dedicated to increasing the physical activity levels of individuals, as well as decreasing instances of cardiovascular disease and reducing obesity in the United States (Columbia University, 2017).

In 2010, one department at a University in the Midwest began using practicum students in Physical Education and Exercise Science to administer a program that would allow for employees of the University to have the opportunity to become more physically active, while allowing the students to gain real-world experiences in their given fields. The program began as a walking club and later changed into a four day per week fitness club with a different activity each day. The goal of this program was to allow for an environment where employees could become active in a safe and controlled environment, while also having fun in doing so. This took
place with a student administering the program for class credit. Therefore, it cost the University no money, and possibly could help to reduce health care costs at the same time.

**Obesity and Cardiovascular Disease in the United States**

In the United States, obesity has become a critical problem. Overweight and obesity rates have increased over the past several years. Men have an overweight (25-29.99 BMI) rate of 70.8% while women have a rate of 61.8%. For obese individuals (BMI of 30 or higher), men have a rate of 31.1% while women have a rate of 33.2% (Hoeger & Hoeger, 2010). Several reasons for this include physical inactivity, increased stress and increased caloric intake. Physical activity levels of parents and siblings are key indicators of our physical activity levels (Kalakanis, 2001). Also, changes in caloric intake over the past 30 years show that men consume 7% more and women consume 22% more calories than in the past. Of the calories consumed, 38% come from fat (Donatelle, 2009).

Around 100 million people in the United States have some form of cardiovascular disease, and around 1.5 million people die of the disease each year (Liguori, 2012; Donatelle, 2009; Hoeger & Hoeger, 2010). In the United States, 35% of the causes of death are linked to cardiovascular disease (Hoeger & Hoeger, 2010; Liguori, 2012). One example of cardiovascular disease is coronary heart disease. Coronary heart disease is the blockage of blood flow for various reasons, such as plaque buildup in the veins (Liguori, 2012). The health related issues of cardiovascular disease are so severe that if it were possible to eliminate all major CVD (cardiovascular disease), life expectancy would increase by close to seven years (Donatelle, 2009; Hoeger & Hoeger, 2010).

The guideline for health benefits is to receive 30 minutes of moderate intensity physical activity five or more times per week (ACSM, 2010; Hoeger & Hoeger, 2010). Another guideline would be to accumulate 10,000 steps per day, or the equivalent of 5-6 miles of walking (Le Masurier, 2003). According to the American College of Sports Medicine, less than half of Americans take part in the appropriate amount of physical activity (Centers for Disease Control and Prevention, 2005). Some of the benefits to increased physical activity are lower risk of heart attack, stroke, diabetes, cancer and other cardiovascular diseases, better body composition and a better quality of life (Liguori, 2012; Hoeger & Hoeger, 2010; Dinger, 2001). “…Americans can substantially improve their health and quality of life by including moderate amounts of physical activity in their daily lives.” (President’s Council on Physical Fitness & Sport, 1996). Time and availability are two of the largest roadblocks to activity. It may be possible to increase activity levels if a location and a time can be provided for activity, a support group for the participants can be arranged, instruction on simple skills taught (i.e. how to use equipment properly) or an option that does not cost them any money can be provided (Hoeger & Hoeger, 2010; Liguori, 2012).

Changes in the behaviors of Americans can lead to a higher quality life that includes less risk of cardiovascular disease and lower rates of overweight and obesity. Wellness programs around the country are being started in order to allow for people to become more active, thus allowing
for less risk for health problems (Hoeger & Hoeger, 2010; Liguori, 2012).

**University Fitness Clubs**

One University began to address the wellness issue by beginning a University fitness club. At a school in the Midwest, the same complications existed for employees of this institution as in many other workforces throughout the United States. Teaching loads, research requirements, and various types of service to the University and community, as well as family obligations back home left little time for physical activity during the day for many University employees. As with many other workforces, this lack of time for activity, coupled with larger portion sizes in the United States, higher caloric intake, and increased stress led to higher probability of obesity, cardiovascular disease and other health risks (Hoeger & Hoeger, 2010).

The University fitness club evolved from several previous events at the University, as well as ideas used at other universities. Previously, walking clubs were present, but were not continued. Another college ran a 100 million step campaign throughout its campus in an attempt to get their campus to become more active. This University also includes many walking labs for its students as part of their Fitness and Wellness course. These ideas were brought together as the Health, Physical Education and Recreation department began the walking club again in 2010 as part of a practicum experience for a Physical Education – Teacher Education student. Over the following semesters, the program evolved into the currently run fitness club by continuing its connection with practicum experiences in the Physical Education Department.

