



**2019 Conference  
Program Supplement**

**Late-breaking Submission Abstracts**

# Motor Development Abstracts

## **The Relationship Between Fundamental Personality Traits and Brain Dynamics during the Recall of Preferred Music**

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Personality plays a vital role in human performance, particularly in the performing arts and dance. The relationship between personality and music preference has been examined for many years, but the findings have been inconsistent (Schäfer & Mehlhorn, 2017). Based on the theory of person-environment interactions, musical preference could satisfy psychological needs, especially for one's typical arousal level. Electroencephalography (EEG) is a promising technique to investigate the relationship between personality traits and brain dynamics during the recall of preferred music. Method: Fifty-nine participants (21 males,  $22.82 \pm 1.63$  years old) recalled their favorite tempo accompanied by tapping a keyboard for 40 beats while EEG was recorded. Two personality questionnaires (Four temperaments and the Big Five) were completed. The average inter-tap interval of the 40 taps indexed beat preference, meanwhile, the EEG (theta, alpha, beta power) was recorded across the scalp topography during the recalled period. Results: The results showed that (i) the preferred free-tapping beat (lower beat equals faster speed) was negatively correlated with Choleric (short-tempered, fast, and irritable;  $r = -.274, p < .05$ ), Melancholic (introverted and deeply sensitive;  $r = -.397, p < .01$ ), and Neuroticism (tendency to experience negative emotions;  $r = -.295, p < .05$ ); and that (ii) Agreeableness (tendency to be compassionate and cooperative) was positively correlated with theta power at sites Fz ( $r = .271, p < .05$ ), Cz ( $r = .326, p < .05$ ) and CPz ( $r = .273, p < .05$ ). Conclusion: The findings of this study provided additional support on the relationship of personality traits with music preference and cortical activity. Based on arousal theory, a higher level of melancholic, choleric and neuroticism was associated with faster beat preference. Furthermore, the trait of agreeableness was positively associated with attention and engagement through EEG measures. Therefore, it is essential to consider an individual's personality trait when undergoing music-related training to enhance learning and performance. Funding source: China Scholarship Council.

## **Childhood Developmental Trajectories of Anthropometry and Cognitive Health**

*Stephen Wheeler, University of Texas at Arlington; Xiaoxia Zhang, University of Texas at Arlington; Alina Shrestha, University of Texas at Arlington; Britton Woolsey, University of Texas at Arlington; Xiangli Gu, University of Texas at Arlington*

Research indicates that childhood obesity has a negative effect on cognitive health (Li et al., 2008). There is not clear evidence, however, about whether the association may differ from the early to later childhood. The purpose of this study was to examine the relationships of anthropometric indices (body mass index [BMI], waist circumference [WC], and skin folder measurements [SFM]), and cognitive health (cognitive and executive functioning) in children from a community-based sample. The developmental trajectories of the study variables in two cohorts of children including 5 to 7 years old (cohort-1) and 8 to 11 years old (cohort-2) were also examined. Participants were 193 children (5-11 years old; 70 cohort-1 and 123 cohort-2). The anthropometry measurements included BMI, WC, and 3-site SFM (triceps, calf, and abdomen). Children's cognitive health were measured by the PedsQLTM Cognitive Functioning Scale, and the Behavior Rating Inventory of Executive Function (BRIEF). The correlation and Analysis of Covariance (ANCOVA; control for gender and ethnicity) were conducted to test the research questions. The significant associations of anthropometry with cognitive functioning ( $r$ s range from  $-.21$  to  $.46$ ) were observed in cohort-2 children, but not in cohort-1. ANCOVA showed age had a significant effect on the anthropometry variables: Wilks' Lambda =  $.78$ ,  $F(5,183) = 10.39$ ,  $p < .001$ . Compare to cohort-1, children in cohort-2 showed higher scores in all anthropometry measures, including BMI (18.80 vs 17.12), WC (26.92 vs 23.07), and SFM (45.16 vs 33.33) regardless of the gender and ethnicity. There was no significant difference in cognitive health between the two cohorts' ( $p > .05$ ). The findings highlight the importance of weight control especially during later childhood, with its significant correlation to cognitive health. A decreasing trend of cognitive health was observed from early to later childhood, thus, early physical activity interventions to maintain healthy body weight are recommended.

# Motor Learning and Control Abstracts

## **Effects of Explicit and Implicit Learning on Volleyball Forearm Pass to Wall Learning**

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The purpose of this study was to examine the effectiveness of the explicit instruction and the implicit instruction on the performance and learning of volleyball forearm pass. This study also investigated the effects of explicit and implicit learning on the movement performance through the manipulation of secondary task, which would need the resources of working memory. Forty high school students were assigned to the group of explicit knowledge ( $17.5 \pm 0.7$  years old) and the group of video simulated ( $17.6 \pm 0.6$  years old) randomly. Both groups were asked to practice 200 trials of volleyball forearm pass to wall, 10 blocks in total, during the two-day of acquisition phase. The tests of volleyball forearm pass to wall for one minute were used to assess the movement performance of pre-test, immediate and delay retention/transfer test. In the transfer test, the participants were required countdown during volleyball one-minute forearm pass. The times of the ball to the target on wall and the rating scales of forearm pass were adopted to examine the statistical differences of experimental groups through the  $2$  (group)  $\times$   $2$  (test) mixed-design two way ANCOVA with alpha level .05. The results showed that there was no difference between the groups of explicit and implicit learning on the times of one-minute forearm pass. However, the immediate scores of the whole body, get set position, and arm action of forearm pass were decreased in the group of explicit knowledge under the condition of attention demand ( $ps < .05$ ). The immediate scores of the get set position, leg action, and trunk action of forearm pass in the group of video simulated were higher than the group of explicit knowledge ( $p < .05$ ). The scores of leg action in the group of video simulated were higher than the group of explicit knowledge during the delayed retention test ( $ps < .05$ ). The study indicated that the secondary task interfered with the performance of the whole body, get set position, and arm action. The process of implicit learning facilitated the forearm pass learning.

