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# A COMPARISON OF FITNESS RATINGS TO EXERCISE PATTERNS AND MOTIVATIONS AMONG COLLEGE STUDENTS

**Authors:** **Andrea J. Ednie, PhD., and Michael D. Stibor, MS,** University of Wisconsin – Whitewater

**Abstract**

This study compares fitness ratings with exercise patterns and motivations within a sample of college students. Study participants (n=172) were recruited to complete an online survey about their exercise patterns and motivations, and to participate in a round of fitness assessments. Exercise motivations were measured using the Exercise Motivations Inventory-2, and five fitness assessments were selected to represent body composition, muscular strength, muscular endurance, aerobic capacity, and flexibility. Cluster analyses were completed to group the participants according to their fitness assessment results, and ANOVA and $\chi^2$ tests identified differences in motivations across the fitness groups. Differences in both gender and self-reported physical activity patterns were also identified across the fitness groups. The fitness cluster groups differed across six of the EMI-2 motivational factors. The differences in motives across the fitness groups identify clear trends demonstrating self-determined versus extrinsic motivations, however, they also lead to questions regarding the multiple meanings particular motivation components may have. Exercise patterns reported by participants were consistent with their placement in the fitness groups.

## INTRODUCTION

There are significant benefits to a physically active lifestyle as well as consequences for inactivity. Some of the well-documented benefits of meeting minimum physical activity recommendations (Haskell et al., 2007) can be living longer, a reduced risk of heart disease and/or stroke, better weight control, better academic achievement in students, and less risk of depression (Centers for Disease Control and Prevention [CDC], 2014). In a 2014 report, the Center for Disease Control (CDC) found that 52.1% of male and 42.6% of female U.S. adults met the ACSM guidelines for physical activity, with younger adults being more likely to meet the guidelines as compared to older adults (CDC, 2014). The trend of decreasing physical activity patterns from early to later adulthood could make one hope that younger adults are adopting healthy patterns. However, the spring 2014 National College Health Assessment (CDC, 2007) found that only 53% of male college students and 49% of female college students reported meeting the minimum recommendations. As a demonstration of this concern, Healthy Campus 2010 included physical inactivity in the six priority health risk behaviors among college students, leading to Healthy Campus 2020 identifying

a 10% improvement as a key student objective (American College Health Association [ACHA], 2002).

Increasing the physical activity patterns of college students is a priority as demonstrated in Healthy Campus 2020. Efforts to do this include a significant body of research about physical activity patterns among college students and about strategies for reversing the inactivity trend. One of the conclusions in a meta-analysis of physical activity behaviors of college students was a call for multi-level approaches to understand and improve college student physical activity behaviors (National College Health Association, 2002). The current study does so by comparing actual fitness measures to self-reported physical activity patterns and exercise motivations with the goal of identifying strategies that may help to increase the proportion of college students who sustain healthy exercise habits.

The bulk of available physical activity statistics, particularly within the context of college students, are based on survey research and represent respondent-reported activity levels (Ebben & Brudzynski, 2009; Ingledew, Markland & Ferguson, 2009; Keating, Guan, Pinero, & Bridges, 2005;; Lutz, Karoly, & Okun, 2008; Teixeira, Carraca, Markland, Silva, & Ryan, 2012). Some research comparing self-reported fitness with actual fitness measures has been conducted, however, many of these studies relate only to body composition (Banegas-Banegas, & Guallar-Castillon, 2002; Gutierrez-Fisac, Lopez-Garcia, Rodriguez-Artalejo, Jacobson & DeBock, 2001; Morrissey, Whetstone, Cummings, & Owen, 2006; Palta, Prineas, Berman, & Hannan, 1982), or reflected a unique population such as children, or physical education instructors (Brandon & Evans, 1988; Lamb & Haworth, 1998;). A limited body of research has made this connection for the college student demographic. Monroe et al. (2010) compared the Physical Self-description Questionnaire responses of 60 college students to their results in four measures of fitness and found students could gauge their own fitness with some degree of accuracy. Clearly, more research that validates self-reported physical activity with actual measures of fitness is needed.

Similarly, little research has examined the relationship between what motivates people to exercise and their measured fitness ratings. One particularly relevant study was completed by Wilson et at. (2003) who examined self-determination theory components over the course of a 12-week prescribed exercise program and found the components of motivation that related most strongly to physical fitness ($VO_{2max}$) were competence and autonomy. This study seeks to expand on the Wilson et al (2003) findings by evaluating a greater variety of fitness measures.

Exercise motivations, independent from measures of fitness, have been thoroughly researched for a variety of demographics and within many specific contexts (Teixeira et al., 2012). Self-determination theory (Deci & Ryan, 1985; Ryan & Deci, 2000) has been commonly used to study exercise participation, and a growing body of literature demonstrates the importance of intrinsic motivation, including competence, autonomy, and psychological relatedness as intrinsic needs central to sustained exercise behavior patterns (McDonough & Crocker, 2007; Markland & Tobin, 2010; Thøgersen-Ntoumani & Ntoumanis, 2006). Self-determined regulations have been found to be a particularly important predictor of exercise, especially when considering the likelihood of sustaining the exercise (Matsumoto & Takenaka, 2004; Mullan & Markland, 1997; Standage, Sevire, & Loney, 2008). Extrinsic motivations, by contrast, have mostly been found to either have little or no association or to be negatively associated with exercise participation (Ingledew & Markland, 2008; Teixeira et al., 2012). However, in some contexts external regulation has been found to be positively associated with physical activity. For example, introjected regulation, or behaving out of guilt or a need to prove something, has been found to be positively associated with exercise, particularly among females (Duncan, Hall, & Wilson, 2010; Wilson, Rodgers, Fraser, & Murray, 2004). Duncan et al. (2010) found introjected regulation to predict exercise intensity for females, and Ingledew et al. (2008) found body related motives to be associated with introjections. However, Rogers, Hall, Duncan, & Pearson (2010) found that increases in introjection tended to occur in the early stages of exercise participation, meaning this type of motivation is less likely to lead to sustained healthy exercise behaviors.

The current study analyzes exercise motivations from the perspective of motives (goals) in order to compare the reasons why participants exercise with their fitness test results. For this purpose, the Exercise Motivations Inventory–2 (EMI-2) was used as a measure, as it allows for differentiation between a variety of motivational components (Kilpatrick, Hebert, & Bartholomew, 2005). The EMI-2 has been validated (Markland & Ingledew, 1997) and previously applied in exercise motivations research (Huang, Lee, & Chang, 2007; Kilpatrick et al., 2005, Maltby & Day, 2001). Similar to the self-determination theory literature, previous research has shown intrinsic motives, such as challenge, affiliation, and enjoyment, to be positively associated with exercise behavior (Teixeira et al., 2012). There have been mixed results in terms of how body-related and health/fitness motives affect exercise patterns. Generally, extrinsic motives, such as social recognition, appearance, and weight have been found to either not predict or negatively predict exercise behavior (Ingledew & Markland, 2008). However, some of the same motives, such as the body and health-related motives, can be perceived as either intrinsic or extrinsic motivations,

depending on the characteristics of the individual and of the exercise. An example of such was made by Teixeira et al. (2012), where a person who is motivated for appearance reasons (extrinsic motives) could strive to seek praise from a partner (controlled motivation) and/or could personally value a fit appearance (autonomous motivation).

The current study contributes to the above body of knowledge by broadening the comparison of motives and participant-reported exercise patterns to include measures of physical fitness. Identifying specific motives that associate with various fitness levels could help professionals to tailor programs, facilities, and strategies to better suit the needs of those who struggle to sustain healthy exercise habits.

## METHODOLOGY

### Participant Recruitment

The study was conducted at a mid-sized (12,000 students) public university in the mid-western United States. Participants were recruited from a general education health and fitness course required for all undergraduate students. Instructors of the course sections agreed to include participation in the study as an optional way for students to earn "activity" points that counted toward their grade. The students who chose to participate self-registered using an online poll and provided their email address so they could be sent the consent forms, the online survey, and a scheduling poll for their fitness assessment. The course instructors shared on their course websites information about the study including how to prepare for the fitness assessments. Willing participants first completed the online survey about their exercise habits and motivations, and then did the fitness assessment.

### Study Participants

During spring semester 2015, 1073 students were enrolled in the participating course sections, and a total of 241 (22%) participated in the study. One hundred seventy-two participants (71% of the total participants) completed all of the study components and provided usable data. The majority (61%) of participants were first year students, and most (91%) were traditional-aged (18-22yrs). The participant sample was evenly split by gender (Males: n = 85; Females: n = 86), and self-identified physical activity levels ranged fairly evenly from 2-5 (M = 3.49, SD = 1.18) on a 5-point Likert-type scale ranging from 1 (not active) to 5 (very active) (see table 1).

**Table 1.** Study Participant Demographics

| Student Status | Gender | Age | Self-Described Physical Activity Level |
|---|---|---|---|
| First Year: 61% (n=104) | Male: 50% (n=85) | 18-22yrs: 91% (n=157) | 1. Not active: 5% (n=8) |
| Sophomore: 24% (n=41) | Female: 50% (n=86) | 23-27yrs: 5% (n=9) | 2: 17% (n=30) |
| Junior: 9% (n=15) | | 28+yrs: 4% (n=6) | 3. Active: 27% (n=46) |
| Senior: 6% (n=11) | | | 4: 26% (n=45) |
| | | | 5: Very active: 25% (n=43) |

**Survey Contents and Data Reduction**

The online survey was conducted using Qualtrics Online Survey Software and took participants an average of 18 minutes to complete. The survey inquired about student demographics, exercise patterns, fitness goals, and exercise motives.

**Exercise Motivations Inventory-2.** The Exercise Motivations Inventory-2 (EMI-2) was used to measure the participants' exercise motives (Markland & Ingledew, 1997). The EMI-2 is a 51-item measure, comprising 14 sub-scales of motivations including fitness, health, social, recreational, weight management, and stress management related categories. Participants rated the 51 items on a 6-point Likert scale from 1 (not at all true for me) to 6 (very true for me). The participant responses were factor analyzed using principal components extraction with varimax rotation. The resulting scree plots, eigenvalues, and factor loadings were examined to determine the appropriate number of factors for this dataset, and Chronbach's alpha coefficients were used to evaluate the internal consistency of each resultant factor. Our dataset represented a 12-component measure instead of the anticipated 14 (ill-health avoidance and positive health were combined, as were enjoyment and revitalization). Eight items were dropped from the 51-item question set because they did not load in such a way that corresponded with the EMI-2 categories or weakened the internal consistency of the categories. Overall, the most highly rated exercise motives were strength and endurance, appearance, ill-health avoidance and positive health, weight management, and enjoyment and revitalization. The lowest rated motives were affiliation and health pressures. Our final 12-component measure, with factor loadings ranging from 0.50 to 0.89 and strong internal consistencies, is summarized in Table 2.

**Fitness Assessment Measures And Cluster Analysis.** The fitness assessments were conducted in the university's exercise physiology laboratories, fitness center, and field house

containing an indoor track. Lasting approximately 1.5 hours, the assessments included anthropometric tests (i.e., height, weight, waist/hip ratio, skinfold measurements, blood pressure, and resting heart rate), muscular strength assessments (i.e., leg press and bench press), muscular endurance tests (i.e., 1-minute push-ups and sit–ups tests), an aerobic capacity assessment (i.e., Cooper 1.5 mile run/walk test), and a flexibility test (sit-and-reach).

The assessments used in this study were chosen due to the following factors: probable familiarity with the test for the subjects; ease of administration/reliability in terms of completing the assessments; and validity (Golding, Myers, & Sinning, 1982; Heywood, 1998; Heyward, 2010; Jeukendrup & Gleeson, 2010; McArdle, 2000; Pollock & Wilmore, 1978; ). An additional consideration, which eliminated more-sophisticated means of conducting $VO_{2max}$ testing, was utilizing tests that could be administered to mid-sized groups in a reasonable amount of time.

**Table 2.** Exercise Motivation Components Following Factor Analysis[a]

| Component | Grand mean | SD | Factor loading range | Cronbach α |
|---|---|---|---|---|
| Strength & endurance | 5.36 | 0.80 | 0.69-0.78 | 0.85 |
| Appearance | 5.12 | 0.97 | 0.59-0.89 | 0.82 |
| Ill-health avoidance & positive health | 4.94 | 0.90 | 0.50-0.76 | 0.85 |
| Weight management | 4.62 | 1.19 | 0.82-0.85 | 0.79 |
| Enjoyment & revitalization | 4.60 | 1.25 | 0.63-0.82 | 0.93 |
| Nimbleness | 4.38 | 1.41 | 0.75-0.81 | 0.91 |
| Challenge | 4.38 | 1.35 | 0.63-0.85 | 0.85 |
| Stress management | 4.30 | 1.34 | 0.72-0.85 | 0.90 |
| Competition | 3.72 | 1.62 | 0.76-0.89 | 0.93 |
| Social recognition | 3.45 | 1.39 | 0.57-0.73 | 0.80 |
| Affiliation | 2.93 | 1.40 | 0.64-0.85 | 0.88 |
| Health pressures | 2.64 | 1.46 | 0.50-0.76 | 0.71 |

[a] Items measured on a Likert-type scale, where 1=not at all true for me, and 6=very true for me.

Five measures were selected out of the full slate of assessments for the purpose of providing an overview of the participants' fitness (see Table 3). One measure was selected to represent each of the five components of fitness (body composition, muscular strength, muscular endurance, aerobic capacity, and flexibility) based on three criteria: (a) researcher confidence in the reliability of the measure; (b) measure correlation with expected variables; and (c) appropriateness of the measure to represent the fitness component. The selected measures included the Brozek 7-site

skinfold measure, 1-minute push-up test, estimated 1-rep bench press test, $VO_{2max}$ based on a 1.5 mile run, and the sit-and-reach test for flexibility.