**History of the Program**

The fitness club started in the spring of 2010 when professors in the Health, Physical Education and Recreation Department began a walking club on campus, designed to get employees more physically active. Professors in the department ran a survey of all employees asking if they were interested in a walking club, when would be the most ideal times for the club, and what days of the week they would most like to see the program run. The results of the survey showed that the program needed to be run on Tuesdays and Thursdays from 4:45 until 5:15. The program was run for eight weeks, and averaged 10 walkers per day, including a total of 30 different participants. Five different routes which were all located on campus were used, measuring anywhere from 0.65 miles to 2.30 miles. The program began at a centralized location on campus.

During the program in the spring, participants began to ask what would happen in the summer and in the fall. Having had many discussions with those participants, as well as with many who did not take part in the program, it was discovered that people wanted more options other than walking, and different days to meet. Several employees noted they would not take part in walking, but would love to be introduced to strength training exercises, or would take part in Yoga or Pilates. Still others claimed to love the walking, and wanted to continue with that. Others claimed that Tuesdays and Thursdays did not fit into their schedules.
After many discussions with coworkers, it was decided that more options would be included.

In the fall of 2010, the fitness club ran for the first time. The program ran for 12 weeks on Monday thru Thursday from 4:45 until 5:15 with a different activity each day. Mondays continued with walking, using the same routes that had previously been used. Tuesdays included instruction on Yoga and Pilates skills. Wednesdays were called “game day” where a new sport or activity was introduced each week, such as walleyball, tennis, disc golf and many others. Thursday was an introduction to many different strength training exercises, followed by free weight lifting time with supervision. The club averaged five members per day, and a total of 15 members, although many members from the previous walking club were spotted walking on the designated routes at various times during the day.

The spring of 2011 continued the fitness club with slight revisions. Mondays again were walking days, while Tuesdays were now the strength training days. Wednesday was again “game day” and Thursday was now an aerobics day, including any activity that raised the heart rate to a moderate or vigorous activity level. The club averaged five members per week and around 20 total participants, most of which are first time members. Again, many previous members were walking (in groups with other previous members) at various times throughout the day on the previously used routes.

**Goals of a Program**

The goals of this program were to attempt to increase the amount of physical activity that employees take part in. As with any individual, the type of physical activity that different people enjoy will vary greatly. Many different suggestions were made that related to inclusion in the program. Inclusion of different types of activities led to more participation, and increased physical activity for employees. Employees, for the purpose of this club, included anyone working for the University (not including student workers). Family members of the employees were also welcome to take part in the club.

While the number of participants each semester is always important to any program, the ultimate goal had little to do with participation numbers on a given day or semester. The goal was to increase activity. This activity took many forms, including previous members walking on their own around the clubs routes outside of club times, non-members of the club beginning to join their friends and co-workers on those same walks, more employees taking part in workouts at the University fitness center, as well as members remaining active in various other aspects, such as Zoomba classes, swimming, running and strength training on their own (at home or in a gym).

In addition to the benefits of physical activity for the members of the fitness club, there were benefits to the Physical Education major who was running the program. The student who facilitated the program gained practical experience that related specifically to their given field. The Physical Education major was always either an Exercise Science major, who may be looking to become a personal trainer, strength and
conditioning coach, fitness coordinator or many other careers related to the field, or was a Physical Education – Teacher Education major who was preparing for their teaching career. These students were in fields that may require skills which can be increased with their instructions during the fitness club. Skills such as communication with participants, motivation and encouragement of participants as well as teaching skills and strategies were critical to running the fitness club. These teaching skills included instruction of proper technique, corrective feedback on those skills, as well as explanations of muscles used, cardiovascular or strength benefits, or proper warm-up and cool-down procedures. In the same fashion that many classes give practical experiences with teaching, lab activities, or internships, this practicum experience allowed for growth in many of these key skills for future work experience.

Liability

Any time a program includes physical activity, there exists a risk of injury. A fitness club run by a Physical Education department is no different. As discussed previously, with overweight and obese individuals, as well as those at risk for cardiovascular disease participating in various intensities of physical activity, the risk for injury increases (Hoeger & Hoeger, 2010; Liguori, 2012). Thus, it was imperative that liability be addressed prior to beginning the program each semester.

Risks associated with this type of fitness club include overuse injuries, such as muscle soreness, fatigue and cramps and injuries related to activity, such as falls, muscle pulls or strains. They might include more simple effects, such as lightheadedness, dizziness or nausea, or can be more severe events, such as heart attack, stroke or death. Whether these events are common, likely, or even unimaginable, they still can be possible results of moderate to vigorous physical activity, and need to be included in a liability waiver, thus limiting the risk to the instructor or University. Those at higher risk include smokers, the overweight and obese, elderly, and those who are inactive (ACSM, 2010).