## **External Focus is Superior to an Internal Focus of Attention: Meta-analyses of Motor Learning and Performance**

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A considerable literature on the role of attentional focus in motor learning and performance has accumulated. We report the results of comprehensive meta-analyses that address the impact of an external focus (EF, on intended movement effects) versus internal focus (IF, on body parts) of attention on the learning and performance of motor skills. A total of 259 studies published between 1998 and 2018 were screened for possible inclusion. Forty-four studies with 1,589 participants and 79 studies with 2,018 participants met inclusion criteria with requisite data for meta-analyses of motor learning and performance, respectively. Effect sizes (ES) for studies examining motor learning were calculated separately for retention and transfer phases of between-participant designs. Effects on motor performance were examined in a separate analysis of within-participant designs. Random effects models using standardized mean difference ES were used to pool results, comparing EF with IF. Heterogeneity was examined using the  $Q$  statistic and inconsistency using the  $I^2$  index. For motor learning, analysis of retention phase studies yielded an ES of .657 (95% CI = 0.441, 0.874,  $n = 45$ ;  $Q = 176.45$ ,  $p < .001$ ;  $I^2 = 75.06\%$ ) in favor of an EF. Evaluation of learning studies with tests of transfer to new task conditions resulted in an ES of .537 (95% CI = 0.257, 0.817,  $n = 21$ ;  $Q = 76.92$ ,  $p < .001$ ;  $I^2 = 73.99\%$ ) favoring EF. Examination of motor performance indicated that performance in the EF condition was more effective than that in the IF condition, ES = .458 (95% CI = 0.348, 0.567,  $n = 90$ ;  $Q = 315.45$ ,  $p < .001$ ;  $I^2 = 71.78\%$ ). Overall, the results of these meta-analyses are consistent with prior narrative reviews and indicate that an EF is superior to an IF whether considering tests of motor learning or performance.

### **Task Performance is Inversely Related to Spatial External Focus Target Removal**

*Sean Cochran, University of North Carolina at Greensboro; Christopher Rhea, University of North Carolina at Greensboro; Randy Schmitz, University of North Carolina at Greensboro; Louisa Raisbeck, University of North Carolina at Greensboro*

A learner's focus of attention influences motor performance, with external focus demonstrating superior result. Changing target characteristics and target occlusion in a virtual environment (VE) have no decrements to performance. Thus, the purpose of this study is to investigate the effects of external focus of attention on single-leg jump performance (SLJP) in a VE when a target is removed. Adults ( $N=48$ , 19M, 29F;  $22.65 \pm 2.91$ ) were recruited from UNCG and the surrounding community. Baseline measures of SLJP on the non-dominant limb were collected in the real world, and in a VE. Qualisys motion capture in combination with Unity 3D and HTC VIVE was used to create a VE for participants. Participants completed six baseline SLJPs in real and VE and were randomized to a control (CON) or an external focus (EF) condition. Participants performed 9 jumps and were told to 'jump as far as you can' (CON) or 'jump towards the target' (EF). The target was shown to participants for five seconds, then were instructed to jump immediately, five seconds, or ten seconds after cone removal. Following training, participants rested for 2 minutes before completing a retention test of 6 maximal SLJPs in VE followed by 6 in the real-world without instruction. A  $2 \times 7$  repeated measures ANOVA was used to determine the effect of condition, controlling for height and sex. A main effect of time  $F(3, 42)=13.14$ ,  $p<.001$  and an interaction effect of time and condition  $F(3, 42)=5.52$ ,  $p<.005$  was observed. Post-hoc analysis revealed significant differences between VE baseline and each training condition in both groups except for the 10 seconds in CON group  $p=1.00$ . This suggests a learning effect occurring in both groups meaning the EF target characteristic changes does not enhance or hinder performance when compared to the CON group. We believe the drop off in performance shows that the EF group encodes the position of the cone to supplement the action-stimulus response coupling. In contrast, the CON group uncoupled this action program from the verbal stimulus resulting in the decrease in SLJP.

### **Goal Achievement and Skill Improvement in Children with Developmental Coordination Disorder (DCD)**

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Goal-oriented interventions are effective and most recommended for children with Developmental Coordination Disorder (DCD). However, little is known about the progression of goal achievement in this population. Here, we determined the progression and skill improvement in children with DCD (4 boys,  $M_{age}=10.31$ ; 4 girls,  $M_{age}=9.02$ ) during their participation in a goal-oriented intervention program. The approach used for the intervention was the Cognitive Orientation to daily Occupational Performance (CO-OP; Polatajko & Mandich, 2004) and consisted of 8 weeks with pre- and post-tests the week prior and after. The sport skills chosen were tennis, soccer, basketball, and riding a bicycle, while folding clothes, tying shoes, drawing, and handwriting were the daily living skills. All of the sessions lasted one hour in which time was spent practicing both goals while also measuring each child's individual progressions. Overall, 75% ( $n=6$ ) of the children met their goals for both the daily living skills and sport skills, with 25% ( $n=2$ ) partially meeting their goal. Additionally, after 4 sessions 25% ( $n=2$ ) of the children met their sport skills goal, while 50% ( $n=4$ ) met their daily living skills goal. The majority of the children improved their performance every session on sport skills, while much of the improvement for daily living skills occurring near the end of the intervention. In general, we found a higher rate of goal achievement and skill improvement with the sport skills. One possible explanation for this is that children chose their sport skills, while their parents selected their daily living skills, which are typically associated with chores and school activities. Moving forward, implementing multiple goals with varying levels of difficulties may alleviate the issue of motivation and persistence. We concluded that an 8-week intervention is effective in improving skills and goal achievement for most children, especially for sport skills. These results provide applicable concepts for the rehabilitation and motor skill improvement in children with DCD.

## **Physiotherapists' Self-Reported Feedback Delivery for Clients in Varying Stages of Rehabilitation**

*Julia Hussien, University of Ottawa; Diane M. Ste-Marie, University of Ottawa*

Barring the concept of practice itself, augmented feedback (AF) has been argued to be one of the most important factors in both motor skill learning and relearning. Over time, various recommendations for AF delivery to optimize motor learning throughout different stages of learning have been proffered. Notably, researchers have been consistent in suggesting that as learning progresses from early to late stages, the individual should be provided with a reduced frequency of AF. Contrastingly, research concerning whether information should be provided about the correct versus the incorrect aspects of the movements performed has been sparse. If one considers more traditional motor learning concepts (e.g., guidance hypothesis), the emphasis is placed more so on informing the learner of the incorrect aspects of their movement as compared to the correct aspects. Given that the goal of much research is to have the findings translated into applied settings, the aim of this study was to assess physiotherapists' self-reported feedback delivery in their practice. A questionnaire titled the Therapists' Perception of Motor Learning Principles Questionnaire was designed and distributed to Canadian physiotherapists. Although data collection is still underway, preliminary data shows that physiotherapists began with high frequencies of AF in the early stages of rehabilitation and progressively reduced the frequency through the middle to late stages; an outcome which is in line with research findings. Regarding feedback content delivery, most physiotherapists (77%) self-reported delivering feedback regarding mostly correct aspects of the movement in early stages of rehabilitation. In late stages of rehabilitation, however, there was a shift; an almost equal distribution of physiotherapists provided feedback on mostly correct or mostly incorrect aspects of the movement (46% vs 38%). Although not aligned with traditional motor learning theories, these findings support the OPTIMAL theory which emphasizes the use of feedback on correct movement aspects to increase learner motivation.