Cluster analysis procedures were conducted in order to group participants by fitness patterns. Agglomerative hierarchical clustering was conducted for the first iterations to examine models with various distances between clusters and numbers of clusters. The procedure was analyzed for three to six clusters, and the four-cluster grouping proved most appealing. Four criteria were used to select the most appropriate number of clusters: (a) members in each cluster should be as close to each other as possible; (b) each cluster should be different from the others; (c) each cluster should be large enough to allow further statistical analyses; and (d) each cluster's contents should be consistent with theory and should make intuitive sense (Halkidi, Batistakis, and Vazirgiannis, 2001). To validate the four-cluster grouping, the cluster analysis was repeated using K-means clustering and specifying four clusters. The results were similar to the four-group hierarchical grouping but provided more difference between groups while maintaining a reasonable sample size within each group. Table 4 defines the K-means four-cluster solution across the five fitness measures used for the analysis.

**Table 3.** Fitness Assessment Results Across the Selected Measures

| Assessment Measure | Scale | Mean | Excellent / Good | Average / Fair | Poor / Very Poor | Correlations (r) | p |
|---|---|---|---|---|---|---|---|
| Brozek Skinfold[a] | 1-5 | 2.21 | 66% | 27% | 7% | Bench Press: .43<br>Push-Up: .38<br>VO2 Max: .48<br>Sit & Reach: .25 | <.001<br><.001<br><.001<br><.01 |
| Bench Press[b] | 1-5 | 3.55 | 28% | 13% | 59% | Push-Up: .56<br>VO2 Max: .41<br>Sit & Reach: .29 | <.001<br><.001<br><.001 |
| Push-Up[c] | 1-5 | 3.18 | 20% | 44% | 36% | VO2 Max: .35<br>Sit & Reach: .22 | <.001<br><.01 |
| $VO_{2max}$[d] | 1-6 | 3.71 | 47% | 21% | 32% | Sit & Reach: .07 | >.05 |
| Sit & Reach[e] | 1-5 | 2.64 | 35% | 65% | 0% | | |

[a] Rating scale ranged from 1=athletic, and 6=obese.
[b] Rating scale ranged from 1=superior to 5=poor.
[ce]Rating scale ranged from 1=excellent to 5=poor.
[d] Rating scale ranged from 1=superior to 6=very poor.

The four cluster groups were (a) Overall Fit, (b) Strength, (c) Average, and (d) Least Fit. The Overall Fit group rated "excellent" or "good" across all of the fitness measures and therefore represented the best overall fitness of the sample. The Strength group rated "excellent" and

represented the highest in muscular strength, however, scored average in muscular endurance and only fair in aerobic capacity. The Average group rated "good" or "fair" across all of the fitness measures, trending slightly lower in muscular strength and endurance compared to the other tests. The Least Fit group rated "acceptable" to "very poor" across the measures.

**Data Analysis.** One-way analyses of variance (ANOVA) with Tukey Honestly Significant Differences (HSD) tests for multiple comparisons (or where appropriate chi-squared ($\chi^2$) tests) were used to examine the relationships between the fitness clusters, motivation components, student demographics, and self-reported exercise patterns. Effect size (eta-squared ($\eta^2$) or Cramer's V tests) was calculated to better understand the relationships between variables. Significance was reported at <0.05.

**Table 4**. Four Cluster Group Solution Showing Mean Scores for Each Assessment Rating[a]

| Fitness Assessment | Mean Scores[b] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Overall fit | Strength | Average | Least fit | Δ mean | F | p | $\eta^2$ |
| Skinfold | $1.61_a$ | $1.91_{ac}$ | $2.16_{ac}$ | $2.89_{bc}$ | 1.28 | 18.83 | <.001 | 0.53 |
| Bench press | $1.94_a$ | $1.65_a$ | $4.38_c$ | $4.73_b$ | 3.08 | 204.56 | <.001 | 0.90 |
| Push-up | $2.36_a$ | $2.70_a$ | $3.48_b$ | $3.64_b$ | 1.28 | 23.88 | <.001 | 0.57 |
| 1.5 mile run | $1.94_a$ | $4.26_b$ | $2.96_c$ | $5.58_d$ | 3.64 | 197.81 | <.001 | 0.90 |
| Sit & Reach | $2.48_{ab}$ | $2.35_a$ | $2.88_b$ | $2.78_{ab}$ | 0.53 | 4.09 | <.05 | 0.28 |

[a] Rating scales for the measures are slightly different, however, 1 is always excellent/superior/athletic, and 5 or 6 is poor/very poor/obese.
[b] Mean scores with a common subscript letter do not differ significantly from each other at the .05 level.

## RESULTS

The participant sample contained limited variety in terms of student status, age, and distance to campus. However, the data were examined for differences among the fitness clusters based on gender and several self-reported patterns, including how physically active the participants consider themselves to be, their rating of the importance of exercise, and whether they think they need more exercise (Table 5).

Based on Chi Square analysis, significant differences were evident between the clusters with respect to gender. The Strength cluster group was significantly different from the Least Fit and the Average cluster groups where there were a higher proportion of male participants in the Strength group (78% male) as compared with the other two groups, which were 36% and 45% male, respectively ($\chi^2$=12.37, df=3, p<.01, Cramer's V=.29). The gender breakdown of the Overall Fit

cluster group was not significantly different from the other groups, but contained more males (58%) as compared to females (42%). Related to this finding is that overall, male participants considered themselves to be more physically active than females participants ($F=15.16$, $p<.01$, $\eta^2=.29$). In the survey, participants indicated how physically active they consider themselves on a Likert scale ranging from 1, not active; to 5, very active. Male participants also held significantly better ratings in body fat ($\chi^2=42.76$, $df=4$, $p<.01$, Cramer's $V=.50$), bench press ($\chi^2=19.30$, $df=4$, $p<.01$, Cramer's $V=.34$), and flexibility ($\chi^2=9.73$, $df=3$, $p<.05$, Cramer's $V=.24$) . Females, on the other hand, rated significantly higher than the male participants in the muscular endurance test ($\chi^2=32.14$, $df=4$, $p<.01$, Cramer's $V=.44$). Males still outnumbered females in the excellent and good ratings, but, there were more females (n=-53) who rated "average" compared with 32 males in the lower rating, named "fair". There were no significant differences between the genders in the aerobic capacity test results.

**Table 5.** Differences in Gender, Self-Reported Exercise Patterns, and Exercise Perceptions Between Fitness Clusters

| | Item Proportion / Mean Scores[a] | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Overall Fit** | **Strength** | **Average** | **Least Fit** | **F or $\chi^2$** | **p** | **$\eta^2$ or Cramer's V** |
| Gender: | | | | | | | |
| Male | $58\%_{ab}$ | $78\%_{a}$ | $45\%_{b}$ | $36\%_{b}$ | $\chi^2=12.37$ | <.01 | Cramer's |
| Female | $42\%_{ab}$ | $22\%_{a}$ | $55\%_{b}$ | $64\%_{b}$ | | | V=.29 |
| Percent meeting ACSM guidelines | $67\%_{a}$ | $60\%_{ab}$ | $46\%_{ab}$ | $37\%_{b}$ | F=2.89 | <.05 | $\eta^2=.27$ |
| Consider themselves physically active[b] | $4.42_{a}$ | $3.83_{ab}$ | $3.60_{b}$ | $2.60_{c}$ | F=22.95 | <.01 | $\eta^2=.32$ |
| Rating of exercise importance[c] | $6.45_{a}$ | $6.22_{ab}$ | $5.68_{b}$ | $5.47_{b}$ | F=5.11 | <.01 | $\eta^2=.16$ |
| Feel they need more exercise[d] | $3.94_{a}$ | $4.87_{ab}$ | $5.44_{b}$ | $5.96_{b}$ | F=9.63 | <.01 | $\eta^2=.16$ |

[a] Percentages/scores with a common subscript letter do not differ significantly from each other at the .05 level.
[b] Item was measured on a 5-point Likert-type scale, where 1=not active, and 5=very active.
[c] Item was measured on a 7-point Likert-type scale, where 1=not at all important, and 7=extremely important.
[d] Item was measured on a 7-point Likert-type scale, where 1=completely disagree, and 7=completely agree.

There were also significant differences in how physically active participants within each of the cluster groups considered themselves to be. Participants in the Least Fit group had a mean rating of 2.6 which was significantly lower than the other three groups, and participants in the Average group (mean rating of 3.6) also considered themselves less physically active as compared to the Overall Fit group who had a mean rating of 4.42 ($F=22.96$, $p<.01$, $\eta^2=.32$). Also, according to their reported exercise patterns, significantly fewer participants in the Least Fit group met ACSM recommendations for cardiorespiratory exercise as compared to the Overall Fit group ($F=2.89$, $p<.05$, $\eta^2=.27$) where 67%, 60%, 46%, and 37% of the Overall Fit, Strength, Average, and Least Fit groups met the recommendations, respectively.

Similarly, participants were asked to rate the importance of exercise on a Likert scale ranging from 1 (not at all important) to 7 (extremely important). Participants in the Least Fit and Average cluster groups rated the importance of exercise lower than those in the Overall Fit group ($F=5.11$, $p<.01$, $\eta^2=.09$). The survey also asked participants to indicate, on a scale ranging from 1 (completely disagree) to 7 (completely agree) whether they need to exercise more than they currently do. Those in the Least Fit and Average cluster groups felt more strongly that they needed more exercise than those in the Overall Fit group ($F=9.63$, $p<.01$, $\eta^2=.16$).

**Fitness Clusters and Exercise Motivations**

In the online survey, participants were asked to rate on a scale of 1-10 how motivated they were to exercise (1=not motivated at all, 10=extremely motivated). Participants in the Overall Fit and Strength cluster groups rated themselves as significantly more motivated than the Least Fit group ($F=6.91$, $p<.01$, $\eta^2=.13$).

**Table 6**. Mean Differences in Exercise Motivation Component Ratings Between Fitness Clusters[a]

| Exercise Motive | Mean Scores[b] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Overall Fit | Strength | Average | Least Fit | Δ mean | F | p | $\eta^2$ |
| Strength & endurance | $5.67_a$ | $5.54_{ab}$ | $5.41_{ab}$ | $5.04_b$ | 0.63 | 4.66 | <.01 | .30 |
| Appearance | $5.15_a$ | $5.12_a$ | $5.05_a$ | $5.26_a$ | 0.21 | 0.39 | >.05 | .01 |
| Positive health | $4.80_a$ | $4.79_a$ | $4.91_a$ | $5.08_a$ | 0.29 | 0.80 | >.05 | .02 |
| Weight Management | $4.55_{ab}$ | $4.13_a$ | $4.47_a$ | $5.18_b$ | 1.05 | 5.15 | <.01 | .31 |
| Enjoyment & revitalization | $5.14_a$ | $4.94_a$ | $4.66_a$ | $3.88_b$ | 1.26 | 8.40 | <.01 | .15 |
| Nimbleness | $4.17_a$ | $4.48_a$ | $4.43_a$ | $4.26_a$ | 0.31 | 0.33 | >.05 | .01 |
| Challenge | $4.91_a$ | $4.46_{ab}$ | $4.30_{ab}$ | $4.03_b$ | 0.88 | 2.82 | <.05 | .05 |
| Stress management | $4.36_a$ | $4.55_a$ | $4.35_a$ | $3.95_a$ | 0.60 | 1.25 | >.05 | .03 |
| Competition | $4.30_a$ | $4.33_a$ | $3.57_{ab}$ | $3.12_b$ | 1.21 | 5.13 | <.01 | .31 |
| Social recognition | $3.59_{ab}$ | $4.19_a$ | $3.40_{ab}$ | $3.04_b$ | 1.15 | 3.85 | <.05 | .27 |
| Affiliation | $3.42_a$ | $3.06_{ab}$ | $2.90_{ab}$ | $2.58_b$ | 0.84 | 2.49 | >.05 | .05 |
| Health pressures | $2.30_a$ | $2.54_a$ | $2.46_a$ | $2.94_a$ | 0.64 | 1.48 | >.05 | .03 |

[a] Items measured on a Likert-type scale, where 1=not at all true for me, and 6=very true for me.
[b] Mean scores with a common subscript letter do not differ significantly from each other at the .05 level.

While the Overall Fit and Strength groups were generally more motivated compared to the Least Fit group, specific motivational components were important for each group (Table 6). Six of the twelve components of exercise motivations differed significantly between the fitness cluster groups. The Overall Fit group rated strength and endurance, enjoyment and revitalization, challenge, competition, and affiliation significantly higher compared to the Least Fit group. The Least Fit group was more motivated by weight management as compared to the Strength and Average groups. Although social recognition received lower ratings across the board, it was rated higher by the Strength group than the Least Fit group.

## CONCLUSIONS

The purpose of this study was to explore how fitness ratings relate to exercise patterns and motivations. Our analysis has identified several trends which provide insight regarding exercise behaviors and warrant further investigation. Consistent with Monroe et al. (2010), the study participants' self-reported exercise patterns and ratings of exercise importance correlated with their actual fitness ratings, suggesting their concepts of their own progress and fitness were at least somewhat in line with their reality. Further research is needed, however, to better examine the accuracy of college students' fitness perceptions and their understanding of the level of performance that can be achieved by adhering to the ACSM guidelines for physical activity. Investigations of this nature are important for the college demographic considering the current national trends of inactivity (CDC, 2007) and the CDC's finding that activity levels tend to decrease with age in adulthood (CDC, 2014). Overall, the sample of college students demonstrated moderate fitness abilities. The sample ranged from an Overall Fit group (22%) who rated in the excellent-good range across all fitness measures, to the Least Fit group (30%) who rated average/acceptable to very poor, depending on the measure. Fifty-two percent of the study sample (Female: 43%; Male: 61%) met or exceeded ACSM recommendations for cardiorespiratory exercise. The overall proportion was consistent with the 2014 CDC report (CDC, 2014); however, the gender breakdown in this study demonstrated a greater proportion of male participants meeting ACSM standards as compared to the 2014 National College Health Assessment data (ACHA, 2002).