A liability waiver was created to limit the risk for those running the program. The waiver included a statement of inherent risk, including injury and cardiovascular risks, and acceptance of those risks. Additionally, contact information in case of emergencies was required for each individual. Individuals were not permitted to take part in the club without this signed waiver. Copies were kept with the individuals running the program (on site every day in case of emergency) as well as with the practicum supervisor. An example of the liability waiver is included in Appendix 1.

University Requirements

The Department of Health, Physical Education and Recreation at the University offered various degrees, which include Health and Exercise Science, Physical Education – Teacher Education, and Physical Education – General, as well as Recreation and Sport Management. Students taking part in the Exercise Science or Physical Education degrees must complete 29 credits of “core requirements” as well as 21 to 24 credits of “methods
courses” based on the major. Of these courses, two credits worth of the “core requirements” include either Practicum in Physical Education or a summer program for children. This fitness club has been offered as the practicum experience for either a Physical Education or Exercise Science student.

The requirement for the practicum experience is 90 hours’ worth of time spent in an environment related to the students’ field. Thus, a student in the Teacher Education degree would garner more teaching experiences, including instruction, communication and motivation skills, while an exercise science major would receive practical experience in muscle usage during various activities, cardiovascular improvements and overall health benefits. While the two different degrees differ in their major intent of the practicum experience, the skills learned for both majors have been learned in each experience, meaning that Teacher Education students teaching about muscles and health benefits, while Exercise Science students gain experience in teaching techniques.

In addition to the 90 hours, Physical Education majors were also required to fill out a practicum packet. The packet included a two page pre-practicum summary, which included items such as practicum goals, ways to achieve those goals, and approval of the practicum from all involved (student, on-site supervisor, professor and department chair). Also included were two post-practicum summaries, which included evaluations of the practicum, one by the student and one by the on-site supervisor. These evaluations rate the experience, as well as the students’ performance during the practicum experience.

Finally, the practicum student was required to turn in a weekly update on the progress of the practicum experience, stating both what was accomplished as well as ways to improve the experience, or the positive experiences from the week. At the end of the semester, they were required to turn in a 3-page summary of the experience. This final summary included a statement of either how they completed the goals of the experience, or why the goals were not accomplished. Thus, the student kept track of their experiences, as well as evaluated the effectiveness of the practicum experience. With successful completion of the 90 hours, the pre-practicum summaries and post-practicum summaries as well as the weekly updates and the final paper, the student was able to receive a proper grade for their practicum experience.

Choosing the Students

The first of the main issues with starting the fitness club each semester was recruiting a student to facilitate the program. This was not an easy problem, as there were many issues that arose with the selection. Since the program ran four days per week from 4:45 until 5:15, student recruitment was difficult. Many times, students had classes or other jobs that took place during one or more of these days, thus eliminating them from consideration. Second, the student needed to be enrolled in the Practicum in Physical Education class. Often, this limited the number of possible students to somewhere around ten in any given semester.

Once the students had been narrowed down from the first two considerations, a closer examination of the students was required. The
requirement for the class was that a student in their practicum experience must be a junior or senior, thus making it easier for the students to have the adequate cognitive background for facilitating the program. However, making sure that the students had the knowledge is critical for the program. If the student did not teach a skill the proper way, or gave inadequate information about safety, technique, or health information then members of the club could lose interest, respect for the facilitator, or not feel they were doing well (if they were trying to lose weight, or improve cardiorespiratory endurance). Therefore, it was critical that the practicum student maintained a high level of cognitive ability in their classes, as well as having taken a majority of their methods classes prior to running the fitness club.

Finally, the choice of a facilitator for the program should reflect specific personal-social traits as well. The student needed to be personable, dependable, trustworthy, honest and very adaptable. These skills were important as the student had to interact on a daily basis with many of his or her professors, administrators, department assistants, and other University employees. They needed be a student who could be trusted to perform every day, with high energy, respect for others, and be willing to change strategies quickly. Many times, a plan for “game day” has needed many players, such as walleyball, but on the given day, only two people showed up. Thus, the practicum student needed to adapt the activity and create a new plan for the day. Of these skills, the most important may be communication. The participants may or may not have any skill for a given activity, and may not have experience with Weight Training, or Yoga positions. Thus, the practicum student needed to be able to clearly portray what the skill should look like, as well as be able to provide feedback (both corrective and positive reinforcement) when needed.