## **The Comparison of Timing Performance According to the Movement Continuity, Pattern and Speed**

*Jaeuk Jeong, Seoul National University*

In the research on motor control, there are two theoretical perspectives about the relation between continuity of movement and timing performance. a) The 'Information processing theory' focus on to explain the mechanism of discontinuous movements through the motor planning and feedback system. And b) the 'Dynamic system theory' approaches to explain the phenomenon and principle of rhythmic continuous motion with movement stability. Also, movement pattern and speed is a crucial control parameter for motor control. However, the relation between continuity of movement and timing performance is unclear with the pattern(linear or circular) and speed of motion. So, the purpose of this paper is to clarify the timing accuracy, consistency, and motor coordination differences in timing tasks, according to movement continuity, pattern, and speed. In order to achieve this goal, 24 participants were random-assigned to the four groups (continuous-linear, continuous-circular, discrete-linear, and discrete-circular motions) and perform timing tasks. Each participant performed 'contacting the target' task in accordance with the sound of metronome. The results showed that a) discrete movement is effective for timing accuracy in linear motion tasks, but no difference in consistency. And b) for timing accuracy and consistency, continuous movement is more effective than discrete in circular motion task. In general, c) as the speed of motion increases, the accuracy and consistency tend to increase. Specifically, the continuous motion is more accurate than discrete motion in speed control conditions. Furthermore, d) observed kinematic properties show that pattern of joint angle is more stable in continuous-circular motion task than in discrete-circular motion task. The analysis discover that continuity of motion leads to different effects on timing performance and motor coordination stability depending on the pattern and speed of motion. These findings provide a useful basis, from fundamental movements to complex behaviors in the study of motor control and learning area.

## **Development and Psychometric Testing of a Measure of Bimanual Function following Stroke: Bimanual Assessment Measure (BAM)**

*Brian Johnson, The University of Maryland School of Medicine; Sandy McCombe Waller, The University of Maryland School of Medicine; Jill Whittall, The University of Maryland School of Medicine; Kelly Westlake, The University of Maryland School of Medicine,*

Loss of hand and arm function is often a devastating consequence of sustaining a stroke. Recent evidence points towards challenges in bimanual function above and beyond unimanual deficits. Thus attention has turned towards treatment of bimanual coordination. However, no performance measures of bimanual control in stroke survivors exist to quantify the clinical meaningfulness of bimanual interventions. Since most everyday tasks are bimanual, it is imperative to understand and assess how bimanual performance influences daily functional activities. We therefore developed the Bimanual Assessment Measure (BAM) as a brief, low cost, mobile web-based performance measure accessible by smart phone and tablet that is easy to administer and incorporates functional bimanual tasks. The initial phase involving item development, editing, and surveying for feedback from 40 occupational therapists and 5 individuals with stroke has been completed. The purpose of this paper is to describe the results of phase 2 development involving psychometric testing of BAM including reliability, validity, and internal consistency. To determine test-retest reliability, individuals with chronic (>6 months) stroke (n=23) were administered the BAM while being videotaped during two sessions separated by one week. To determine inter-rater and intra-rater reliability, occupational therapists (n=5) performed retrospective scoring of participants on the BAM via video analysis on two separate occasions. BAM validity was assessed using common measures of unimanual and bimanual activity and impairment. An assessment of internal consistency was also included. Preliminary analyses from 4 occupational therapists and 23 individuals with stroke show that the BAM possesses excellent inter-rater (ICC = 0.99) and intra-rater (ICC = 0.94) reliability, as well as good internal consistency (Cronbachs alpha = 0.85). Further analyses are planned to include data from the 5th occupational therapist, test-retest reliability, and validity testing via data gathered from alternative unimanual and bimanual outcome measures. Funding source: Qualtrics Behavioral Research Grant.

## **The Relationship Between Core Stability Related Measures and Jump Reach**

*Chang Liu, Seoul National University, Korea; Seonjin Kim, Seoul National University, Korea; Hye Jin Seo, Seoul National University, Korea; Wei Zhang, Zhengzhou University, China*

This paper aims to uncover which test type of core stability related measurements (CSRM) can be applied to jump reach (JR) by exploring the relationship between CSRM and JR. Furthermore, it is estimated that CSRM has the specificity for certain motor behavior. 20 active college students were recruited from the physical education department of a local university in this study. Jump reach height was calculated from the data which were collected by a vertical jump station. A stopwatch was used to measure the time. JR included 2 tests: the maximum height of jump reach (HJR), the average height of three consecutive jump reaches (H3JR), the time of three consecutive jump reaches (T3JR). CSRM included 5 tests: sit-up test (SUT), extensor endurance test (EET), sit-and-reach test (SRT), the time of dominant limb single leg stance test (DLS), and the distance of dominant limb single leg hop test (DLH). Each CSRM tests have been done 3 times. Each test has two results, maximum and average. Pearson correlation coefficient was employed to detect the correlation between JR height and CSRM. Linear Regression was conducted to determine which independent variables in CSRM were significant predictors of JR performance. The results turned out that DLH correlated with HJR height significantly ( $p < 0.01$ ), they shared 86% variance. DLH correlated with H3JR height significantly ( $p < 0.01$ ), they shared 78.7% variance. There is no significant correlation between other variables. The current study implies that DLH is a good predictor for HJR. The relationship between different CSRM and a certain motor behavioral performance is specific. The specificity of CSRM should be considered in movement performance.

## **Augmented Information and the Distant Effect of Attentional Focus on Motor Skill Acquisition**

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When learning a new motor skill, learners explore the perceptual-motor work space and search for the critical information to help improving performances. Directing the focus of attention of the learners to the relevant information will facilitate acquiring the skill. Research on focus of attention suggest that external focus of attention is more effective than internal focus of attention during skills acquisition. Furthermore, a more distal focus is found to be more effective when external focus is used. However, there has been discrepancy in the actual content and use of instructional cues, especially in the distal and proximal comparisons. The aim of the study was to examine the effect of the instructional cues, which could be mapped onto the distal (D) and proximal (P) foci of attention, from the perceptual-motor work space framework on the learning of the roller ball task. 40 participants were randomly assigned to D and P groups and were placed to either high (H) or low (L) skilled group after 3 days practice. Participants practiced for 5 more days that was followed by a 1 week retention test. The P group was instructed to focus on the relation between the outer shell and the inner ball movements and the D group was to focus on the graphical display of the ball speed on the screen. For the H group, the changing rate of the ball speed was significantly higher for the P group indicating a better performance ( $p < .05$ ). For the L group, the P group showed significantly longer search time than the D group in the preparatory stage, but they also showed significantly decreasing trend over the 3 stages ( $ps < .05$ ), an indication of continuing improvement. The D group did not show any reduction of search time over the 3 stages. The findings support that the attentional focus on the information of the perception-action coupling is a key factor to successful search for movement strategies that enable task success. The effect is more pronounced in the H group. The results of the study do not support the hypothesis that H performers benefit from more distal focus of attention. Funding source: Ministry of Science and Technology of Taiwan, Grant MOST 106-2410-H-003-100 awarded to YTL.