Our whole sample demonstrated good-acceptable mean body composition ratings. However, the effect of decreasing activity levels, combined with natural processes associated with aging (i.e., loss of muscle mass, lower metabolism), may prevent this pattern from persisting throughout adulthood. This decline may occur even if older adults maintain the same exercise and nutritional habits due to metabolism slowing with age (Fukagawa, Bandini, and Young, 1990). Any

findings that help young adults understand the positive results associated with regular exercise and the implications of inactivity, or that help professionals to effectively motivate the college populations, will be important toward reversing the obesity trend.

A consideration of the mean cluster ratings of the motivation components for each of the fitness groups provided context for the college sample and lead to several important research questions. Appearance was among the top three most highly rated motivation factors for all four fitness groups. Being an extrinsic motivator, appearance has generally been found to be negatively associated with exercise behavior (Ingledew & Markland, 2008). Our data would suggest that appearance was important for everyone, but that it may not have been the motive that actually drove those who were committed to fitness, since those who were not committed rated it equally high. A more comprehensive study into appearance motives for college students may help to better understand whether appearance is, in fact, an external motive, or whether the reasons for wanting to improve one's appearance are more complex (Teixeira et al., 2012).

Strength and endurance was also among the top three motives for all of the fitness groups except for the Least Fit group. With survey questions such as "to build up my strength", "to increase my endurance", and "to get stronger," this motive could also either be an autonomous motive (i.e., the participant values being strong and fit) or a more controlled motive (i.e., the participant wants praise for his or her performance) (Teixeira et al., 2012). The Overall Fit group rated this motive higher than the Least Fit group, making it particularly interesting for further research.

Enjoyment and revitalization was rated among the top three motives for the two fit groups, and the two areas were rated significantly higher than the Least Fit group. This is more of an intrinsic motive characteristic of self-determined patterns and is likely important for sustaining commitment to exercise (Markland & Tobin, 2010). Enjoyment was rated higher than challenge and stress management, which are other intrinsic motives one could expect to be prevalent within the college demographic. In order to develop strategies to reach those students less motivated, further research is warranted into what activities and exercise environments college students enjoy the most.

Social recognition was rated higher by the Strength group that performed well in muscular strength but worse in cardiorespiratory endurance than other groups. From the perspective that muscular strength is the most quantifiable of all fitness categories, it makes sense that a group seeking social recognition would perform well in the most easily-compared measures of fitness. A

concern, however, is that social recognition is generally considered an extrinsic motive, which has not been associated with sustained exercise patterns (Ingledew & Markland, 2008).

The Least Fit group rated appearance and health benefits among their top three, along with weight management. This group understood the connection between appearance, health, and exercise; however, knowledge was not enough to motivate them to sustain exercise behaviors. Moreover, they were extrinsically motivated to lose weight and had less intrinsic motivation in terms of enjoying exercise. They did not yet have a sense for how they intrinsically "needed" exercise to fulfill their personal, professional, and relational goals. Programs for helping this group would benefit from more research about how they experience exercise, and about their preferred exercise support structures.

**Limitations**

One limitation of this research was the voluntary participant recruitment process. Students were awarded course credit for participating in the study; however, they also had several alternative options for receiving the credit. Twenty-two percent of the course-enrolled students chose to participate in the study. It would seem likely that students who are more physically fit would choose to participate in the study over those more sedentary and less fit; however, the alternative options for course credit were each worth fewer points in comparison and each involved a significant time commitment. Also, the overall fitness measure results of the study suggest the sample was relatively similar to national norms (CDC, 2014).

A second limitation of this study was the use of an online survey to collect demographic information, exercise patterns, and exercise motivations data. There is no guarantee that the survey respondents represented themselves accurately throughout the online survey (Wright, 2006).

**Implications**

This is one of the few studies that compare fitness ratings with exercise motivations, and it also contributes to an emerging body of literature evaluating the accuracy with which people self-evaluate their exercise patterns. The motivation patterns identified in this study demonstrate clear trends such as the importance of self-determined, autonomous motivations for exercise as demonstrated by the top fitness groups' high ratings of enjoyment and revitalization. To the contrary, the Least Fit group was more motivated than the other groups by weight management, which is an external motive that previous studies suggest is negatively correlated with physical activity. Some of the trends that were identified in this study warrant further inquiry, such as the

prevalence of appearance as a top-rated motive across all of the fitness groups. We suspect that appearance as a motivator contains a variety of meanings across the sample, and we suggest that a better understanding of these complexities could help to develop strategies to better motivate target groups.

The bulk of exercise motivation literature relies on participant-reported exercise patterns, yet relatively few studies have evaluated the accuracy with which a person's reported patterns associates with their physical fitness. The trends across the fitness rating groups in this study were consistent with the self-reported exercise patterns in the survey. However, further research is needed before we can rely on the accuracy with which groups of different demographics report and assess their physical activity patterns. Also, additional studies connecting exercise motivations to fitness ratings could help wellness practitioners better understand the needs and preferences of clients and community members.

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# THE INFLUENCE OF THE SPORT EDUCATION MODEL ON AN ADAPTED PHYSICAL EDUCATION TEACHER'S CONCEPTIONS

**Author:** Hong-Min Lee, University of New Mexico, Jungil Oh, University of Texas-Rio Grand Valley, Seungyeop Baek, Changwon National University, and Young-Sik Kim, Korea National University of Education

**Abstract**

Physical education teachers implement model-based instruction as their fundamental teaching framework to provide quality physical education (Metzler, 2005). Siedentop et al. (2004) indicated that the Sport Education curriculum model encourages students to become literate, competent, and enthusiastic players. Therefore, the purpose of the current study was to examine the conceptions of a junior high school physical education teacher using the Sport Education curriculum model to teach students with disabilities during a swimming unit. Data were gathered from videotaping of physical education classes, sixteen informal and two formal interviews, lesson plans, and field notes. The results of the study found that the teacher perceived students to be more enthusiastic and interactive with their classmates when participating in the model. In addition, the physical education teacher spent more time preparing for his lessons and modified his teaching method. Team affiliation was the most challenging aspect of using the Sport Education model with the population.

## INTRODUCTION

The Sport Education curriculum model is a physical education model that provides "authentic" sporting experiences to students. Wallhead and O'Sullivan (2005) indicated that the Sport Education model allows physical education teachers to provide quality lessons that encourage positive student experiences in physical education. In addition, Siedentop (2002) stated that Sport Education has a significant influence on teachers' teaching practices such as peer tutoring, teaching games for understanding, cooperative learning, and constructivism. In this regard, Siedentop (1994) developed the Sport Education model to promote active learning for students in physical education using a team-based approach. There are certain features in the Sport Education model: a) seasons including pre-season, in-season, and post-season; b) team affiliation to plan and practice for team competitions; c) formal competitions lasting at least nine weeks; d) a

culminating event including tournament games; and e) recording individual and team achievements. More specifically, Siedentop et al. (2004) pointed out that the Sport Education model is essential to students to become literate, enthusiastic, competent players in physical education.

Researchers examined physical education teachers' conceptions using the Sport Education model in their physical education lessons. Alexander & Luckman (2001) found that the model provided physical education teachers with positive conceptions in terms of teacher self-efficacy. As a result, the Sport Education model has been found to be a useful tool for physical education teachers to develop their pedagogical skills. However, there is no research on conceptions of physical education teachers who implement the Sport Education model to students with physical and cognitive disabilities. Thus, the aim of the current study was to investigate the conceptions of a junior high school physical education teacher using the Sport Education model to teach students with disabilities during a swimming unit.

## METHODS

This study was conducted in a junior high school physical education class at a school for students with severe or profound intellectual disabilities. The physical education teacher had been teaching adapted physical education at the school for about six years. At the time of the study, he implemented the Sport Education model during a swimming and diving unit. Two formal interviews were used to collect the teacher's conceptions of teaching students with severe or profound intellectual disability. Semi-structured formal interviews were conducted in the study (Patton, 2002). In addition, informal interviews were collected to clarify the data. The teacher was also observed 16 times. Field notes and lesson plans were also gathered for data analysis, along with analytic induction and constant comparison (Goetz & LeCompte, 1984).Trustworthiness was completed through triangulation of the data, member checks, and peer debriefing.

## RESULTS

The results of the study revealed that the physical education teacher (Steve) modified his teaching practices and spent more time preparing for his sport education units. The teacher said he used indirect instruction for his swimming lessons using the Sport Education model:

> They were surprised I let them go work on swimming themselves. Several coaches took over, and they started. I just go around and whisper something into the coach's ear.

In addition, Steve spent a lot of time making sure that students with disabilities understood roles in Sport Education units. In this regard, Steve had to spend more time to organize his lessons. As he said about planning:

> I do a lot more planning and getting everything ready for each day of class and then I am waiting for them to learn a little more.

Steve indicated that students with disabilities appeared to show more enthusiasm with their peers when engaged in the Sport Education model. Steve reported that team affiliation was the most difficult part of the model to teach students with disabilities. The sport education curriculum model provided students with disabilities engaging opportunities to be active during class participation. As Steve commented about the increased enthusiasm and social interactions:

> At the end of the unit, students cheered each other and gave students sportsmanship points. Most teams realized they needed to be shaking hands before the event with their teammates, as well as cheering with the other team.

Steve found the challenges in terms of team affiliation he faced with teaching swimming lessons using the Sport Education curriculum model. As a student commended about challenges in team affiliation:

> Sport Education model works with team sports better than the individual sports. It's hard to get team aspects involved in swimming.

The teacher indicated that students with disabilities understood their roles and responsibilities as the class progressed and as they became familiar with the model.

## CONCLUSION

As with a previous study on the sport education curriculum model (Hastie, 2000), students with disabilities in this study enjoyed being a part of the team. The physical education teacher in the study believed that the student roles and responsibilities provided a sense of belonging in terms of the increased class participation. The teacher perceived that his students worked harder in the Sport Education model than in a regular physical education class. Siedentop et al.(2004) stated that involving the students in the Sport Education model provides them a sense of ownership in the lesson. In this regard, the feeling of increased roles and responsibilities helped enhance enthusiasm when participating in the swimming and diving unit.

The Sport Education model works well in a team sport rather an individual sport because of the importance of team-based learning. In this regard, one of the significant findings of the study was the students' challenges of team affiliation in the swimming and diving unit.

The findings of the study also revealed that the teacher adjusted his teaching style toward more of an indirect approach rather than direct approach and also had to increase his planning time for sport education. Further research is needed to examine teacher conceptions when using various types of physical education curriculum models to teach students with different types of disabilities. Understanding teacher conceptions of teaching students with disabilities will provide additional insights in the development of teacher-preparation programs for physical education teachers.

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**Oral Presentations. Wednesday, October 12, 2016**

***The Process of Data-Driven Decision Making in Physical Education Teacher Preparation Programs.*** Glenn Hushman, Carolyn Hushman; University of New Mexico.

Education has entered an evidence-based era requiring all aspects of decision making to be grounded in data. The result has been many school districts, educational programs, and instructors moving toward conducting program and teaching changes through Data Driven Decision Making (DDDM). DDDM is a process that uses a variety of input, outcome, process and student success artifacts in order to explore challenges and successes and make programmatic decisions based on data, not just anecdote. This presentation will provide a basic overview of DDDM followed by examples of how DDDM has been used to inform change in physical education teacher preparation programs. Specific examples of assessments and how they were used to inform change will be provided.

***Transfer of Life Skills from Collegiate Physical Activity Experiences.*** Shirley H.M. Reekie, Katelynn Thompson, Bethany Shifflett, Michael Fallon, Jose Bonpua; San Jose State University.

Designed to examine the transfer of life skills from collegiate physical activity programs, this study surveyed students enrolled in activity classes to gather their perceptions with respect to the transfer of skills in these 7 areas: sensitivity to diversity, communication, problem solving, positive attitude, self-confidence, health habits, resolving conflicts. Using the same survey, data was also collected from intercollegiate athletes so a comparison could be made. The purpose of the project was to (a) document through descriptive statistics the extent to which skills were perceived to impact students beyond the activity experience and (b) compare the transfer scores from athletes' intercollegiate sport experiences with non athletes' engaged in physical activity/sport classes. Long considered beneficial to the health and personal development of youth, sports programs often cite as positive outcomes gains in self-confidence, mental discipline, self esteem, inter-personal relationships, and academic performance. The transfer of such characteristics for adults beyond the sport/activity environment would be equally valuable. Results from this study suggested that the transfer of skills from both settings was quite strong. In addition, overall transfer scores from athletes were higher in comparison to students in physical activity classes.

***Progression in Gait Symmetry Following Total Hip Arthroplasty.*** Julia Freedman Silvernail, Kara Radzak; University of Nevada, Las Vegas. Cass Nakasone; Straub Clinic and Hospital, Honolulu, HI. Samantha Andrews, Christopher Stickley; University of Hawaii, Manoa.