Recruiting the Participants

The second of the main issues was recruiting the participants for the fitness club. As with any program, having enough participants to make the program worthwhile was a critical issue. However, when seeing the results of previous clubs on campus, it was easy to see that the impact of the program could come outside of the program. For example, several of the previous members of the walking club or fitness club were no longer members, but continued to walk the same routes as the club, but with their friends at different times. Therefore, the impact of the program may not be seen during the program itself.

There were many ways to introduce the program to the different member of the University community. The first was through personal contact with many of the participants, both from the members of the Health, Physical Education and Recreation department and from the student in the practicum experience. Through word of mouth by those running the program, as well as recruiting during previous semesters (getting the previous participants to come back) was the first draw for the club.

The second way to draw was through e-mails and postings. Many Universities have an employee information e-mail list where employees could e-mail everyone employed at the University (although they are
typically monitored and messages must be approved before being sent to all employees). These e-mails needed to be very specific in nature, telling what the club was, where it was to meet, when it met, and the events for the day. Also, it was important to have a statement about why the program was important, as well as who would be running the program and how to sign up. Additionally, making sure contact information was available for anyone with questions about the program. If these e-mails or postings were not complete, participants could have had many questions or concerns about joining. These e-mails were sent out three times, once when the program dates were set, and days were decides, another the week before it began, and a third a week into the program as a reminder.

Finally, word of mouth draws more members than each of the other ways described above. Members of the program were encouraged to bring their friends, as this was many times a very social club. Thus, working out with a friend, or group of friends made it more likely for the participants to continue to participate. Over the semesters the program ran, over half of the members were recruited by a current member.

Practicum Requirements
Other than the requirements of the students for the class portion of the experience, there were also many requirements that made the program unique. First, with the knowledge base required to become the administrator of the program, the student had to keep up-to-date on that knowledge. For example, new strategies for teaching a weight training skill, or introducing new Yoga or Pilates position were required. This knowledge base needed to be kept in order to give accurate and beneficial information to the participants. Additionally, practicing these skills was also an important aspect of the position. Many times, the practicum student was required to demonstrate a skill to show proper form, or to explain different aspects that should not be done, such as positioning, safety concerns or possible problems relating to becoming tired.

With skills such as Yoga and Pilates, or with many forms of aerobic conditioning, videos would demonstrate proper form. Students were not allowed to simply show these videos, but they often used these videos as review for themselves. Also, the weight training equipment had instructions, as well as different parts that could be moved to make the equipment run more effectively. Students were required to have read these instructions, and to understand how the machines work. This allowed them to be able to instruct the members of the club effectively, as well as to be able to correct members who may not be using the equipment or performing the skill correctly.

With the inclusion of walking in every semester, the practicum students were required to map out new routes that have not previously been used. These routes ranged in distance from 0.65 miles to 2.50 miles and included different areas of the University, including sidewalks, walking trails, paths and other areas. Also, the paths included as little overlap as possible with other routes, thus eliminating redundancy of the routes. Each semester the routes were developed, scanned to a computer and uploaded to a website that allows for members of the club (and non-members) to view and use at their discretion.
Activities and Teaching Requirements

The practicum student was responsible for everything that takes place during the program. This began with the decision of what activities to include in the program. Some of these decisions were made for them, as the requirements of the previous facilitator were to find out what the previous members liked, did not like, and would have liked to be included in the future. As had been the case each semester, several members enjoy the walking, and would not take part in activities if walking was not included. Many of the members explained that they had never been shown how to lift weights or use the machines correctly to reduce the risk of injury. Therefore, the practicum student was told that walking and weight training should be included every semester.

The remainder of the activities, as well as what day they would occur on, was left to the facilitator of the program. Once the decision was made by the practicum student, they were told to defend the decision to the practicum supervisor. Here, they explained the reason for including the activities they did, as well as why they chose the days they did for running each activity. For example, including the walking on Monday, and the aerobic day on Tuesday would provide back-to-back days of cardiovascular work. While this may not be a problem, it might have been better for the health of the participants to provide a different day, such as strength training, between the aerobic days. This allowed for the participants to recover and feel they could be successful in their workouts.

Finally, there was an issue of availability of space and equipment. The practicum student was required to make the reservations of all space needed. Days such as Yoga and Pilates, strength training and aerobic activities required the same space on any given day, thus making it easy to reserve the location. However, having to make the reservation, fill out the forms, and discuss the required space or equipment was part of the learning process for the student. Additionally, having the equipment available (such as volleyballs, tennis rackets, discs for disc golf, etc.) was a pivotal portion of the program. The practicum student was required to reserve, pick up and prepare, and return the equipment each time it was needed. Many times, the equipment was required for another class or other programs and was available, meaning the practicum student had to reconsider the options for the day, or adapt the activity somehow.