## **The Effects of Attentional Focus Cues on Skilled Athlete's Shot Put Throwing Performance**

*Emily Lynn, The College at Brockport, State University of New York; Melanie Perreault, The College at Brockport, State University of New York; Craig Mattern, The College at Brockport, State University of New York*

Attentional focus has been studied in a wide variety of sports and motor skills, and has been shown to impact motor performance. However, very little research has been conducted on field throwing sports such as shot put, discus, and hammer. This study examined the influence of three attentional focus cues on skilled shot put thrower's performance. Fifteen division three varsity throwers from a College in Western New York (male  $n=9$ ; female  $n=6$ ; age  $20.4 \pm 1.1$  years) executed five trials under each of four conditions: (1) control (no cue given), (2) internal (maximal acceleration of the body at the block), (3) external near (maximal acceleration of the shot put), and (4) external far (maximal distance for the shot put to go). All participants performed the control condition first, and the order of the subsequent 3 levels of the independent variable was randomized using a randomized counterbalanced study design. Randomization software was used to assign individuals to one of three order groups and each group contained five participants. A standardized warm-up was performed prior to testing. Two-minutes of recovery time was provided between each throw and five minutes of recovery time was given between each cue. Following each block of five throws a manipulation check was conducted by asking participants "what were you thinking about while you were performing your shot put throws?", and these responses were recorded and transcribed. The responses were coded by two individuals to control for inter-rater reliability. Quantitative data were analyzed using a one-way repeated measures ANOVA. There was no significant difference in throwing distance among the four cues. The verbal data indicated that some participants were not capable of complying with all focus cue directions. This may be in part why a difference in throwing distance among the cues was not observed. In the future, further education on how to follow the cues or additional practice using the attentional focus cues prior to the study could be warranted to elicit higher levels of adherence to the focus cues.

## **Goal-keepers Beware! Penalty Kick Accuracy is Improved when an External Focus of Attention is Combined with Autonomy Support**

*Stephanie Palmer, Southern Illinois University; Jared M. Porter, University of Tennessee; Hubert Makaruk, The Josef Pilsudski University of Physical Education in Warsaw*

Capitalizing on penalty kick opportunities is crucial in the sport of soccer. Considered alone, successful penalty kick performance is a frequent determinant in match play, particularly in high-stakes international contests. Interestingly, shot placement rather than power best predicts successful penalty kick execution. With this in mind, the present study sought to evaluate the predictions of OPTIMAL theory and identify key factors impacting penalty kick accuracy with an active goal-keeper attempting to block each shot. Twenty-four skilled participants performed 12 penalty kicks following instructions directing their focus of attention, altering their autonomy support, or both. The dependent variables were shot accuracy and successful execution of the penalty kick. The six groups were categorized as follows: external focus with autonomy support (EF/AS), external focus alone (EF), internal focus with autonomy support (IF/AS), internal focus alone (IF), autonomy support alone (AS) and control (C). The results of our analysis revealed that combining an external focus of attention with autonomy support increased the number of goals scored compared to the control condition. Additionally, the EF/AS condition augmented shot accuracy relative to the AS and C conditions. These findings suggest that instructing a skilled soccer player to direct their attention externally while also permitting independent target selection improved penalty kick performance compared to other forms of practice.

## **Transferring the Optimal Theory to Lower Extremity Movements**

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Optimal Theory suggests an effective strategy for learning and retaining new or modified movements (Wulf, 2016). To date, Optimal Theory (OT) has primarily examined upper extremity movements. Recently rehabilitation fields have shown an interest in learning new strategies that could offset lower extremity injuries and restructure injury prevention programs (Dijk, van der Sluis, Bongers, 2017). The purpose of the present study was to determine the extent to which learning strategies influence learning and retention of knee separation distance during a box squat using the OT. Participants (37 = F, 18 = M,  $21.6 \pm 2.2$  y/o;  $172.5 \pm 14.4$  cm;  $76.8.8 \pm 13.6$  kg) completed the 2-day study where they were randomly assigned to one of five training groups: (1) External Focus, Autonomy of Support, Enhanced Expectancies (EF,AS,EE), (2) EF & EE, (3) EF & AS, (4) EE & AS and (5) control. Participants performed a pre-test (3 squats), 6×10 practice blocks (60 squats) and a post-test (3 squats) on day 1. 24-hours later, participants performed 10 squats. Task performance was based on knee separation distance (KSD) compared to hip width at peak knee flexion, recorded as the absolute error value from the neutral position. Repeated measures ANOVAs compared groups from pre-test to post test and pre-test to retention. Groups did not differ on KSD at baseline ( $P=0.107$ ). There was a significant learning effect from pre-test to post-test,  $F(1, 50) = 10.963, p = 0.002$ , but this did not differ by group,  $F(4, 50) = 1.346, p = 0.266$ . Large effect sizes were observed for EF\_AS ( $d=0.89$ ) and OT ( $d=1.32$ ). There was a significant retention effect from pre-test to retention  $F(1, 50) = 8.452, p = 0.005$ , but this did not differ by group,  $F(4, 50) = 0.547, p = 0.702$ . Large effect sizes were observed for OT ( $d=1.00$ ). Our results suggest that learning and retention of this simple squat task occurs regardless of group instruction. Future studies are planned to apply the OT to a more difficult and complex task.

## **Examining Cognitive Function between Preschoolers with and without Gymnastic Training**

*Jie Zhang, Shanghai University of Sport*

Growing evidence suggests that physical exercise program benefits cognition during childhood. There is a positive correlation between the level of physical activity with the ability of perception, intelligence quotient (IQ), and academic skills in young children (Irfannuddin et al., 2018). Exercise training such as gymnastics has been suggested as an important approach for children's overall cognitive development. The purpose of this study was to examine the differences of cognitive function (i.e., IQ) between preschoolers with and without gymnastic training. A cross-sectional comparison design was employed. A total of 186 children were recruited: (1) the gymnastic group (52 boys, 48 girls;  $Mage = 5.61$ ) were preschoolers received gymnastic training once per week (2-3 hours) for 6 months, (2)

the non-gymnastic group (38 boys, 48 girls;  $M_{age} = 5.59$ ) were preschoolers without any gymnastic training. Children in both groups were assessed by the Wechsler Preschool and Primary Scale of Intelligence (WPPSI; Full Scale IQ) including Verbal IQ (5 subscales) and Performance IQ (5 subscales) (Wechsler et al., 1967). The independent t-test was applied to test the group mean differences (gymnastic vs. non-gymnastic) among study variables. The results revealed that gymnastic group performed significantly better than non-gymnastic group on all subscales of IQ tests, including Performance IQ (130.31 vs. 112.38;  $p < .01$ ), Verbal IQ (115.27 vs. 111.26;  $p < .01$ ), and Full scale IQ (124.80 vs. 112.85;  $p < .01$ ), respectively. In addition, gymnastic group had better performance than non-gymnastic group in three out of five Verbal IQ subscale tests: Information (13.49 vs. 12.67;  $p < .01$ ), Vocabulary (11.37 vs. 10.88;  $p < .05$ ), and Similarities (12.43 vs. 11.50;  $p < .01$ ), respectively. The findings of this study indicated that gymnastic practice may contribute to young children's intelligent development. It suggests that implementing gymnastic program into preschool curriculum may enhance brain and cognitive development during early childhood.