As the population of individuals undergoing total hip arthroplasty (THA) continues to grow, it becomes increasingly important to understand the progression of recovery from both functional and movement perspectives. Current research investigating movement symmetry following THA has focused on discrete events such as peak angles, thereby disposing of the majority of data collected in a gait analysis. Therefore, the purpose of the current study was to utilize a vector coding technique to assess movement symmetry in the hip and knee joint angles and moments before and for multiple time-points up to 1 year after surgery. We observed that control participants consistently spent a significantly greater percentage of stance moving and loading the knee and hip joints symmetrically than the THA participants did at all time-points. THA participants exhibited a greater percentage of stance moving and loading the contralateral side, showing a

continuing reliance and stress on contralateral joints. Though many measures did not change over time, the progression of the sagittal plan knee motion and moment in the contralateral joint suggest that risk may be increasing after the 1 year that these data were collected. Therefore, it is important that future work investigate THA patients for longer than 1 year after surgery and that rehabilitation programs emphasize health in both lower extremity limbs, not just the surgical side.

***Stretching and Sports.*** John Ostarello; CSU East Bay.

The objective of this session is to examine some ideas about the purpose and effectiveness of muscle stretching with respect to sport. It has long been thought that stretching in sports activities is beneficial. It is thought to be beneficial in terms of injury prevention and in enhancing sports performance. It is also widely believed that stretching is helpful in improving strength, coordination, agility, speed of movement and general well-being. To what extent are these claims valid? An empirical examination of the topic will be developed. In this sense, experience and observation, without due regard for data, will be presented. In addition, scientific evidence that is data driven will be presented to aid in understanding the true state of affairs. In keeping with the tenets of WSKW's round-table format, audience participation will be encouraged.

***Two Steps Forward, One Step Back?: A Preliminary Analysis of a 3-year Mixed Methods Study of Varsity Hazing Knowledges' and Practices.*** Jay Johnson; University of Manitoba, Canada.

Hazing is a complex issue that affects many students on university campuses across North America. Acting as an initiation ceremony, hazing behavior can be seen in many different types of social groups, including military units, fraternities, sororities, and sport teams. While efforts have been made in recent years to increase the prevention of hazing at educational institutions, hazing continues to be an open secret, affecting university athletics at an alarming rate (Crow & MacIntosh, 2009; Waldron, 2012). To date, research has primarily focused on United States college campus hazing incidents, pushing the prevalence of Canadian hazing incidents to the background. However, in recent years university campuses have experienced an influx in hazing activities from both mens' and womens' sport teams. This presentation will focus on preliminary data collected by the author and an international team of hazing research specialists over the last 3 years. Initial results indicate that many of the current hazing practices mimic those of the past, including the pervasive use of alcohol, nudity and forced activities (rookie servitude). There is also an abundance of first year athletes who are entering university with the expectation of being hazed, and are generally defining it as a "fun" activity. Teams are becoming more sophisticated in disguising their hazing, including manipulating the language used and defining their entry rituals. This presentation will address gender and hazing, the role of administrations with regards to hazing and the use, perceptions and strength of alternatives to hazing such as land-based education, adventure and team building. This study intends to provide research-based strategies to sport administrators for responding to and preventing hazing; and delivering a template for the transfer of knowledge by which other sport organizations such as secondary schools, community sport or regional/national teams can address the hazing within their programs.

***Promoting student excellence in sport, exercise and wellness science through exchange and presentation.*** Geoff Wood; Rosmini College, New Zealand, Seck Kwoon Lee, Randy Tan, Natalie Ng; Raffles Institution, Singapore.

2016 marks the fifth year of a collaboration between the Raffles Institution, E.W. Barker Institute of Sport (Singapore) and Rosmini College (New Zealand). Students travel to meet, exchange and

develop project work that stimulates inquiry, and develops project and presentation skills. Sharing projects on the stage at a professional conference enhances student professionalism.

***Development of the DLG F3 glider activity: A low cost, high response, STEM activity incorporating physical science and movement.*** George Timings, Luke Sluyter, William Clarkson, et al.; Rosmini College, New Zealand.

Adapting a F3K DLG class glider for school based activity enables this affordable standardised 3-D printed fuselage as a robust and cheap activity. The gliders are collapsible to a briefcase size enabling safe travel to and from the competitions. Individualised wing design encourages the application of STEM to an activity providing high levels of physical activity.

***Assessment of a potential head concussion protection device.*** Matthew Mangino, Jacob Gunnell, Jacob Ridling; Rosmini College, New Zealand.

Concussion sustained during high school sport participation can affect the concussed player for years into the future. The injury has implications for school and university success, employment and family life. Full contact sport in New Zealand results in a high number of diagnosed and suspected undiagnosed concussions. This project investigated G-force sustained during high school male rugby games by using a simple low-cost device.

**Keynote Address:** ***"If not us, then who? If not now, then when***?" Shirley H.M. Reekie; San Jose State University

Dr. Reekie will briefly examine the status of physical activity programs in higher education internationally and then focus on a short history of such programs in the US, before asking the question that is the title of the presentation. Furthermore, why are so many in Kinesiology, having bemoaned for years the fact that physical activity received so little respect from the public in general, now so seemingly reluctant to be seen promoting physical activity. If we don't champion the cause, who will step in to do so, and at what cost to Kinesiology? And if we don't seize the time now, when the public finally "gets it," when will it be the "right time," if ever?

**Oral Presentations Thursday, October 13, 2016**

***Incorporating Problem-Based Learning in Physical Education Teacher Preparation Programs.*** Glenn Hushman, George Schaefer, Alfredo Martinez, Carolyn Hushman; University of New Mexico, Cuauhtemoc Carboni; Imperial Valley College.

Problem-Based Learning (PBL) is an educational method that identifies a problem as a context for student learning. Critical thinking skills, deductive reasoning, and knowledge skills and behaviors are developed as students begin to understand how theory can be applied to practical settings. PBL encourages self-direction and development of lifelong learning and promotes the sharing of learning within a group. Although the PBL approach has been implemented in a variety of other educational domains, there is limited discussion about PBL pedagogical approaches being incorporated in physical education teacher education programs. This presentation will highlight the basics of a PBL approach to educating future teachers and discuss how it can be incorporated into existing physical education teacher education programs.

***More than Sport: The Importance of Philosophy to the Field of Kinesiology.*** Douglas McLaughlin; California State University Northridge.

It is a common complaint from scholars in the socio-cultural content areas that departments of

Kinesiology heavily favor the hard sciences. But any lament over the marginalization of socio-cultural perspectives should be accompanied by critical analysis. In recent years, there have been very few faculty positions advertised for the content area of philosophy of kinesiology. As a philosopher of kinesiology, I worry about the future of this content area. But, I also worry that the content area has not sufficiently developed to reflect the growth of the field of kinesiology. In this presentation, I will argue that the primary focus of philosophy has been on sport, specifically elite sport. This focus is too narrow to be of value to the broad concerns of kinesiology. In order to justify their presence in and value to the field of kinesiology, philosophers need to expand their research and teaching focus into areas of study that address the full range of philosophical issues facing the field of kinesiology. The presentation will conclude with several examples of how "philosophy of sport" can develop into the "philosophy of kinesiology" and what impact it will have on philosophical research and how it will benefit the field of kinesiology.

***The effect of Physical Activity on the Brain–derived Neurotrophic Factor (BDNF).*** Farzaneh Ghiasvand; San Jose State University.

Over the last decade a new and exciting line of research has examined the effect of exercise and/or training on a neurotrophin molecule called BDNF (brain-derived neuropeptide factor). This presentation will summarize the research in this area and provide insights based on the findings. BDNF is essential for neural growth and maintenance, neurogenesis, neuroplasticity, and cognitive function. BDNF has also been linked to metabolic disorders such as obesity and diabetes. The majority of the experimental research in this area has concentrated on the effect of aerobic exercises (one bout, chronic aerobic exercise, or the combination of both) on peripheral blood BDNF concentration. In contrast, smaller numbers of studies have focused on muscular strength exercises (single session, or training) and blood [BDNF]. The results of most investigations on the effect of aerobic exercise and blood [BDNF] have indicated significant increases in [BDNF]. However, the results of most studies on strength exercises and BDNF have shown no significant increase in blood [BDNF] after either one session or after weeks of strength training. In comparison to experimental studies, the results of observational studies have indicated an inverse association between exercise/physical activity and BDNF, which seems to be in conflict with the results of experimental studies.

***Effects of Intermittent Fasting on the Body.*** Jessica Savage, Clay Robinson, Chris Walker, Hannah Byerly, Kelsey Darnell; Lewis-Clark State College.

Intermittent fasting is not a diet, but a diet schedule that is purported to accelerate fat loss and muscle growth compared to traditional eating schedules (Simmons, 2016). It is suggested that intermittent fasting often yields equivalent benefits as traditional low-calorie diets in regard to changes in fat mass, alleviating discomfort due to low energy, improving insulin sensitivity, and improving blood lipid profiles. Currently the bulk of scientific evidence for the health benefits of intermittent fasting has come from animal studies (review: (Chaouachi et al., 2009). Although more and more human studies are being conducted to validate claims found in animals, many studies are with patients with a certain illness or condition (i.e. Rheumatoid arthritis, hypertension, obesity) and not in healthy individuals (Simmons, 2016). Therefore, the purpose of this study was to determine how intermittent fasting effects body composition, weight, and blood lipid levels. Fourteen (9 experimental, 5 control) healthy adults ages 21 – 54 participated in this study. Skin fold, DEXA, and blood lipid panels were collected prior to the start of a six week intermittent fasting schedule (8 hour time frame to consume all caloric needs for the day), as well as at the conclusion of six weeks. A post-test questionnaire was given to all participants in the experimental group. Significant differences ($p < .05$) were seen in pre-

and post-tests between control and experimental groups for total cholesterol (p = .04) and LDL (p = .044). Although not statistically significant the experimental group lost 4x more weight than the control (p = .06), .54% more overall body composition (p = .24), and increased HDL by 4.33 (p = .14).

***Influence of a Modified Martial Arts Program on Adult Over the Age of 70.*** Jennifer Schachner; San Jose State University.

Abstract: Research to examine the benefits that martial arts, particularly Taekwondo, can have a life enhancing impact for older participants. Positive changes have been documented in falls prevention (Brudnak, Dundero, & Van Hecke, 2002), cognition (Pons van Dijk, Huijts & Lodder, 2013) and overall increases in psychological components (Jansen and Dahmen-Simmer, 2012). The purpose of this case study is to examine how modifications to a martial arts curriculum for older adults can change older students physically, while positively affecting and influencing other aspects of their lives. Three 70 year old adults were chosen for this study. The physical movements in the curriculum were modified to meet their specific needs. Data collection included direct observations of training lessons and interviews to capture the older adult students' thoughts, beliefs, and attitudes. Results indicated that Taekwondo training impacted these students by improving their quality of life. They reported increases in self-confidence, self esteem, body awareness and balance. Further they pointed out emotional and social connections made during the program were underlying factors for their continued participation. They also indicated that they enjoyed opportunities to learn to move their bodies in new ways. Modified Taekwondo training as demonstrated in this case study can improve and strengthen many aspects of the older adults lives. From increases in physical mobility to increases in social and emotional connections, a modified Taekwondo program designed to meet the needs of the older adult can provide the aging community with a new and effective way to stay active.

***Making play a positive inclusive experience for differently abled students, athletes, and patients.*** Sharon Stoll, Aubrey Shaw; University of Idaho

The Americans with Disabilities Act (1990) is a civil rights law that prohibits discrimination against individuals with disabilities in all areas of public life. Agencies work diligently to meet the demands of the law with inclusionary practices, including public accommodations, engaging students in regular classes, offering regular activities and state and local government services. However, the practices though well-meaning often actually exclude impaired people from play. Thus, the purpose of this philosophical research presentation is to educate leisure professionals on the importance of play for people with impairments and provide skills and strategies for inclusive behavior. These skills and strategies will help professionals foster an inclusive environment that the laws expect them to uphold. The skills include but are not limited to: perspective change, assessing students' physical capabilities, modifying activities to include all participants' capabilities, engaging all students in inclusivity and fostering play enjoyment with participants of varying abilities, teaching confidence building skills, and educating students who do not want to be inclusive on the importance of play for everyone. Every professional should be successful at implementing an inclusive environment Therefore, by participating in this presentation, the participants will leave with an understanding of how important play is not just to people who are abled but those who have impairments. Participants will leave with an understanding of how play is universal as well as with the skills and strategies to help include people with impairments, and an understanding of how one should implement these skills and strategies.

***The IronMay Challenge: Making the Impossible Possible Within the Community.*** W. Matthew Silvers; Whitworth University.

"I could never do that!" This is the theme of too many quotes from people in our community who once thought they lacked the capacity to complete the IronMay Challenge. This set of beliefs and correspondent behavior is, unfortunately, the norm for wide swaths of people. IronMay is a web-facilitated, community-oriented fitness event where individuals and small teams (family, friends, coworkers, etc.) are tasked with the objective to cumulatively complete an Ironman-distance triathlon during the month of May. Most importantly, the target audience is comprised of those who do not see themselves as active or athletic. That is when the impossible becomes possible. Every year, new IronMay participants learn that physical activity can be fun, can be social, and most importantly, that they have bodies capable of doing amazing things with the right amount of challenge. In 2008, 98 participants on a single college campus completed 9752 miles (99.5 miles/person) during the first IronMay Challenge. Since then, IronMay has consistently grown in attendance, reach, and per capita particip3:30ation. In 2016, over 400 participants from 17 U.S. states and 7 countries completed 57,766 miles (143.7 miles/person). As the event has grown, new challenges have been met with improvements in event and awards structure, website design, and the adoption of social media, such as Facebook, for improved participant engagement. Attendees to this presentation will learn the history and sociocultural perspectives associated with IronMay, the logistics involved with the planning and coordination of such an event, and what is on the horizon for IronMay in the future.