Evaluating the Experience

The first of the evaluation techniques was a visit from the practicum supervisor. This was done as needed throughout the program, but should be done a minimum of twice. This allowed the supervisor to see exactly what was being taught, as well as how it was being taught. Additionally, over the course of the program both the practicum student, or the University supervisor had discussions with the members of the club. These discussions allowed for the club to be revised, improved or otherwise changed for the better. This also allowed for discussions of how the practicum student was doing in their facilitation of the club. Occasionally, this lead to times when the practicum student needed to be brought in to discuss his or her performance, and given instructions on how to better facilitate the program. To date, each time these discussions
have taken place, the practicum student made the appropriate changes. At the end of each semester, the members of the club all had only good things to say about the practicum students. Additionally, as has been mentioned previously, members have given suggestions on how to improve the program, such as including different activities each day, what activities to include, or including more days of the week.

Overall, more employees of the University have been seen walking around campus on the paths used for the club, using the fitness center that was provided for employees and students, and started working out at home or in local gyms (according to the members themselves). Thus, the goals of the program were successful in both creating a more active and fit campus, and in terms of the programs impact on the Physical Education student who was facilitating the program.

References


BRITTON JOHNSON and GREG KRIEWITZ are with Missouri Western State University.
Appendix 1
XXX University
Department of Health, Physical Education and Recreation
Fitness Club – Assumption of Risk and Release

This program is being started to increase physical activity of XXX employees and/or employee’s spouses. The “club” will meet at the XXX fitness center Monday through Thursday from 4:45 until about 5:15PM. The program will involve University students within the Health, Physical Education, and Recreation Department who serve as instructors.

Risks Due to Participation
Potential risks to your health and well-being because of your participation include 1) Cardiovascular injury which may occur due to stress added to an existing condition (heart attack, stroke, and death), 2) Severe acute fatigue, 3) Lightheadedness, dizziness, nausea, 4) Muscle soreness, 5) All other possible risks associated with light to moderate physical activity.

Precautions
Participants need to watch for symptoms during exercise that might call for exercising to stop: dizziness, nausea, jaw pain, chest pain, upset stomach, bleeding, paleness or any other unusual behavior. Additionally, participants should notify program staff of symptoms. Participants are free to stop activities for any reason if they so wish.

By signing this Assumption of Risk and Release, the individual named below wishes to participate in the event and recognizes there are risks of damage or injury arising from the activities. By his/her signature below, the participating individual agrees to assume the risks and responsibilities surrounding his/her participation in the Program. In addition, the participant (including his/her heirs and personal representatives) agrees to release, hold harmless, and indemnify XXX University from and against any claims, demands, actions, causes of action, lawsuits, expenses, or losses (including attorney’s fees) on account of property damage or personal injury (including death) arising out of or attributable to the individual’s travel to or participating in the Event. The Participant understands the University does not provide any accident or medical insurance. This Assumptions of Risk and Release Waiver applies to XXX University and all of its trustees, officers, employees, and agents.

Voluntary Consent & Whom to Contact for Further Information
If you have any problems or questions on the program later on, you can contact XXX, Dept of HPER, XXX University, (Phone number here) or XXX, Dept of HPER, XXX University, (Phone number here).

I have read this consent form and freely and voluntarily agree to
participate in the program described above. I understand that I can terminate participation at any time without penalty of prejudice.

If you decide to participate, please sign below:

Participant: (PRINT NAME) __________________________________
Date:____________________
Participant: (SIGNATURE) __________________________________
Participant work phone:________________________
Participant email:________________________
In Case of Emergency Contact:________________________ @ phone
number (___)_________________

Answering the below questions is optional, it just gives us a better understanding who are a serving on campus:
Employee _____ Faculty_____
Department_______ Gender: M____
Employee’s spouse ____
Staff _____ F____

BRITTON JOHNSON is an Associate Professor of Physical Education at Missouri Western State University. He has worked in Physical Education - Teacher Education programs for the past 11 years.