## Sport and Exercise Psychology Abstracts

### **Do Types of Physical Activity Impact Alcohol Consumption Differently among University Students?**

*Steve Amireault, Purdue University; Jonathan Spencer, Purdue University; Yumary Ruiz, Purdue University; Sean Lane, Purdue University*

Several studies have documented a positive association between physical activity (PA) and alcohol consumption among college students. The *Celebration Drinking* [drinking after winning a game] and *Work Hard/Play Hard* [drinking (playing hard) after intensive workouts (working hard)] hypotheses both suggest that these two behaviors may co-occur in the pursuit of hedonic rewards. However, little is known about the features of PA that drive its association with alcohol consumption. The purpose of this study was to determine whether team sport participation and leisure-time physical activity (LTPA) differentially impact alcohol consumption among college-aged students. University students aged 18 to 25 years ( $N = 597$ ;  $M_{age} = 20.10$ ,  $SD = 1.69$ ) were invited via emails to complete an online survey. Alcohol consumption was assessed using questions related to binge drinking, frequency of alcohol use, and quantity of drinks when alcohol is used. LTPA was assessed using the Godin Leisure-Time Exercise Questionnaire. Sports team participation was measured by asking "During the past 12 months, on how many sports teams did you play?" Answers were dichotomized into a *yes* (participated on  $\geq 1$  sport teams) – *no* (did not participate on sport teams) variable. Controlling for age, gender, sorority/fraternity membership, and extraversion, logistic regression [Odds Ratio (95%CI); complete cases analysis,  $n = 433$ ] revealed that team sport participation, but not LTPA, was positively associated with binge drinking. This association was stronger [2.59 (1.41, 4.73)] for college students aged 22 years ( $M_{age} + 1 SD$ ); compared to those aged 18 years [ $M_{age} - 1 SD$ ; 1.07 (0.59, 1.96)]. Similar findings from multiple linear regression analysis were obtained for frequency of alcohol use and quantity of drinks. Findings remained unchanged when performing multiple imputation analysis ( $N = 597$ ). While LTPA is unlikely to co-occur with alcohol consumption, college students who report playing a team sport should be considered at greater risk for heavy drinking. Funding source: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

### **Examining the Effects of Exercise-Efficacy, Intensity, and Affect on Exercise Behavior among college students**

*Sisi Chen, Michigan State University; Leapetswe Maletse, Michigan State University*

There is significant evidence that demonstrates a strong association between regular physical activity (PA) and a wide range of health outcomes (Streeter et al., 2010). Despite an increase in awareness of these benefits, PA levels remain low. This creates a need for more investigations on factors that influence PA behaviors. Exercise efficacy and affect, have been associated with exercise behavior (Williams et al., 2008; McAuley et al., 2003). However, there is limited research that examines this relationship. The purpose of this study was to investigate if exercise efficacy and affect, predict PA behaviors of college students in different intensity exercises. Undergraduate students ( $N=96$ ) enrolled in different activity courses completed the International Physical Activity Questionnaire, Short-Form (Craig,

et al., 2003), the Self-Efficacy and Exercise Habits survey (Sallis et al., 1988), and The Feeling Scale (Hardy & Rejeski, 1989) at the beginning and end of 6 weeks. ANOVA, paired sample t-test, and multiple regressions were used to analyze the data. No significant difference in PA levels we found from pre to post test ( $p > .05$ ). Exercise efficacy increased significantly at post-test ( $p = .021$ ). In post-test, exercise efficacy was found to fully mediate the relationship between affect and PA, which is opposite to previous findings. Results suggest that exercise efficacy and affective responses are important in promoting PA. More research is needed to have a better understanding of the mechanism that underlie the relationship.

### **Defining an Olympic legacy: A Case Study of One Community's Efforts to Optimize Youth Sport Programming**

*Travis Dorsch, Utah State University; Matthew Vierimaa, Utah State University*

Sport event legacies are the “planned and unplanned, positive and negative, tangible and intangible structures created for and by a sport event that remain longer than the event itself” (Preuss, 2007, p. 211). Over the past two decades, the literature examining sport event legacies has grown considerably, wherein the Olympics have emerged as the most commonly studied event. It is widely suggested that the Olympics can be used as a mechanism to mobilize and motivate youth to take part in sport and physical activity; however, there remains a critical need to identify the dynamic and context-specific mechanisms that may initiate a true participation legacy for youth in past Olympic host cities. In light of this, the present research was designed to examine the nature of the Olympic legacy in Park City, Utah, and better understand the legacy's impact on youth sport programming in the nearly two decades since serving as a host site during the 2002 Salt Lake City Games. Park City serves as a unique community based on its small size, its proximity to a large urban center, its transforming demographics, and its potential to serve again in a host capacity in 2030. Through focus groups with administrators ( $n = 9$ ), coaches ( $n = 13$ ), parents ( $n = 10$ ), and athletes ( $n = 11$ ), we sought stakeholder perceptions of core community characteristics that were shaped by Park City's role as a host community for the 2002 Games. Data were inductively analyzed using thematic analysis (Braun & Clarke, 2006), and highlighted multiple tangible (e.g., world-class infrastructure, cost of living) and intangible (e.g., community spirit, an all-or-none mentality) aspects of Park City's Olympic legacy. Findings shed further light on the often-espoused belief that large-scale sporting events can be used as a catalyst to increase levels of participation in sport and physical activity. This research therefore has the potential to inform decision-making at the community, organizational, team, and family levels in Park City, Utah. Funding source: Utah Olympic Park.