***6-Minute Walk Test: Relationship to Cognitive Function in Healthy Older Adults.*** Cathy Inouye, Jennifer Sherwood, Shannon Webb, YanYan Zhou, Erik Anderson, Nicole Spink, Joaquin Tabera, California State University East Bay.

Loss of independence and poor cognition is associated with low aerobic fitness in the older population (Ortman et al., 2014; Paterson et al., 2004). The VO2max test is expensive and contraindicated in older populations. Alternatively, the 6-minute walk test (6MWT) is a valid assessment of aerobic fitness for older populations (Rikli & Jones, 1998). Previous studies suggest that aerobic fitness is positively correlated with cognitive function in older adults (Colcombe et al., 2003) however; a lack of research examines the relationship between the 6MWT and cognitive function. **Purpose**: To assess the relationship between 6MWT and cognitive function in the healthy population, 60-95 yrs. Methods: 85 participants (67 female, 18 male), 74.3 + 9.43 years, were recruited. During the 6MWT, exercise HR, distance walked, and heart rate recovery (HRR) was recorded. Additional assessments included Mini-Mental State (3MS), Trailmaking, Animal Naming, muscular fitness (hand-grip strength), Physical Activity Scale for Elderly (PASE), and Perceived Stress Scale (PSS). **Results**: 6MWT highly predicted 3MS ($p=0.0009$). 6MWT ($p=0.02$) and PASE ($p=0.0033$) predicted scores for animal naming test, and PSS ($p=0.048$) an inverse predictor. HRR factor impacted score on 3MS ($p=0.0184$) and inversely impacted completion time on Trailmaking Part A ($p=0.0483$). 6MWT predicted score on Trailmaking Part B ($p=0.0076$). **Conclusion**: Findings agree with previous studies (Barnes et al., 2003; Colcombe et al., 2003) suggesting that aerobic fitness is associated with preservation of cognitive function. Attendees will be able to use these results to develop simple clinical assessments to assess cognitive health.

***Exercise Motivation and Adherence: The influence and interpretations of EMI-2 motives.*** Andrea Ednie; University of Wisconsin - Whitewater.

This study explores the relationships between, and perceptions of, various exercise motivations and exercise adherence. Self-determination theory, as applied to exercise motivations has demonstrated the importance of intrinsic motivations, however, extrinsic motivations have not been thoroughly

explored. This study places exercise motive perceptions along the Organismic Integration Theory's (OIT) spectrum of motivations, and identifies associations between those interpretations and exercise adherence. Participants (812 college students) completed an online survey detailing their exercise motivations and participation. The Exercise Motivations Inventory-2 (EMI-2) was used to measure exercise motivations, and participants provided open-ended explanations for their ratings of each of the 14 motivational sub-constructs. Total exercise scores were calculated by assigning MET values to exercise bouts using the Leisure Time Exercise Questionnaire (LTEQ). Multiple regression analyses revealed stress management, enjoyment, competition, and weight management as predictors of exercise for the sample group, and appearance as a negative predictor for females. Analysis of the open-ended motive explanations found participants held diverse perspectives on the health, appearance, weight management, nimbleness, and strength & endurance motivations. The varying interpretations of extrinsic motivations ranged across the OIT. Based on motivation theory, they may be conducive to the process of internalization, meaning they may develop into more intrinsic motivations as participants achieve goals and develop a sense of value for the exercise activities. Additional patterns were identified that require further research, including a gap between the proportion of male versus female participants who enjoy exercise, and the difference between weight management and appearance as predictors of exercise adherence.

**E.C. Davis Lecture: *Towards Making a Difference***. Rob Thomas; La Sierra University.

"Where the conferee is the program and mentoring and networking are the foundation." This phrase should ring familiar for those who have attended the conference a few times. WSKW began in the 1950s with the intent of providing these opportunities, and has continued since then with this ethos. Attendees will have the opportunity to consider key elements of mentoring, reflect on who they have been mentored by, and who they have opportunity to mentor this year. As developing professionals we benefit by our cultural capital, and also have the chance to contribute to it organizationally and individually.

***The Physical Practice of Dance and Sport as Cultural Expression.*** Melonie Buchanan Murray, Steven R. Murray; University of Utah.

Dance and sport are both considered prehistoric forms of human physical activity. Cultural scholars agree that values and belief systems may be reflected through physical practice and the way individuals within a culture move. Given the current situation of globalization, in which various cultures mix with historically unprecedented regularity, the study of other cultures' dances and sport activities might inform us about those cultures. Perhaps, much in the same vein as de Coubertin attempted to use sport as a means to bridge cultural differences through the Olympic movement, the sharing of cultural dance and sport might encourage harmony among those with vastly differing cultural backgrounds. This presentation explores ways in which connections between physical cultural practices of dance and sport have historically reflected cultural values, thereby providing an additional perspective for the importance of human physical activity as a means of studying and understanding human culture.

***Importance of Consumer Engagement in Fitness Industry: The Effect of Extra-role Behavior on Consumers' Intention to Renew.*** Yong Chae Rhee, Tae-Ho Kim; Washington State University, Ki-Tak Kim; Pai Chai University.

The concept of engagement has gotten tremendous interest from scholars in a variety of academic fields (e.g., organization behavior, education, and service quality). Consumer Engagement is also an emerging theme in the field of the fitness industry. Yet, little empirical research has been conducted

to understand consumer engagement in the fitness industry. The purpose of the current research was to measure the effectiveness of consumers' extra-role behaviors (Word of Mouth, Suggestion, and Cooperation) with respect to their intention to renew membership. Extra-role is defined as "those behaviors that go beyond specified role requirements, and are directed towards the individual, the group, or the organization as a unit, in order to promote organizational goals" (Somech & Drach-Zahavy, 2000, p. 650). 456 actual fitness center goers, ages from 18 to 60, were recruited for the study. A SEM test was conducted using AMOS to examine the structural relationships among consumer engagement, extra-role behaviors, and intention to renew. The measurement model yielded an acceptable model fit ($\chi 2 = 461.56$ df = 183, $\chi 2/df = 2.52$; SRMR = .067; RMSEA = .058; CFI = .97; TLI = .98). All of the hypothesized paths were significant in the hypothesized directions. The result suggests that, in the fitness industry, consumer engagement significantly influence consumers' extra-role behavior ($\beta = .90$). Also, consumers' extra-role has a significant relationship to membership retention ($\beta = .68$). In the fitness industry, building a better relationship between a business and its consumers is important. The result of this study confirms, however, fostering a better relationship among consumers is even more important.

***Effect of Visualization on Self Efficacy and Rock Climbing.*** Milena Pointer; Whitworth University.

External visualization (EV) has been investigated as a technique to improve sport climbing (SC) performance. Additionally, researchers have reported that EV improved self efficacy (SE) related to SC performance. Though it is reasonable to assume that EV may improve SC performance through improved SE, this has not been verified. Therefore, the purpose of this study was to investigate the effects of EV on SE and aspects of indoor SC performance, such as climb time and post-clim blood lactate (LA) and heart rate (HR). It was hypothesized that EV would improve SE and all aspects of indoor SC performance.

***The Synchrony of Concurrent Enrollment with Athletic Training Education: A Potentially Harmonious Relationship.*** John W. McChesney, Boise State University

Concurrent Enrollment Partnership (CEP) programs have been established at nearly 100 colleges and universities providing college credit for 500,000 high school students annually. A particularly interesting area of study to both high school and college students is that of athletic training and formalized athletic training programs (ATPs) exist at many universities. The marriage between a college based CEP to its area high schools is often a harmonious relationship. Here, we present a retrospective study of the longstanding CEP program at Boise State University and its 13 affiliated high schools. The BSU-CEP program started nearly 20 years ago with an affiliation two high schools. Over the years and as interest grew in athletic training so did participation in the CEP program. High schools offering classes in the Idaho state approved curriculum in "sportsmedicine" are encouraged to apply to collaboration with BSU under the CEP. This case study will also include an outline of how other accredited ATPs could synchronize with their host CEP colleges and universities. The list of benefits to both institutions (university & high school) involved is lengthy and can also include a socio-cultural benefit for the students. Many students find themselves studying within allied health and often earn advanced degrees in health care as a result of their initial enrollment in an athletic training CEP course. As seen in other areas of study, upward academic and social-cultural mobility may be realized through participation in a CEP and many students eventually achieve a higher level of education and socio-cultural (and economic) position as a result.

***What is Implicit Bias?*** Jane Shimon; Boise State University, Heather Van Mullem, Pete Van Mullem; Lewis-Clark State College.

Implicit bias is a subtle form of prejudice against members of a group which often consists of unconscious attitudes and/or unintentional actions towards that group. Usually most people are not even aware that their actions are biased. Implicit biases have a negative impact on those groups and the overall social climate. This informative session will allow attendees to examine the fundamentals of implicit bias though the use of interactive scratch-cards. A general discussion of potential attitudes or stereotypes will be examined in various contexts that may affect our unintended actions when working with others in teaching, coaching, and health-related fields. Strategies to counteract implicit bias will also be explored.

**Oral Presentations Friday, October 14, 2016**

***MERLOT: Free Educational Innovations and Teaching Resources for Kinesiology.*** Gerard Hanley; CSU Chancellor's Office, Vanessa Yingling, Penny McCullagh; CSU East Bay

The multidisciplinary nature of kinesiology provides a range of challenges and opportunities for faculty teaching kinesiology to put educational innovations into practices. A wide-range of technology-based resources can be employed to empower both faculty and students to use multimedia, delivered reliably, affordably, and flexibly to achieve the learning outcomes associated with a quality education in kinesiology. This panel will present a framework to advance and sustain the kinesiology professional community's capabilities to put educational innovations into practice through the use of MERLOT's open educational services and resources (www.merlot.org) and leverage strategies deployed by the California State University System. The panelists will review the taxonomy for kinesiology which can be used to browse and build the collection of free and open educational resources (OER) that faculty and students can use for their teaching and learning. The panelists will also demonstrate how MERLOT's collection of over 75,000 free and open educational resources are available right now to improve the interactivity and affordability of course materials in kinesiology.

***Branding (or rebranding) Yourself.*** Carole Casten; CSU Dominguez Hills.

You've done all the work to get this far in your career, now let the public know who you are if you want to tweak and move toward another opportunity.

***Can Diversity Actually Cause Exclusion?*** Sharon Stoll, Marcis Fennell; University of Idaho.

The purpose of this presentation is to offer an alternate perspective to diversity in higher education and offer strategies to avoid pitfalls of present diversity application. Title IX and the Civil Rights Acts have forced all colleges/universities to move to diverse inclusion. However, what if common diversity practice actually limits minorities from inclusion? Diversity centers, diversity cultural experiences, and diversity hires attempt to create inclusion. These practices have enabled some to succeed to positions of power, the vivid discrepancies Caucasians in power compared to individuals of color must be considered. Though those in the kinesiology field are often exposed to a more diverse population of students, those in power often place undue and unintentional burden on the "diverse" individual to represent and be versed in all minority social justice issues. Based on previous research in diversity education, this session will highlight strategies to help faculty and administrators become aware of unintended burdens, for example: A. Does diversity

incorporate inclusion? Inclusion is more than attendance; administration must value the insight and perspective of the diverse individuals. B. Administration needs to appreciate that diversity is not translated to "one" diverse individual within the department, C. Administration must invest time to know the diverse individual as well as his/her background. Background provides insight into an individual's thought process and interpretation of organizational climate. D. Diversity will cause cognitive dissonance. Administrators should not judge character, professionalism, and ability based on appearance. This salient point needs to be educated throughout the department: personal style does not justify inequality.

***Spinderellas, Wildflowers, and Wonderwomen: Investigating Women's Motivation to Participate in an All-Female, Non-Competitive Cycling Event.*** Elaine Foster, Catherine Rider, Carol Kirkpatrick, Karen Appleby, Dani Moffit,, Teri Peterson; Department of Sport Science and PE and Department of Marketing & Management, Idaho State University.

A trend in mass participation sporting events (MPSE) is the increase of women-only MPSEs. While some researchers have investigated all women's MPSEs in sports such as running and triathlon (Crofts, Scholfield, & Dickson, 2012; Eagleman, 2013), none have looked specifically at all-women cycling events. The high participation rate in women-only cycling events indicates that women are drawn to these events; however, factors that motivate and/or discourage women from participating in these events are not currently known. The purpose of this study was to investigate why women are attracted to and participate in an all-women's cycling event, and to determine if this participation impacts their intention to continue future cycling. A mixed-methods, cross-sectional survey approach using a convenience sample was utilized. Participants were females between 18 and 79 years of age who participated in a local, non-competitive, all-women cycling event. A total of 218 participants completed the study survey out of 1,142 participants registered for the event. The quantitative portion of this study scored five motivation subscales: Interest/Enjoyment, Competence, Appearance, Social, and Fitness. On a 7-point scale, the highest motivation subscales were Interest/Enjoyment (M=6.0, Range=1.3 to 7.0) and Fitness (M=6.1, Range=2.6 to 7.0). Competence (M=5.8, Range=1.9 to 7.0) and Social (M=5.1, Range=1.0 to 7.0) as motivation also averaged above 5. The lowest motivation to participate was appearance (M=4.4, Range=1.0 to 7.0). The qualitative data analysis revealed that women who had participated in similar events in the past were motivated primarily through social, environmental, and physical factors.