GREG KRIEWITZ is an exercise scientist with more than 20 years teaching experience in higher education. He has certifications from ACSM, NSCA, ACE, and FMS.
Use of Fitness and Nutrition Applications by College Students

Marla Jones, Jessica Maddox, Claudia Benavides-Espinoza, and Paul Finnicum

The purpose of this study was to gather information on the use and user’s satisfaction of health-related mobile applications (apps) by university students for fitness and dietary purposes. The survey utilized in this study was developed with the aid of exercise scientists, health educators, and business professionals. Information was gathered by distributing the survey to 200 students, of which 195 surveys were completed and returned. Overall, data from this study showed fitness apps are more popular than nutrition apps among college students and were used by roughly half of the participants surveyed. MyFitnessPal was identified as the most popular fitness and nutrition app. Several respondents used the app for both nutrition and fitness purposes. Students identified a variety of apps that are not marketed as health-related aids to fitness and dietary behaviors. Student’s responses showed moderate to high levels of satisfaction with the fitness and nutrition apps they use.

Keywords: mobile applications, fitness, nutrition

In the United States, diseases related to unhealthy lifestyle choices are commonplace, and related technology is often linked to a sedentary lifestyle (Owen, Sparling, Healy, Dunstan, & Matthews, 2010). Today’s adults spend more time sitting compared to their parents and grandparents. We live in environments that minimize human movement, and physical inactivity is associated with 3.2 million deaths annually (World Health Organization [WHO], 2017). Health professionals may have found an unserved niche with health-related apps as a means of combating a variety of our unhealthy behaviors.

According to a report by the Pew Research Center, 68% of all Americans have smartphones, 45% have tablet computers, and 86% of people between the ages of 18-29 own a smartphone (Anderson, 2015). In 2013 there were over 40,000 apps categorized as health and fitness available
The use of apps grew 35% between 2011 and 2012 (Yoganathan & Kajanan, 2013). A large part of modern culture centers on the use of technology, and though this technology often contributes to sedentary behaviors, it could be beneficial in increasing physical activity, improving dietary choices, and encouraging other health-related behaviors. A variety of mobile apps can be considered health-related; however, not much is known about the use and user’s satisfaction of these health and fitness apps.

By allowing the user to conveniently access and track health information, health-related apps appeal to a mobile society. Health and fitness apps that focus on exercise and nutrition often allow users to track dietary and exercise information on the go, in real-time, and allow mobile access of information on exercise and diet. Use of these apps will continue to rise as mobile technology becomes more entwined with everyday life. Use of health-related fitness apps could potentially result in a society that is more health conscious. Benefits of using mobile apps include the ability to personalize the app to fit one’s needs and having the content available anytime and anywhere (Whittaker, 2012; Tate, et al., 2013).

Since health-related apps are fairly new, there is limited research that examines use and satisfaction of health apps. Studying the demographics, motivation, and satisfaction of the people that use these apps could provide important information for further research. Researching app usage and user satisfaction to determine the strengths and weaknesses of existing health apps may allow researchers to offer suggestions to application developers enabling them to develop more user-friendly apps with features consumers desire.

Health professionals may also benefit from studies that examine app usage. Some health and fitness apps such as MyFitnessPal and Nike Run are designed with GPS, social networking capabilities, and sensor based technology that provides feedback on physiological functions (Yoganathan & Kajanan, 2013). Information provided by health apps could be beneficial to personal trainers, fitness instructors, and wellness coaches as they work with clients to improve their health. Research on the usefulness and effectiveness of health-related apps would allow fitness professionals to determine which apps would better fit the needs of their clients. Apps may prove useful as an exercise adherence tool and encourage clients to monitor or track their diet and exercise on their own. Nutrition and weight loss professionals could also benefit from information logged by their clients through nutrition apps. Since apps are so versatile, research on health-related apps has the potential to impact a wide range of app users and professionals.
Purpose of the Study

Mobile apps are relatively new to the health world, and little is known about their use and consumers’ attitudes towards them. The purpose of this study was to collect data on university students’ use and satisfaction of fitness and nutrition apps on mobile devices such as phones and tablets. A survey was developed to gather information that would identify nutrition and fitness apps students choose to use and their satisfaction of app use.

Methods

Sample

Participants in this study were university students over the age of 18 enrolled at a mid-sized, four-year, public university. The survey included multiple sections with questions over demographic information, and a series of three sets of questions focused on the use and user satisfaction of fitness and nutrition apps. Information regarding the significance of the study was shared with participants, participants were allowed to ask questions, and were then asked to sign a university approved IRB consent form prior to completing the survey.

Demographics

The mean age of participants was 21.71 years (SD=3.92), and the age range was from 18 to 52 years old. The majority of respondents were females (60.5%). Most of the participants were white (70.3%), followed by African Americans (22.1%). The remaining participants identified themselves as Asian, Hispanic/Latino, American Indian, or other. Most of the respondents were seniors (46.7%), followed by juniors (24.1%). Sophomores comprised 16.9% of participants, 19.7% were freshmen, and 2.1% were graduate students. Students from 62 different majors agreed to complete the survey. The most majority of participants identified their major as Exercise Science (27.2%), followed by Nursing (6.7%), and Interdisciplinary studies (6.2%).