### **The Effects of Acute High-intensity Interval Training on Working Memory and Contralateral Delay Activity**

*Eric Drollette, University of North Carolina at Greensboro; Caroline Meadows, University of North Carolina at Greensboro*

Previous investigations are mixed regarding the transient after effects of acute bouts of physical activity on working memory. However, recent evidence suggests that high-intensity interval training (HIIT) may serve as an effective modality for enhancing aspects of cognitive control and associated underlying neurocognitive operations. The present investigation examined the effects of a single bout of aerobic and aerobic-resistance HIIT on behavioral and neuroelectrical indices of working memory. Young adults ( $n = 24$ ) performed six blocks (45 minutes) of a working memory change detection task (trials included set size 2, 3, 4, and 5 memory items) while ERPs (contralateral delay activity; CDA) were collected following three separate counterbalanced sessions (9-minutes of seated rest, aerobic HIIT, and aerobic-resistance HIIT). Results revealed greater overall accuracy and K-score accuracy for set sizes 2, 3, and 4 following both aerobic and aerobic-resistance HIIT compared to seated rest. Further, these differences were only observed during the first two blocks of the working memory task with diminishing trends observed across the remaining four blocks. Additionally, CDA results revealed a similar trend with greater amplitude (change in amplitude from set size 2 to 5) observed for both HIIT conditions compared to seated rest only in the first two blocks of the task. Together, these findings suggest that short acute bouts of HIIT may serve as an effective modality for temporary improvements in behavioral and neuroelectrical indices of working memory capacity.

## **Perceived Motivational Climate, Basic Need Satisfaction, Enjoyment of PE and Young Adolescents' Intentions to be Active in their Leisure Time**

*Joan L. Duda, University of Birmingham, UK; Paul Appleton, University of Birmingham, UK; Papaioannou, Athanasios' University of Thessaly, Greece*

Physical education is assumed to be an educational context where young people can engage in physical activity (PA) and be encouraged to participate in PA in their free-time. This study examined whether features of the motivational climate created by PE teachers predict pupils' intentions to be active in their leisure time via the promotion of their need satisfaction and related enjoyment. 147 pupils (mean age = 13.0 years, SD = 1.00, range =9-17 years; 44% males) from schools in England participated in this study. Validated scales were administered assessing targeted variables. The hypothesised model was tested in Mplus 8.0 using the MLR estimator. Results revealed good fit for the model (CFI = 1.00; RMSEA = .00 (90% .00 - .09); SRMR = .03). Inspection of the standardised paths revealed that the pupils' perceptions of a mastery climate positively and significantly (.57) predicted pupils' basic psychological need satisfaction in PE. In contrast, the performance climate dimensions were non-significant predictors of basic psychological needs. In turn, basic psychological needs significantly and positively (.61) predicted pupils' enjoyment in PE which, in turn, was a significant and positive (.47) predictor of pupils' intentions to engage in physical activity during their leisure-time. Variance explained in basic needs was 40%, in enjoyment was 21% and in intentions 12%. Testing the indirect via bootstrapping supported significant indirect effects from mastery climate on enjoyment ( $\beta = .28$ ; 95% CI = .10 to .56) and from psychological need satisfaction on intentions to be physical activity during leisure time ( $\beta = .16$ ; 95% CI = 02. to .52). The indirect effects from mastery climate on intentions to be physically active approached statistical significance ( $\beta = .10$ ; 95% CI = 01. to .34,  $p = .05$ ). Findings point to the implications of the PE teacher-created motivational climate to indicators of the quality of pupils' engagement in PE, which correspond to young people's intention to be more active outside of school. Funding Source: European Commission ERASMUS+ Sport programme. This study draws from data collected in the IMPACT Project (Identifying and Motivating youth who mostly need Physical ACTivity)

## **I am not your Student-Athlete: An investigation of Social Identity Complexity as a Stereotype Threat Mitigation Strategy**

*Jacob English, Georgia State University College of Education and Human Development*

Collegiate athletes must contend with negative stereotypes during their academic career (Comeaux, 2012). Such stereotypes depict student-athletes (SAs) as unintelligent (Yopyk & Prentice, 2005) and overlook the benefits and variability of the collegiate athletic experience. Unfair depictions can influence SAs' classroom behavior. Research shows that SAs' academic performance is affected by stereotype threat (Dee, 2014). Currently, there is no published evidence-based research on stereotype threat mitigation strategies tailored to SAs. This study explored a self-concept map activity, based on the social identity complexity theory, as one potential strategy for SAs (exploring multiple social identities). Division I SAs ( $N = 70$ ) were randomly assigned to one of three experimental conditions: threat-no mitigation, threat-mitigation, and no threat-no mitigation. Factorial ANOVA was employed to assess differences in participants' scores on an SAT-style exam across conditions. Academic self-concept (ASC), gender identity (GI), and race/ethnicity (RE) served as potential moderators. No significant differences in overall test performance across conditions, or between GI were found. Results revealed main effects of ASC and RE on components of performance, especially on difficult items. Specific to the main hypothesis, a marginally significant ( $p = .052$ ) interaction effect of condition by RE was observed on the difficult math items. Post-hoc analyses showed that African American SAs had significantly poorer scores in the control condition than Caucasian SAs ( $p = .010$ ), and in the threat condition than did Caucasian ( $p = .001$ ) and Hispanic ( $p = .004$ ) SAs. There was no difference between these groups in the mitigation condition. African American participants' performance on difficult math items in the mitigation condition was significantly better than their performance in the threat condition ( $p = .02$ ). These results suggest that stereotype threat mitigations may work for SAs, but strategies should be culturally-specific and tailored to the challenge of the academic tasks. Funding source: NCAA Graduate Student Research Grant Program.

### **Can Cohesion Mediate between Commitment and Team Resilience? Empirical Evidence in Young National Soccer Teams.**

*Tomás García-Calvo, University of Extremadura; Spain; Francisco Miguel Leo, University of Extremadura; Spain; Miguel Angel Lopez-Gajardo, University of Extremadura; Spain; Jesus Diaz-García, University of Extremadura; Spain; Juan José Pulido-Gonzalez, University of Extremadura; Spain; Jose Carlos Ponce, University of Extremadura; Spain; Ivan Ramirez, University of Extremadura; Spain*

Grounded in resilience theory, there are different factors that can help improve the resilience characteristics in sport teams (Decroos et al., 2014). In this sense, one of these factors is the collective commitment to ongoing learning despite adversity (Morgan et al., 2013). Therefore, it is expected that a greater commitment on the part of the team can help to generate a more resilient team (Sarkar, & Fletcher, 2013). Although this association has been considered at the theoretical level, from our knowledge there are no studies that have tested this relationship (Morgan et al., 2017). In addition, they have not considered whether other types of factors linked to resilience can improve this relationship (Sarkar & Flecher, 2014). In fact, deep emotional bonds between team members and stick together during setbacks, have been identified as key elements to achieve greater team resilience (Decroos et al., 2014). Therefore, this study aimed to examine whether task and social cohesion is a mechanism by which athletes' perception of team commitment are associated with high levels of team resilience. A total number of 170 male football players (16-38 years;  $M = 18.35$ ;  $DT = 4.72$ ), who participated in national teams of Argentina, Costa Rica and Mexico completed the Group Environment Questionnaire (GEC: Carron et al., 1985), the KUT Commitment Scale (KUT: Klein et al., 2014), and the Characteristics of Resilience in Sports Teams Inventory (CREST: Decross et al., 2017). First, the results revealed that athletes' perceptions of team commitment was positively related to team resilience (Morgan et al., 2013). Second, bootstrap mediation analysis revealed that athletes' perceptions of task cohesion mediated the association between athletes' perception of team commitment and team resilience. However, social cohesion didn't improve these relationship. To conclude, the findings from the study highlight that task cohesion have the capacity to improve the association between team commitment and team resilience.