***The Performance of Gendered Movement Mechanics in American Dance.*** Melonie Buchanan Murray; University of Utah.

If kinesiology is defined as the study of the mechanics of human movement, then dance, as one of the oldest forms of human physical activity, should be considered. In a multitude of ways, dance permeates contemporary American culture—from social dancing in various venues, to community dance studios that train youth recreationally in a variety of dance forms, to dance fitness crazes such as Zumba, to commercial entities such as popular television shows like So You Think You Can Dance. Dance scholars and cultural theorists agree that the way a society dances can speak volumes about the culture. If we accept this notion that cultural dances reflect the values of a culture, then a scrutiny of American gendered dance practices is fertile ground for scholarly inquiry. Contemporary society views gender differently than the societies of the socio-historical context in which common Western dance genres, such as classical ballet and ballroom dance, were first born and developed. By highlighting ways in which most dance training reinforces gendered codes of

behavior, this presentation contributes to discourses surrounding the evolution of dance in America and evolving notions of gender, while also providing a lens that might be applied to a multitude of physical practices.

***The Effects of a Concept-Based Physical Education Unit for Energy Balance Education.*** Senlin Chen; Iowa State University.

*Background*: Physical education (PE) is a key channel that impacts children's decisions and behaviors for healthful living. This study evaluated the effects of a concept-based PE (CBPE) instructional unit, featured by energy balance (EB) education, on students' knowledge learning, situational interest, cognitive and physical engagements as well as teachers' perceptions. *Methods*: Fourth and 5th grade students ($N$ = 468) in a mid-western state of the United States were recruited as the participants. Four elementary schools were randomized to the CBPE or control groups. Students' EB knowledge, situational interest, cognitive engagement, and physical engagement were measured by a knowledge test, the Situational Interest Scale—Elementary, written task sheets, and accelerometers, respectively, while teachers' perceptions of the CBPE unit were captured by individual interviews at the end of the experiment. *Results*: The CBPE group showed a significant increase in EB knowledge, while the control did not. Both groups showed a similar increasing trend for situational interest over time, although the statistical results favored the control group. For physical engagement, the CBPE group demonstrated a statistically different but substantively similar level of in-class physical activity compared to the control group. The CBPE group also showed a moderate level of cognitive engagement throughout the unit. The PE teachers reported overall positive perceptions about teaching the CBPE unit. ***Conclusion*****:** These results support the utility of the CBPE unit in enhancing EB education along with facilitating positive student interest and engagement as well as positive teaching experiences.

***Love HIIT or Hate HIIT: That is Your Question.*** W. Matthew Silvers; Whitworth University.

High intensity interval training (HIIT) has exploded in popularity as a training style over the past two decades. Early on, it was utilized mostly for competitive sports training, now it is often prescribed to recreational or clinically diseased populations for weight loss and health benefits. However, the evolution of HIIT over the years has spurred a wealth of jargon along with confusion about program prescription and efficacy. Is HIIT for everybody? Is HIIT the best form of training? Few training philosophies have created such deep divides among exercise professionals and fitness enthusiasts. Unbeknownst to many, there is a wealth of research on this topic and the verdict is clear: HIIT is an effective training strategy for many different populations. This presentation is designed to clarify what we know about HIITT using the most current research findings and recommendations. The speaker will review basic concepts of fitness and terminology relevant to HIIT, the physiological responses and adaptations observed for HIIT, and most importantly, recommendations and special considerations for HIIT with various populations based on current research. Whether you have plenty of HIIT experience or none at all, this presentation will serve as a helpful resource to understand how HIIT works, who can benefit from it, and how it can be implemented.

***Giving Meaning to Movement: The Value of Sociocultural Studies in Kinesiology.*** William H. Freeman and Donna L. Woolard; Campbell University

In 1968 Eleanor Metheny expressed what should be our field with her book Meaning and Movement. In today's kinesiology, movement has lost all meaning. Meaning is not practiced, or taught, or given value. Sociocultural studies should be an integral part of any reputable program of kinesiology. In developing discipline-focused scholarly organizations, we mentored the growth of programs of sport and movement studies. Over the last 25 years our field's focus has shrink. We now embrace the community college mind-set of narrow technical training, rather than a broad education. While we emphasize the need for interdisciplinary research, we do not educate our students, and especially our doctoral students, broadly enough to enable them to communicate with another discipline, much less be able to conduct meaningful research with them. Thus the importance of sociocultural studies to our field. We need a broader focus than simply enabling wellness. We need a concern with the real-life movement interests of people, which goes far beyond basic fitness. We need to examine joyful, playful, and sporting movement that gives meaning to our lives. Yet sociocultural studies is vanishing from our programs. We are studying bodies without humanity. Now kinesiology is a world with no competition, no performance, and no joy of movement. Interdisciplinary conferences and research outlets have disappeared. The "umbrella" has blown away. Using collected data from college web sites we will examine today's undergraduate curricula as practiced to determine the degree to which our heritage of sociocultural studies that provided meaning to movement is still a part of our field.

***Dispositional Discourses on the Application of Incentive Based Budgeting Models in Academically Free Disseminating Academies.*** Brett Holt; University of Vermont.

Various public universities (Michigan, Georgia, Vermont, etc.). have begun applying Incentive Based Budgeting (IBB) models within faculties in an attempt to produce more visible programs in a n effort to compete for student enrollment/tuition monies. Although IBB models are growing in number and receiving positive reviews from administrators, what has been the expense to faculties once valued for decisive expertise over socially accepted visibility? Has "incentivizing" the faculties either led to evidence of higher/more credible visibility or have Universities sacrificed free inquiry in the demand to be more relevant in a competitive academic market for future students? These discourses will be explored from administrator consideration. Further, is it possible to offer incentives for free inquiry and attain high amounts of visibility? Certainly it must be considered in an academic setting where faculties value academic freedoms while administrators appear to value visibility of faculties, then oft times one may experience a form of social conformity to survive as an academic. Finally, to illustrate both perceived benefits and potential infringements of free inquiry, an IBB model will be modeled and scrutinized with regards to a professional Kinesiology organization to illustrate fifteen years of declining visibility while increasing membership numbers.

***Exercising Sovereignty: Everybody Leaves a Footprint***. Alisse Ali-Joseph; Northern Arizona University.

Few activities have the power to bring people together as sports; victory is contagious, defeat unifies, and the concept of a team can create common goals and unbreakable bonds among teammates, communities, and even an entire nation. The fluidity and prevalence of sports played by American Indian people and communities reflects the plausibility of sport enhancing health and access to education. Sports have emerged from a traditional source of

strength to a means to improve health and foster education for American Indian communities. Athletics can serve as a pathway to college for American Indian students who participate in individual or team sports. Access to higher education, in turn, offers the opportunity for larger income and greater economic opportunities. Historically in American Indian societies, physical activity and sports held a prominent role in daily life. Over the last decade Native communities and organizations have recognized the importance of re-establishing sports and physical activity as part of tribal traditions, to ensure good health and the rich heritage and lasting contributions of indigenous peoples and communities, as well as the connection to important issues such as policy, economics, sovereignty, self-determination and spirituality. This paper will explore the impact of sports on American Indian collegiate athletes to determine the factors that both inspired and inhibited them from the pursuit of athletics in college. It will provide the first in-depth look at several American Indian collegiate athletes who can document how sports helped or failed to help them reach their educational aspirations.

***Walking Performance in Adolescents and Young Adults with Down syndrome: The Role of Obesity and Sleep Disorders.*** Chih-Chia Chen; Mississippi State University.

Individuals with Down syndrome (DS) have high prevalence of obesity and sleep disorders. In addition, they even had lower levels of physical work capacity compared to their peers with intellectual disabilities. This study investigated the influence of body mass index (BMI) and different types of sleep disorders on walking performance in adolescents and young adults with Down syndrome (DS) (14-31 yr). The incremental treadmill walking trial was used to assess PWC. The negatively associations were indicated between BMI and walking steps (p= .03) as well as features with obstructive sleep apnea (OSA) and walking steps (p=.03). In addition, BMI and OSA were significantly predictors of walking steps (p= .03; R2=.42). Further, Bland-Altman plots demonstrated no over- and underestimation of variability in the difference between actual and estimated walking steps. To maintain dynamic balance and perceive the increased level of task difficulty, slow walk pace may be adopted to reduce the risk in individuals with DS. Hence, this study identified BMI and OSA associated with DS which may contribute to walking performance.

**Professional Poster Presentations**

***Student Perceptions of Collegiate Self-defense Education***. Gong Chen, San Jose State University; Liu Liu, Shenyang Sport University.

This research was designed to study the perceptions of students enrolled in self-defense courses and the potential impacts of self-defense education on college students. Anonymous responses to surveys administered between 2012 and 2015 were used to examine student perspectives regarding mental self-defense, physical self-defense, and their self-defense class overall. With respect to mental self-defense skills learned in classes, the majority of students (females: 96%-100%, males: 88%-100%) indicated that they were academic in nature, educational for life, valuable and useful, critical to safety, and worth their time/tuition/effort. Most students (females: 78%-100%, males: 77.8%) felt that the physical self-defense skills learned in classes increased their self-defense ability, were good learning experiences, enjoyable or exciting, and worth their time/effort/tuition. They felt stronger, had more self-confidence with respect to applications in real-life situations, had fun while learning skills, and got good exercise during practice. Concerning the class overall, the majority of students (females: 92%-100%, males: 96%-100%) felt that they achieved their goals for the class, learned systematic mental self-defense for safety, learned

comprehensive physical self-defense skills, had hands-on experience, had fun while practicing skills, and obtained moderate to vigorous exercise during skill practice. The majority of students indicated that the class helped them established a safe lifestyle, and self-defense education significantly changed their life. Results suggest that self-defense education may benefit college students in terms of mental self-defense, physical self-defense, and safe lifestyles.

***A longitudinal study of crimes against Chinese abroad students and their self-defense behaviors.*** Gong Chen; San Jose State University.

The purpose of the study was to investigate violent crimes targeting Chinese students studying abroad and their self-defense behaviors during attacks. The results were expected to provide a comprehensive body of new knowledge as a solid base for establishing self-defense education in the kinesiology departments in Chinese and American universities so that they can prepare these students to protect their lives when they study in different countries. The research covered 106 cases for women and 89 cases for men from all sources of media from 2000-2016. Categories for analyses were: murder, rape, aggravated assault, robbery, kidnapping, and bullying. The results indicated that the USA had the highest number of violent crimes against Chinese students. Most victims were attacked by a single attacker and 10-20% by two attackers. The crime rate showed no relationship with their status (undergraduate, masters, or doctoral students), suggesting that self-defense should be taught to all undergraduate and graduate students. Most attackers were strangers, and the second group of attackers included dates, classmates, and roommates. The results also found that the most frequently used weapons by attackers were knives, blunt objects, and guns. Barehanded attacks included kicks, punches, chokes, and throws. The main triggering factors of violent crimes included dating-oriented problems, arguments and conflicts, rape, robbery, and hate. Self-defense behaviors were evident in only in a few cases.

***Using Anatomy in Clay® Engages College Students and Improves Test Scores.*** Karen Hostetter; Northern Arizona University.

**Context:** Students who pursue degrees in exercise science or athletic training are often challenged by classes, such as anatomy & physiology and kinesiology. Using clay models has been suggested for learning anatomy and kinesiology. **Objective:** The purpose of this study was to evaluate the effectiveness of using Anatomy in Clay® in a 300-level kinesiology class. **Design:** This was a cohort study. Setting: This study took place from fall 2011 through spring 2013, in a 1-semester kinesiology class. **Participants:** Exercise science or athletic training students (n=213). Participants had passed 1 semester of anatomy and physiology. **Intervention:** During the first year of the study students were taught without Anatomy in Clay® (NAC, n=93). Students enrolled after Anatomy in Clay® was purchased (AC, n=126) experienced 6 "build days." The first data set evaluated final exam scores of all participants (n=213). Beginning with the fall 2012, a pre-test/post-test was included, in addition to the final exam. The second data set evaluated pre-test/post-test scores of students (n=126) who were enrolled beginning fall 2012. **Main Outcome Measure:** We hypothesized that students' scores would improve after implementing lessons with Anatomy in Clay®. **Results:** A two-sample t-test demonstrated a statistically significant difference in final exam scores of the NAC students (M=31.65, SD=8.36) and the AC students (M=44, SD=8.99), $t(211) = 10.49$, $p < .001$). When comparing pre-test (M=29.78, SD= 13.1) to post-test (M=46.19, SD=15.66) scores of the AC students, similar outcomes were found [$t(125)=9.76$; $p < .001$]. **Conclusion:** Introducing Anatomy in Clay® promotes active learning in kinesiology courses.

***Measuring Resistance at Different Lengths of Resistance Bands.*** Karen Hostetter; Northern Arizona University, Brett Bernal; CSU-Pueblo.

**Context:** Resistance band protocols are used daily in rehabilitation settings. The selection of resistance is usually determined by level (color) of band with little attention paid to the length of the band during exercise. **Objective:** The purpose of this study was to determine how the amount of resistance of resistance bands changes as the distance from a fixed attachment increases. **Design:** This was a group comparison study. **Setting:** A university athletic training room was used as the lab setting for this study. **Participants:** No human subjects were used in this study. **Intervention:** Two sets (6 levels of resistance per set) of two brands of resistance bands were compared in this study. The starting length of each resistance band was 48 inches. Using an Aviator-110® digital luggage scale (DLS), resistance was measured from a starting length of 48-, 72- and 96-inches. Based on pilot data, resistance of each band was measured twice for a total of four measurements of each level of band at each distance. **Main Outcome Measures:** We hypothesized that resistance would increase as each resistance band was stretched. We also reasoned that each level of resistance band would increase the amount of resistance provided. **Results:** Data from each brand were analyzed separately. An ANOVA demonstrated statistically significant differences in resistance related to band lengths [Brand A: $F(2, 72)=563.17$; $p<.001$; $\eta^2=.98$; Brand B: $F(2, 72)=1125.70$; $p<.001$; $\eta^2=.99$]. **Conclusion:** The amount of resistance experienced when using resistance bands depends on the length of the resistance band.