Data Collection

Data was collected through the distribution of a printed survey. The survey was developed with the help of professionals in the fields of exercise science, health promotion, and business. The survey was distributed in classes and to voluntary participants recruited around campus. Participants were asked to list up to three apps they use to assist with fitness or workouts and up to three apps they use for nutrition or dietary purposes (#1 = most used app, #2 – second most used app, etc.). They were then asked to answer questions regarding their use and satisfaction for each app they listed. The survey included statements about the app and participants were asked to identify their level of agreement with the statement regarding the app by using a scale of 1-5 (strongly disagree to strongly agree). Some questions required “Yes”, “No”, “N/A”, or
“Unsure” responses.

**Data Analysis**

To ensure participants’ confidentiality, surveys were assigned a random number before the information was entered into a Microsoft Excel spreadsheet. Information was then entered into SPSS for statistical analyses. Means and standard deviation were calculated for demographic information. Frequencies and percentages were calculated for responses to questions regarding health-related mobile app usage.

**Results**

**Response Rate**

The survey was distributed to 200 undergraduate and graduate university students. Students were required to be 18 years of age or older to participate in the study. Of the original 200 surveys, 196 surveys were completed and returned to researchers, and 195 were used for data analysis. Not all questions were answered by all participants. Some participants reported that they did not use health-related apps and others reported they used only one type of health app (nutrition or exercise). Some participants used multiple apps, while others reported using only one app.

**Analysis of Survey Results**

The study was designed with two purposes; one purpose was to gather general information regarding students’ use of health-related apps and the second purpose was to gather information regarding user satisfaction of health-related apps. The information for the questions below reflects responses regarding general information on student app usage from participants.

*What demographic of college students own a smartphone or tablet?*

Out of the 195 surveys analyzed, only two students reported that they did not own a smart mobile device.

*What percent of students use fitness and/or nutrition apps?*

Approximately 48% of students reported that they use health-related mobile apps (48.2%) while 51% reported they did not use a health-related fitness app. Approximately 28% of participants reported using nutrition apps. Students identified 20 different nutrition apps they use compared to 60 different fitness apps.

*Did students pay for the apps they use?*

Approximately 42% reported that they did not pay for the fitness/workout apps they used, and approximately 27% reported they did not pay for nutrition apps. The average price paid for fitness apps was $2.95
(SD= $1.75) and, the average price paid for nutrition apps was $3.00 (SD=$1.16).

What are the most popular fitness and nutrition apps used by students?
The most popular app used by participants for both fitness and nutrition was MyFitnessPal. The number of participants that reported they used the app for fitness was 13.8% and 18.5% of participants reported they used it for nutrition. The next two most popular health-related mobile apps for fitness were Nike Run and Run Keeper. For nutrition, the most popular apps following MyFitnessPal were Instagram and Fitness Buddy.

How satisfied are students with their fitness and nutrition apps?
The second purpose of the study was to gather information from participants regarding their satisfaction of the health-related apps they use. Participants could list up to three fitness/workout related apps and three nutrition related apps. The information presented in the tables below reflects participants responses to statements regarding their satisfaction with the health-related apps they identified. For fitness apps, six statements regarding use and user satisfaction of the apps were investigated. The frequency of responses for each statement is shown in Table 1.

For nutrition apps, five statements regarding use and user satisfaction of the apps were investigated. The frequency of responses for each statement is shown in Table 2.

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1: Using this app enables me to accomplish more tasks</td>
<td>3</td>
<td>7</td>
<td>32</td>
<td>39</td>
<td>10</td>
</tr>
<tr>
<td>Q2: Using this app improves the efficiency of my workout</td>
<td>2</td>
<td>5</td>
<td>25</td>
<td>42</td>
<td>18</td>
</tr>
<tr>
<td>Q3: Using this app makes it easier to complete my workout</td>
<td>1</td>
<td>8</td>
<td>25</td>
<td>42</td>
<td>16</td>
</tr>
<tr>
<td>Q4: Using this app makes organizing my workouts easier</td>
<td>2</td>
<td>12</td>
<td>17</td>
<td>43</td>
<td>18</td>
</tr>
<tr>
<td>Q5: Overall, I think the app is easy to use</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>48</td>
<td>38</td>
</tr>
<tr>
<td>Q6: Learning to use the app was easy for me</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>47</td>
<td>37</td>
</tr>
</tbody>
</table>
Table 2
Nutrition Apps Satisfaction