### **Mental Load in Soccer: Training and Evaluation Proposal**

*Tomás García-Calvo, University of Extremadura; Spain; Jose Carlos Ponce Bordon, University of Extremadura; Spain; Jesus Diaz García, University of Extremadura; Spain; Miguel Lopez Gajardo, University of Extremadura; Spain; Jose Manuel Barrero, University of Extremadura; Spain; Inmaculada Gonzalez-Ponce, University of Extremadura; Spain; Francisco Miguel Leo, University of Extremadura; Spain*

The aim of this study was to define the constraints that can help us to manipulate the mental load levels in soccer training plans. The mental load refers to the amount of mental effort necessary to develop a sport activity in a marked period of time, causing a level of mental fatigue in the participant. Participants were 66 semi-professional players (45 men – 21 women) with an approximately age of 22.4 years ( $SD=2.25$ ). The variables (and instrument) of the study was: Effort perception (RPE), Mental Load (an adaptation of NASA TXL and pupilometry), Mental Fatigue (an adaptation of VAS 100) and Physical Load (GPS Polar Team). The constraints employed can be classified into three types: the design of exercise (e.g.: space size), the development of exercise (e.g.: complexity of scoring) and the coach behavior (e.g.: passive/active attitude). A total of 24 constraints were used in the present study. The study consisted of 48 training sessions (24 neutral – 24 experimental). In experimental sessions the constraints that formed the object of study was manipulated. The neutral sessions permit the comparisons of data. The tests used to measure the mental load were passed at the beginning and at end of both the training session and each exercise. To analyze the results we employed Student-t to related samples. About conclusions, firstly, it has been shown that the tools used in this study are adequate to assess the levels of mental fatigue and mental load in soccer. Secondly, we can conclude that a greater involvement of the coach in the exercises produced an increases in the mental load perceived by soccer players. Also, when the feedback was focus on negative aspects, the mental load was increases too. Finally about the effect of the exercise design and development, we can conclude that a greater complexity in the exercise's organization and in the difficulty to achieve the objectives of the exercises would be the guidelines to increase the mental load in our training plans in soccer. Funding Source: This abstract show the main conclusions of project funded by the Real Madrid Chair.

## **A Cultural Sport Psychology Approach to Enhance Coach Development and Develop New Movement Planning Practices**

*Brian Gearity, University of Denver; Clayton Kuklick, University of Denver*

Cultural sport psychology (CSP) argues for research sensitive to issues of culture, power-knowledge, and reflexivity (Schinke et al., 2013). CSP researchers repeatedly show how coaches rely on physiology and biomechanics knowledge to enhance athletic performance, however, these “disciplinary practices” (strict control of time, space, flow, efficiency) are done unreflexively and often result in unintended consequences (injury, lack of decision making) (Gearity and Mills, 2012). The purpose of this qualitative case study was to use a CSP approach in a learning community (LC) to educate coaches to enhance outcomes by overcoming the negative effects of disciplinary practices. Three interscholastic strength and conditioning coaches and 2 researchers participated in 7 LC meetings. Data were collected from audio recordings of the LC meetings and researchers’ field notes. We grouped data into themes understood as new practices contra disciplinary practices. Disrupting the control of time resulted in the theme spasmodic tempo training or practices that use time in various, discontinuous, and multifaceted ways; and atemporal training, which uses time as a sensation or un-quantifiable digit. Disrupting space resulted in variable geographic training or practices that use space in diverse, unconventional, and versatile ways; and variable intra-geographic training or practices that engaged athletes in exploring exercise through inter and intra-planer space. Disrupting flow resulted in fluid periodization defined as adaptable and flexible practices to plan athletes’ performance. Disrupting efficiency resulted in explorative coaching or practices for athletes to self-regulate their bodies; and strength coach as sage where coaches engage in an egalitarian relationship with athletes. Our novel study showed how to educate coaches via a CSP approach and offers unique opportunities for additional research to understand these new practices alongside theories of motor learning such as constraints-led approaches (Renshaw, Davids, and Savelsbergh, 2010).

## **Building your Best Day: Disseminating the Canadian 24-Hour Movement Guidelines for Children and Youth Via a Digital Hub**

*Madelaine Gierc, Queen's University; Alexandra J Walters, Queen's University; Emily M Tennant, Queen's University; Marc S Tremblay, Children's Hospital of Eastern Ontario Research Institute; Guy Faulkner, University of British Columbia; Amy Latimer-Cheung, Queen's University*

*Build Your Best Day!*(BYBD) is a digital hub developed to assist the dissemination and understanding of the Canadian 24-Hour Movement Guidelines for Children and Youth (“Guidelines”) to children and parents. Guided by Diffusion of Innovations Theory, the current research examined whether engaging with BYBD was associated with changes in parents’ perceptions of and decision to adopt the Guidelines. Parents with children aged 10-14 years participated in a mixed-method interview answering questions regarding the Guidelines before and after trialing BYBD. Outcomes included perceived advantage of the integrated Guidelines, complexity (e.g., ease of understanding and application), and intention to adopt the Guidelines. Qualitative data were analyzed with thematic content analysis. Pre-/post-BYBD changes in quantitative variables were assessed with Cohen’s effect sizes. Eleven parents participated. Prior to interacting with BYBD, parents rated the Guidelines as helpful ( $M=5.8/7$ ,  $SD=1.3$ ) and easy to understand ( $M=6.5/7$ ,  $SD=0.7$ ). Parents frequently described the Guidelines as straightforward, and noted the advantage of having a single document. Parents rated the Guidelines as being moderately compatible with their child’s life ( $M=4.2$ ,  $SD=1.7$ ) and voiced intention to help their child achieve the Guidelines ( $M=5.1/7$ ,  $SD=1.4$ ). Parents described the BYBD platform as useful for generating activity ideas. However, most parents reported feeling “lost” or as though they were “clicking through”, and did not explicitly link BYBD material to the Guidelines. Few reported intention to return to the site. While parents’ ratings of the Guidelines slightly increased following interaction with BYBD, the magnitude of changes was very small ( $ds=0.03-0.21$ ). Preliminary findings suggest the Guidelines are perceived as helpful and easy to understand, and parents reported intentions to adopt the Guidelines. Parents’ perceptions of the Guidelines were not altered by completing the BYBD activity.