***Comparing Resistance of Two Brands of Resistance Bands.*** Karen Hostetter; Northern Arizona University, Brett Bernal; CSU-Pueblo.

**Context:** Resistance band exercises are common in rehabilitation protocols. The use of these bands improves muscle strength and function in several populations (e.g., the elderly, athletes, patients following orthopedic surgeries). **Objective:** The purpose of this study was to determine the difference in amount of resistance provided by different brands of resistance band. **Design:** This was a comparative study which evaluated the amount of resistance provided by two brands of resistance band. **Setting:** A university athletic training room was used as the lab setting for this study. **Participants:** Human subjects were not used in this study. **Intervention:** Twenty-four resistance bands (2 sets of 2 brands, each with 6 levels of resistance) were compared for the average amount of resistance provided by each level of band. Each resistance band was secured to the wall and connected to the Aviator-110®, while the other end was stretched approximately 16-inches. Resistance was measured from distances of 48-, 72-, and 96-inches. **Main Outcome Measure:** Prior to data collection, we hypothesized that the amount of resistance across brands of resistance band would not be significantly different. **Results:** An ANOVA demonstrated statistically significant differences in resistance across resistance band levels $F(1, 11) = 23.81$; $p<.001$; $\eta^2=.64$. **Conclusion:** Special attention should be given to the brand of resistance band when creating rehabilitation or strengthening protocols for patients and athletes. If more than one brand of resistance band is available, the athletic trainer or other professional should document the brand used to ensure consistency in progression of workouts.

***Does Gender Really Matter? Examining Gender Bias in the Evaluation of Coaches.*** Heather Van Mullem, Randi Smith, Karina Davila-Castillo; Lewis-Clark State College

"Gender bias is a form of favoritism that elevates one gender over another. Gender bias has nothing to do with biological differences between the sexes, but rather, how men and

women or 'masculinity' and 'femininity' are defined or viewed within a particular culture or institutional setting" (Women's Sports Foundation, 2016, p. 5). Acosta and Carpenter's work (2014) documents that more males continue to serve as head coaches in intercollegiate athletic settings in comparison to females. A potential reason for this could be gender bias in leadership and/or sport settings. Gender bias in attitudes toward coaches and aspects of their coaching abilities were examined in this study. Subjects (n = 136) were undergraduate students at a small, public college located in the Northwest. Subjects evaluated professional status statements and written coaching philosophy statements of hypothetical male and female coaches. Subjects offered their perceptions of the hypothetical coaches' knowledge of coaching, motivation effectiveness, desire to play for the coach, and a prediction of how successful the coach will be in the future by completing twelve, 6-point semantic differential scales. Overall, subjects continue to show a preference for male coaches. This poster will: 1) share the results of this study, and 2) explore potential reasons for perceived gender bias in coaching and other leadership roles in sport.

***Truths or Misconceptions about Pursuing Teaching: Undergraduate Students Perspectives.*** Heather Van Mullem, Heather Henson-Ramsey, Andrew Hanson; Lewis-Clark State College, Chris Williams, University of Idaho.

**Background/Purpose:** Applications to teacher preparation programs have been on a steady decline across the nation (Sawchuk, 2014). The purpose of this study was to investigate reasons why undergraduate students may not have chosen teacher education certification as a degree and professional path. **Method:** Undergraduate participants (n=311; 84 males, 227 females) who declared an academic major in an area other than teacher education at a small, public, baccalaureate degree granting institution, completed a 60 item online survey measured on a 5 point likert scale. Questions for the survey were adapted from the FIT-Choice scale (Watt & Richardson, 2007). Demographic data was collected as well. **Analysis/Results:** Analysis of the survey data shows trends that are helpful for understanding obstacles to entering the teaching profession. The survey respondents were divided into two groups: Group A -- students who had considered teaching as a career, but decided against it (n=105), and Group B -- students who had never considered teaching as a career (n= 206). Group A respondents believed that educators make worthwhile contributions to society (mean= 4.44). They strongly disagreed that they had not had good education role models (mean= 1.59). The primary reason why Group A appears to not have chosen education as a career was the perceived lack of income (mean=3.46). Results were similar when considering Group B. Group B respondents felt that their own teachers were inspirational (mean=4.33) and they had concerns about low salaries (mean=3.64). Both groups agreed that teaching was an emotionally demanding career (mean= 4.00) and that it was a lot of hard work (mean=4.03). **Conclusions:** The data suggests the primary obstacle to college students choosing education as a career is the perception of low pay in combination with the perceived workload.

***Psychic income of college students: Examining the Impact of Team Identification, College Students' Perceived Athletic Department Success on Psychic Income.*** Jinwook Jason Chung; Winthrop University, Wanyong Choi; Marshall University, Woo-Young Lee; University of Central Missouri, Wonyoung Kim; Wichita State University, Jae-Pil Ha; Gyeongsang National University, Dan Drane; Winthrop University.

The benefits of maintaining and operating athletic departments have been examined in diverse areas. For example, previous studies have argued that there is positive impact upon monetary donations (Goff, 2000), academic prestige (Lovaglia & Lucas, 2005), admission

applications (Toma & Cross, 1998), and graduation rates (Tucker, 1992). However, less attention has been focused on the non-economic values of athletic teams. One of the most important non-economic values is psychic income, defined as "emotional and psychological benefit residents perceive they receive, even though they do not physically attend sports events and are not involved in organizing them" (Crompton 2004, p. 181). Clopton (2007) indicated that college sport could influence a campus' sense of community. Using social identity theory (Tajfel & Turner, 1986) and seven dimensions of a psychic income paradigm (Crompton), the current study examined the relationship between college students' team identification, perceived athletic team's success, and psychic income (i.e., community pride, civic pride, resuscitate areas, excitement, social bonding, collective self-esteem, and emotional involvement). Data were collected from a random sample of 250 college students in four mid-sized universities in the United States. The regression results indicated that team identification and perceived athletic team's success significantly influenced participants' level of psychic income. Findings of this study add knowledge of psychic income and should provide useful information for college administrators, sport practitioners, and marketers.

***High school athletes knowledge and attitudes regarding concussions.*** Diana Avans, Brianna Audelo; Vanguard University.

The purpose of this study was to examine the knowledge and attitudes of high school athletes regarding concussions. A convenience sample of student-athletes from two high schools in Southern California included grades 9-12; mean age 15.6 ± 3 years. Fifty five percent were freshman or sophomores, 37 females (76%) and 12 males (24%). The main sports were softball, football, volleyball, and baseball. Parental consent was obtained for the participants. Mihalik's (2013) survey was adapted for this study and descriptive statistics used for analysis. A total of 52% of the athletes reported having experienced at least one concussion in their lifetime. Nineteen of the 49 (38%) athletes reported having experienced at least one concussion while in high school. Of these athletes, 43% of them claimed that they reported their symptoms to a medical professional or coach. Athletes were asked to identify common concussion symptoms and were presented with reporting scenarios. When asked to identify common concussion symptoms, the four most correctly identified were headache (94%), dizziness (92%), blurred vision (88%) and confusion (76%). The most significant finding was that more than half of the participants did not report their symptoms because they did not think they were serious enough to report. The results also highlighted the pressure athletes felt to perform and that this pressure made reporting symptoms more difficult. The presence of a medical professional such as athletic trainer helped alleviate some of this reluctance to report.

***What influences students to attend small-college athletic events?*** Diana Avans, Lauryn Cooper, Michaele Sullivan; Vanguard University.

What motivates a student to attend the athletic events at a small University? According to Wann & Pierce (2003), teams may be able to increase the identification and commitment of their fans by improving the overall group experience by focusing on the team's success or history or changing the stadium/field atmosphere. Thirty four males, 73 females (N= 104), from all education levels completed a questionnaire adapted from previous fan identification questionnaires (Fink, et. al, 2002; Wann, et. al 2003). The results showed that 61% of the participants attended games more when the team was having a winning season. Men's basketball is the best attended followed by baseball. Top reasons for attending were they were sport fans; to support the school and athletic program; to support a friend on the

team; for the social experience; and that it was free. Twenty two percent reported that they do not attend events. The number one reason for not attending was lack of time (65%). What would encourage them to attend would be better facilities, more school spirit, knowing more people on the teams, and better advertisement of the games. We determined that age, gender, and major do not play a factor in game attendance; rather it is the team's success that drives fan involvement and attendance and having a social atmosphere. We recommend that small colleges work to create a more social atmosphere at the games. Efforts to attract commuter students are needed as well as more direct marketing of women's sports.

***Evaluating the Perceived Social Impact of a Regional Sport Event.*** Wonyoung Kim; Wichita State University, Jinwook Chung,;Winthrop University, Wanyong Choi; Marshall University, Jae-pil Ha; Gyeongsang National University, Wooyoung Lee; University of Central Missouri.

Hosting sport events can generate economic and socio-psychological impacts for the host community and for those directly involved in the events (Chalip, 2006; Delamere, Wankel, & Hinch, 2001; Kim & Walker, 2012). Specifically, sport events derive positive social impact (e.g., increasing sociability, image enhancement, etc.) and negative social impact (e.g., traffic congestion, security concerns, etc.) to the host community (Kim & Petrick, 2005; Kim et al., 2015). There has been a wealth of studies into the financial and social impact of hosting sport events focusing on the hosting community and local residents; however, there is a lack of research to understand the attendees' perception on social impact associated with behavioral intention (Inoue & Havard, 2013). The purpose of the current study was two-fold: (1) explore the perceived social impacts of event attendees at a regional sport event and (2) examine the influence of attendees' perceive social impact on future behavioral intentions. The current study was conducted as a part of a larger event assessment survey commissioned by the event organizers. The questionnaire was developed consisting of following three sections: the perceived social impact (ten items under four factors; Kim & Walker, 2012), event-related behavioral intentions (three items; Yoshida & James, 2010) and socio-demographic variables. As a result, attendees indicated event excitement (M=5.97, SD=.94) and community excitement (M=5.95, SD=1.03) were the main psychic incomes from hosting a sport event following by community pride (M=5.80, SD=1.01) and enhancing community attachment (M=5.39, SD=1.03). Further analyses revealed that the psychic income was positively influenced on behavioral intentions including satisfaction, word of mouth, and future intention to attend.

***Do Socio-cultural and Other Demographics Affect Outdoor Recreation Constraints?*** The Case of Mesa County, Colorado. Steven Murray, Nathan Perry, Timothy Casey; Colorado Mesa University.

Physical activity from outdoor recreational pursuits is well known to be beneficial and has been encouraged by the US Surgeon General. Specific constraints, often reflected in sociocultural issues, can be impediments to individuals participating in outdoor recreational activities. Working in conjunction with the Bureau of Land Management and the Mesa County Health Department (Colorado) data were collected via surveys at numerous focus groups involving 580 residents of Mesa County, regarding access to outdoor recreation. Ordinal logistic regression was used to test whether ten different constraints to outdoor recreation were important to the respondents, given their age, sex, education, race/ethnicity, native language, and residential density. The results indicated that the probability of experiencing outdoor constraints increased with lower education, Hispanic ethnicity, native Spanish speaking, and young age. A second model, albeit with fewer respondents, was tested to include income. The results of the second model were

similar to the first model and in addition showed that lower incomes were associated with a higher probability of outdoor constraints. The results of the two models indicated that socioeconomic status was a driving factor behind constraints to outdoor recreation.

***Student Perceptions of a Service Learning Based Course Designed to Prepare Kinesiology Professionals to Work with Older Adults.*** Jennifer Sherwood, Cathy Inouye, Joaquin Tabera, Shannon Webb; California State University East Bay.

Currently, 40 million Americans are over age 65, and by 2050 the population aged 65 and over is predicted to double, increasing to 83.7 million (Ortman, et.al., 2014). Maintaining fitness with age is critical to reduce the likelihood of falls, to prolong independence and improve quality of life in older adults. Thus, it is imperative that kinesiology students are prepared to meet the demands of this rapidly growing population. However, few kinesiology students report feeling comfortable, or have had the opportunity to work with older adults. Exercise Prescription, a required course for many of our majors, focuses on teaching the knowledge, skills, and abilities for exercise testing and prescription using guidelines established by the American College of Sports Medicine for various populations including older adults. However, students reported that this course would benefit from more opportunities to practice physical assessments and interpret results in a real-world context. Considering the growing need of older adults and the professional preparation of our majors, Exercise Prescription was modified to include a service learning component in which students were required to assist with physical fitness assessments in local, nonprofit senior community centers. Preliminary results from pre- and post- course student surveys suggest that students enjoyed the company of older adults more (3.2 + 0.5 vs. 3.4 + 0.97, pre vs. post respectively; $p = 0.02$), valued their interactions with older adults more (2.2 + 1.6 vs. 3.1 + 1.5, pre vs. post respectively; $p = 0.04$), and tended to have more confidence working with older adults (1.6 + 1.7 vs. 2.6 + 1.7, pre vs. post respectively; $p = 0.058$) after participating in this service learning based course.

***Applying Obstacles in Traditional Games.*** Brett Holt; University of Vermont.

The disposition of k-12 physical education students varies from course to course. In fact both traditional games enrollment in community recreation leagues have declined while alternative opportunities (i.e., Frisbee Golf and Skateboard Parks) have increased in community/university recreation departments and dispositional studies (Siedentop & Tanehill, 1999) have indicated declining interest from k-12 physical education students in more traditional games. One such increase in alternative games can be found in the ever growing number of obstacle races and participants involved. Therefore, as participation rates decline in traditional games and societal interests increase in alternative activities, it can be proposed that traditional games be modified to include obstacles in an attempt to increase children learning objectives and interest in participation in said games. This presentation will provide pedagogical modifications for including obstacles in traditional physical education games such as softball, flag-football, golf, volleyball, etc. These modifications will not detract from the learning objectives of traditional games but rather add a new dimension to playing games that many children have decided are no longer exciting or relevant.