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1: Using this app enables me to accomplish dietary tasks</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>26</td>
<td>25</td>
</tr>
<tr>
<td>Q2: Using this app improves my dietary health</td>
<td>1</td>
<td>0</td>
<td>6</td>
<td>34</td>
<td>16</td>
</tr>
<tr>
<td>Q3: Using this app increases my awareness of patterns in food consumption</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>25</td>
<td>26</td>
</tr>
<tr>
<td>Q4: Overall this app is easy to use</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>23</td>
<td>32</td>
</tr>
<tr>
<td>Q5: Using this app helps improve my overall health</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>23</td>
<td>31</td>
</tr>
</tbody>
</table>

Discussion

Responses to the survey show apps used for fitness/workouts are more popular than nutrition apps among students and were used by roughly half of the students that participated in this study. These findings reflect those found in a study conducted by Krebs and Duncan (2015) that showed a little over half of the U.S. adults they surveyed had downloaded a health-related mobile app. The majority of participants in this study reported they did not pay for apps they used. Krebs and Duncan (2015) also found a large percentage of people they surveyed were not willing to pay for a health-related app.

A variety of health and fitness mobile apps were identified by participants, and the responses regarding their usefulness and satisfaction varied widely. Participants identified using three times the number of fitness/workout apps compared to nutrition apps. Among those that use fitness apps, the majority of respondents ‘agreed’ or ‘strongly agreed’ that the apps make their workouts more efficient, easier to complete, and helps with organizing a workout. Among those that use nutrition apps, the majority of respondents ‘agreed’ or ‘strongly agreed’ that the nutrition/dietary apps they use enables them to accomplish their dietary tasks, improve their dietary health, and increase their awareness of patterns in food consumption.

One of the most unexpected findings of this study was the types of mobile apps students considered to be health-related. Students reported using a wide variety of apps they considered health-related such as radio...
and social media apps. Instagram, a social networking app, was listed four times as a fitness app, making it the fourth most popular fitness app and the third most popular nutrition app. Other unanticipated apps identified by participants as fitness/workout apps were Pinterest, Spotify, Facebook, and Pregnancy Plus. Many of the nutrition apps identified were specifically for dietary purposes.

MyFitnessPal was the most popular app for fitness/workout and nutrition. Some individuals that identified MyFitnessPal as a fitness app they use gave neutral to negative responses regarding their satisfaction with the app; however, when it was identified as a nutrition app, responses were on average more positive. Several respondents used MyFitnessPal for both workout and nutrition purposes. The dual purpose of this app makes it more versatile, yet it seems consumers feel it more useful for nutrition purposes compared to the fitness/workout purposes.

The field of mobile health is still at an infant stage. There are many limitations in the sophistication of available health-related apps and little is known about the people that download and use these apps (Krebs & Duncan, 2015). Most health-related apps lack essential behavior change components and were not created with input from health care or behavior change professionals. This may be one reason students reported such a wide variety of apps used for fitness/workout purposes. They may not be able to find a single app that fits their needs, and therefore download multiple apps. Many health-related apps only provide information and do not allow for tracking or data input thereby limiting their usefulness (IMS Institute for Healthcare Informatics, 2016).

Overall, students may not be using fitness and nutrition apps as much as expected considering the large number of students that own mobile devices. Approximately half of the students in this study reported using health-related apps. Previous research has found that health-related app use is low and less time is spent using these apps compared to apps used for games and social networking (Yoganathan & Kajanan, 2013). Participants in this study that reported using mobile apps for fitness and nutrition did not always use apps that would commonly be identified as a health-related app. Data regarding use and satisfaction varied widely, but was positive overall. This study did not ask participants to identify why they chose not to use health-related fitness apps, which should be examined in future research. Krebs and Duncan (2015) found commonly reported reasons for adults not having downloaded apps were cost, lack of interest, and concerns about apps collecting personal data.

**Conclusion**

Though health-related mobile apps could have a significant positive impact on health related behaviors, it appears many students are opting not to use them. Based on the results from this study and previous research by Krebs and Duncan, apps developers are missing an opportunity to
significantly impact the health of many Americans. More research is needed to determine why individuals are choosing not to use these apps, and the reasons they decide to stop using an app if they did download the app to their device. Cost was identified as a potential barrier as a reason for downloading health-related apps, and those that develop and offer apps should take this into consideration. For individuals to download and use apps they must feel the app is beneficial and will assist them in reaching their health-related goals. This means many health-related apps may need to expand their functional ability to appeal to more users.

References


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Editors, 2017

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