***Servant-leadership in Coaching.*** Kirk Westre; Whitworth University.

Servant-leadership is a philosophy and set of practices that enriches the lives of individuals, builds better organizations and ultimately creates a more just and caring world. Sport has a

long tradition of applying leadership and management practices from business. Servant-leadership (Greenleaf, 1977) is a prominent theory in business and other fields today. Little research has been done to date applying Servant-leadership to the area of sport coaching. This study examined the shared meanings and experiences of sport coaches who practice Servant-leadership. The characteristics of servant-leaders, first described by Robert K. Greenleaf (1977), served as the framework for this study. A qualitative, multiple case study research methodology with a heuristic phenomenological slant was chosen for this study. Semi-structured in-depth interviews were used to ascertain the participants' (coaches) experiences with the phenomenon. From these interviews six themes emerged which characterized the specific practices of the servant-leader coaches. The data was discussed in relationship to the ten characteristics of Servant-leadership as described by Spears (1995). It was concluded that Servant-leadership has potential as a viable leadership style in the sport setting.

***Exercise Performance Following Foam Rolling.*** Pat Hickey; Whitworth University.

Research on the effects of foam rolling and dynamic stretching prior to exercise has produced divided conclusions. The purpose of this study was to compare the effects of four different warm-up conditions: 1) foam rolling (FR), 2) dynamic stretching (DS), 3) a combination of FR and DS, and 4) a control condition on different functional performance tests. The research hypothesis was that all warm up conditions, except the control would improve performance.

***Short-Term Expiratory Muscle Strength Training Attenuates Sleep Apnea and Improves Sleep Quality in Patients with Obstructive Sleep Apnea.*** Jeffrey R. Bernard; CSU, Stanislaus.

The purpose of this study was to investigate the effects of 5-weeks expiratory muscle strength training (EMST) on sleep apnea, respiratory muscle strength, daily sleepiness, and sleep quality in patients with varied levels of obstructive sleep apnea (OSA). Methods: Twenty-five outpatients diagnosed with OSA participated in this study, and were assigned into either an EMST training group (EMST group; n= 13) or control group (CTRL; n= 12) by matching their genders, apnea-hypopnea index (AHI), and BMI. The training intensity for the EMST group was 75% PEmax (5-d/wk for 5-weeks), while the intensity for the control group was 0% PEmax. The PEmax, AHI, Epworth Sleepiness Scale (ESS), and Pittsburgh sleep quality index (PSQI) were evaluated pre- and post-intervention. Results: EMST treatment significantly improved the scores for AHI (−40 ± 6 %; $P < .05$), PEmax (+68 ± 12 %; $P < .05$), and PSQI (−28 ± 5%; $P < .05$). Whereas EMST significantly decreased PSQI scores in the moderate OSA subgroups ($P < .05$) but not in the mild OSA subgroup. However, the EMST intervention had no effect on alleviating daytime sleepiness. Of note, the percent changes in AHI were negatively correlated with the percent changes in PEmax ($r = −0.443$; $P = .013$). Conclusion: This study demonstrated that 5-weeks of EMST training improved sleep apnea and PEmax in OSA patients, with the greatest improvements observed in patients with moderate compared to those with mild OSA. Furthermore, the PEmax improvement was correlated with improvements in sleep apnea.

**Student Poster Presentations – Research Critiques**

***Efficacy of Mirror use on Improving Balance of Ballet Student.*** Wendy Ahearn; San Jose State University. In dance, the mirror is an effective tool for learning steps through imitation, self-evaluation of skill, and monitoring spacial placement. The purpose of the

reviewed study was to determine whether or not the use of a mirror in ballet class serves to improve the dancers' balance

***Biomechanical Analysis of Gymnasts At Peak GFR In Landing***. Alyssa Kaschak; San Jose State University. Gymnastics is a sport that can place excessive loads on the body. The purpose of the article reviewed was to quantify posture variables and peak ground reaction force (GRF) at the end of simulated landings for gymnasts.

**Student Poster Presentations –Literature Reviews**

***Effect of Body Posture on Drag Force While Cycling.*** Christopher Johnston; California State University, Chico. Drag resistive force accounts for up to 90% of all resistive forces during cycling. Anecdotally, by putting the body into the optimal riding position, cyclists are able to reduce drag forces and increase power output. Studies have examined the effect of shoulder and torso angles, including factors such as handle bar and seat height, on the change of drag force and power output.

***Soccer: A Comparison between Germany, Mexico and the USA.*** Daniel F. Flores, Alexis Cuevas; La Sierra University. According to the Federation Internationale de Football Association (FIFA), more than 240 million people around the world play soccer regularly. The origin of arguably the world's most popular sport dates back more than 100 years ago. Although this sport is widely popular in almost every country, it is not nearly as popular or valued in the United States of America (USA) like it is in Germany and Mexico.

***Effects of Air Quality and Greenness on Health.*** Amy Jung eun Park; La Sierra University. There are a growing number of concerns regarding air pollution. This review will focus on how air quality and greenness effects human health. In particular, attention will be given to pregnancy, cardiovascular and respiratory diseases.

***Musculoskeletal Injury Prevention In Ballet Dancers.*** Micki Lenderman, Michelle Paulson, Akasha Trisler; Whitworth University. Musculoskeletal injuries are an inevitable part of ballet dancing due to the extreme force placed on the lower extremities and the spine, as well as malnutrition prevalence due body image pressures. Prevention is the best way to limit the number of these injuries. Prevention can be approached several ways, which include: 1) dancer education, 2) nutrition, 3) warm-ups to improve flexibility, and 4) proper equipment.

***Concurrent Training and Soccer Performance Adaptations.*** Terence Moriarty, Kelly Johnson, Trisha VanDusseldorp; University of New Mexico. Soccer is a multifaceted team sport that demands a range of qualities, including speed, repeated sprint ability, agility, endurance, strength, power and flexibility. Developing all of these qualities is a challenge for coaches and practitioners, especially during the pre-season period when players usually return to training in a deconditioned state after a lengthy rest period. Despite the wealth of evidence regarding physical training strategies in the sport of soccer, there is little information regarding soccer-specific concurrent training and the performance adaptations which occur as a result.

***Health Status of Kidney Donors Post Transplant.*** Megan Malingkas; La Sierra University. Living kidney donor's health status after kidney transplantation is often overlooked when compared to the kidney recipient's health. Organ donation is not and should not be detrimental to a donor's health. Donor's quality of life after transplantation is generally high

in all aspects. After kidney donation, female donors are at risk for preeclampsia and gestational diabetes during pregnancy but are still able to have children. Also, although kidney donors are less likely to have cardiovascular disease than the general population, they are more at risk for developing disease in the future.

***Do Parks Reduce Childhood Obesity?*** Mary Hanna, Gerald Williams; La Sierra University. Obesity, a state in which an individual is overweight for their age and height, it is a large problem that is affecting children in the United States. Childhood obesity has increased to more than three million US cases. Some explanations for this increase include decreased recess time, technological gadgets increasing sitting time, and inaccessibility to parks.

***Relationship Between Sleep and BMI in Children.*** Amy Jung eun Park; La Sierra University. There is increased concern about childhood obesity. This review will focus on how sleep deprivation impacts child's Body Mass Index (BMI). In particular, attention will be given to three factors that affect child's nighttime sleep: screen time, hormonal imbalance (Altenburg et al. 2013; Kjeldsen et al., 2014), and nutrition.

***Supplement Effects on Muscle Performance and Recovery.*** Conner Bichler; Whitworth University. Pre-and post-workout supplementation are often used to enhance workout efficiency and boost recovery rates. This literature review will examine the efficacy of commercially available pre- and post-workout supplements on 1) hypertrophy, 2) fatigue rate, and 3) anaerobic power output.

***Womens Olympic Gymnastics in the Czech Republic, Romania and U.S.*** Teresa Coronado, Velhan Avellona; La Sierra University. It is well known that Gymnastics is a top viewed event for women's sports in the Olympics. Since it is wildly popular, each country has made its mark on the sport, utilizing their platform as a way for smaller nations to stand up to and defeat larger nations (Coakley, 2015). However, there are cultural differences in training and views on women's international gymnastics as a whole. With a focus on Romania, Czech Republic and United States this research will compare the cultural factors effecting the sport of gymnastics.

**Student Poster Presentations – Original Research**

***Investigation of USA Weightlifting Facebook Follower Engagement.*** Dora Gyulai, Dr. Cole Armstrong; San Jose State University. Sport organizations maintain social media profiles to gain followers, to create fan community, and to encourage engagement with sport fans (Abeza & O'Reilly, 2014; Armstrong, Delia & Giardina, 2014). The purpose of this case study was an attempt to decipher the best ways for a non-profit sport organization like USA Weightlifting (USAW) to engage sport fans to like, share, and comment on social media posts. The following research questions were used to guide the investigation: 1) How did USAW utilize Facebook (FB) for advertising purposes? 2) How did USAW utilize FB to encourage fan engagement? 3) How did USAW utilize FB to encourage brand community amongst customers interested in weightlifting at the international level?

***Effects of Caffeine and Carbohydrate on YMCA Bench Press.*** Shannae Pello, Jackie Beal, Eleni Larue, Alexis Woodie; Whitworth University. Previous literature has shown significant improvements in aerobic endurance with the use of a caffeine (CAF) and carbohydrate (CHO) supplement. However, little research has tested the efficacy of combined CAF-CHO supplementation on muscular endurance. The purpose of this study

was to determine the effects of a CAF-CHO supplement on performance (repetitions, heart rate [HR], and rate of perceived exertion [RPE]) during a standardized YMCA bench press test. The researchers hypothesized that CAF-CHO supplementation would 1) increase the number of repetitions before exhaustion, 2) decrease RPE and 3) increase HR compared to a placebo (PLA) condition.

***Effects of ASL RTP on Manual Dexterity and Grip Strength.*** Micki Lenderman, Catelyn Musa, Emily Rollins; Whitworth University. Repetitive Task Practice (RTP) has been shown to be an effective treatment to improve manual dexterity and grip strength. American Sign Language (ASL) is a gestural language, that when practiced, is repetitive in nature and may be an effective form of Repetitive Task Practice. The purpose of this study was to compare the effect of two-weeks of ASL as a form of RTP on manual dexterity and grip strength. It was hypothesized that ASL RTP would improve manual dexterity and grip strength scores for the training group, especially in the non-dominant hand.

***Relation Between Sleep Duration and CVD Risk in College Students.*** Ellie Shaughnessy, Anneliese Barnes; Whitworth University. In 2015, cardiovascular disease (CVD) was the leading cause of death in the United States according to the Center for Disease Control, in part, due to obesity and hypertension. The American College of Sports and Medicine (ACSM) reports that minimal waist circumference (an indicator of obesity) is one measurement that can be used to estimate CVD risk. The American Heart Association (AHA) claimed that high blood pressure levels also were connected to poor sleep quality (AHA, 2015). The Framingham 30-year risk score (30-year FRS) predicts the absolute risk for CVD in those who do not have a history of CVD and was developed specifically for use in younger adults (Clark et al., 2014). The purpose of this study was to determine the relationship between average sleep duration and CVD risk (estimated from WC and 30-year FRS) amongst college-aged students. The hypothesis was that sleep durations would be significantly negatively correlated with CVD risk.

***Almond Consumption Effects on Exercise Performance.*** Connor Bichler, Logan Streit, Allie Wood; Whitworth University. The use of almond milk (AM) may provide a simple alternative form of nutrient supplementation compared to almond (A) consumption, which has been investigated in previous research. The purpose of this study was to compare the effects of A and AM on delayed onset muscle soreness (DOMS) and exercise performance. The research hypotheses were that consumption of A or AM would: 1) improve performance for the functional posttests compared to a control group (no supplementation), and 2) reduce the pain associated with DOMS compared to a control group.

***The Reciprocal Influence of Exercise on Academics and Relationships.*** Elizabeth Mielke, Andrea Ednie; University of Wisconsin-Whitewater. There are many documented positive impacts of physical activity. The relationship between exercise, academic performance, and college experiences, however, are not yet fully understood. Some studies report that exercise can improve performance in the classroom (Active Living Research, 2007), while others caution that such conclusions are not well substantiated (Taras, 2005). The purpose of this study is to look at the associations between exercise and each of: 1) the various influences on students' college experiences (null hypotheses: no significant relationships would be observed between total exercise scores and influence variables); and 2) participants' perceptions of exercise benefits on academic and personal performance (null

hypothesis: no significant relationships would be observed between total exercise scores and benefit variables).

***Relationship Between Caloric and Protein Intake on Undergrad GPA.*** ZACHARY Travis, Dr. Robert Thomas; La Sierra University. Presently, scientists, nutritionists, and those directly involved in the academic success of children are concerned with how the nutritional value of food is effecting the way students perform in the classroom. This question gained more scientific attention when a Gallup poll survey, conducted in 2014, stated that nearly fifty two percent of America's youth are dissatisfied with school and American children are falling in literacy and mathematics. Researchers became keen on presenting a link between nutrition and the academic success of America's youth. Findings from Edwards, Mauch, and Winkelman (2011) showed that, "Higher math scores were associated with nutrition." Specifically Edwards et.al. found that students who consume 2% milk rather than a sugar beverage such as juice from concentrate or soda had higher math and reading scores. The purpose of this study was twofold: 1) "Does total caloric intake affect undergraduate grade point average (GPA)?" 2) "Does protein intake affect undergraduate GPA?" We hypothesized that "Total caloric intake does affect undergraduate GPA" and, "Protein intake does affect undergraduate GPA".