### **Linking Athlete Narcissism and Sport Satisfaction**

*Michael Godfrey, Wilfrid Laurier University; Jeemin Kim, Wilfrid Laurier University; Mark Eys, Wilfrid Laurier University*

Sport scholars have emphasized the importance of considering athlete personality characteristics (Allen et al., 2013). One specific personality characteristic that has recently received attention is narcissism (e.g., Jones et al., 2017). Although there are several facets of narcissism, one of the most defining features is the need to maintain a grandiose sense of self through two strategies: admiration (i.e., self-promotion) and rivalry (i.e., self-defense; Back et al., 2013). Interpersonal relationship and organizational psychology research has found narcissistic tendencies to be influential with respect to both relationship and job satisfaction (Mathieu, 2013; Wurst et al., 2016). Given the downstream importance of athlete satisfaction for individual outcomes (e.g., team commitment; Riemer & Chelladurai, 1998), it is important to understand whether narcissism has a similar impact in sport. This study explored if narcissistic admiration and rivalry could predict athlete satisfaction. Linear regression analyses of responses from 200 team sport athletes (88 males and 112 females) at two time points (1-2 weeks separation) revealed that admiration predicted satisfaction with social contribution,  $\beta = .31, p < .001, R^2_{adj} = .07, p < .001$ , and personal dedication,  $\beta = .22, p = .003, R^2_{adj} = .03, p = .013$ , while both admiration,  $\beta = .26, p = .001$ , and rivalry,  $\beta = -.16, p = .038$ , predicted team integration,  $R^2_{adj} = .05, p = .002$ . Athletes higher in narcissistic admiration may view their individual contributions to the team in a more positive light (i.e., social contribution, personal dedication) and also have inflated perceptions regarding the team's integration as a result of the intersection of personal and social identities, as well as the potential extension from individual to collective narcissism (i.e., grandiose view of one's group; Golec de Zavala et al., 2009). However, athletes higher in narcissistic rivalry may be more likely to experience conflicts (Back et al., 2013) with teammates that could decrease their satisfaction with team integration.

### **Motivational Modeling: The Structure of Implicit Beliefs, Perceived Motivational Climate, and Self-determined Motivation in Sport**

*Jordan Goffena, George Mason University; Angela D. Miller, George Mason University; Thelma S. Horn, Miami University*

The purpose of this research was to use Structural Equation Modeling (SEM) to determine the relationship between perception of athletic ability, perceived motivational climate, and athletes' self-determined motivation. A sample of 512 college-level athletes (e.g., NCAA D-I, D-II, & D-III) from both individual and team sports participated in the study. The Conceptions of the Nature of Athletic Ability Questionnaire-2 (Biddle, Wang, Chatzisarantis, & Spray, 2003), the Perceived Motivational Climate in Sport Questionnaire (Newton, Duda, & Jin, 2000), and the Sport Motivation Scale (Pelletier, Fortier, Vallerand, Tuson, & Blais, 1995) were used. A two-step modeling procedure was used to first analyze the measurement model followed by an analysis of the structural model. Standardized estimates from the Statistical Analysis Software system were recorded. A confirmatory factor analysis yielded adequate levels of fitness, chi-square (324) = 810.3,  $p < .001$ , SRMR = .067, RMSEA = .054 [.050, .059], and CFI = .92. The final structural model supported an adequate level of fitness, chi-square (332) = 907.30,  $p < .0001$ , SRMR = .080, RMSEA = .058 [.054, .063], and CFI = .90. Generally, this research indicates that, while taking into consideration incremental beliefs of athletic ability, task-oriented motivational climates are strongly and positively associated with intrinsic motivation, moderately and positively related to extrinsic motivation, and moderately and negatively associated with amotivation. Ego-involving motivational climates mediated the relationship between entity beliefs and extrinsic motivation and amotivation. Further, ego-involving climates displayed a non-significant relationship with intrinsic motivation. Limitations, future directions, and practical applications will be discussed.

## **Exploring the Quality of Experiences of Athletes with a Disability at a High-Performance Talent Identification Event**

*Janet A. Lawson, Queen's University; Alexandra J. Walters, Queen's University; Jennifer Davey, Canadian Paralympic Committee; Jennifer Bruce, Canadian Paralympic Committee; Joseph Baker, York University; Amy E. Latimer-Cheung, Queen's University*

The experiences of athletes with a disability in high-performance talent identification events are rarely considered, yet they may determine an athlete's motivation to pursue subsequent parasport opportunities. Objective: To explore the experiences of athletes with a disability at a high-performance talent identification event. Participants: Nine individuals with physical and/or sensory disabilities (M age = 32.71, SD = 18.64; 33.3% Female) attending a single, four-hour talent identification event were recruited. Methods: Quasi-experimental, pre-post measures of quality experiences were used. Prior to beginning the physical tests athletes indicated how they were feeling. Athletes again indicated how they were feeling, and how they were enjoying the experience, following each of the five physical tests as well as at the end of the event. Intentions to pursue parasport were measured at the end of the event. Data were analyzed using paired, one-tailed t-tests and correlations. Results: Feelings of autonomy, belongingness, engagement, and mastery increased following the event ( $ps < .10$ ). Feeling states and enjoyment remained consistent throughout the event relative to baseline ( $ps < .10$ ) except following a high intensity cycle test where feeling state and enjoyment dropped,  $t(3) = .67, ps < .10$ ;  $t(3) = -.972, ps < .10$ . Overall, participants enjoyed the event (M = 6.78, SD = .67/7) and intended to pursue parasport in the next three months (M = 6.89, SD = .33/7). Autonomy and belongingness were associated with intentions to pursue parasport ( $rs = .80, p < .05$ ). Conclusion: Despite being a high-performance event with some tests requiring extreme exertion, the athletes experiences were very positive. Fostering feelings of autonomy and belonging may be especially important in promoting subsequent parasport participation for athletes with a disability.

## **Personality Dimensions of Exercise Addiction – a Field Study**

*Dalit Lev Arey, The Academic College of Tel Aviv-Yaffo*

Exercise has favorable effects on people's physical health and mental well-being. However, excessive exercise may elevate serious negative consequences. Lately, there is a growing interest in exercise addiction, defined as craving for physical activity, which results in extreme workout sessions and generates negative physiological and psychological symptoms (e.g., withdrawal symptoms, tolerance, and social conflict). Exercise addiction is conceptualized as a behavioral addiction, yet it is not included in the DSM-IV, mostly due to lack of significant research. Specifically, there is scarce research on the relationship between exercise addiction and personality dimensions. The purpose of the current study was to examine the relationship between primary exercise addiction symptoms and: three of the 'Big Five' dimensions (Neuroticism, Consciousness and Extroversion), Perfectionism and Subjective-Affect. Participants were 152 trainees, who worked out for a minimum of 5 hours per week. Participants answered personality measures, an exercise addiction measure and an eating disorder scale. Hierarchical linear regression with forced blocks entry was performed. Results indicated that Neuroticism and Consciousness significantly and uniquely predicted exercise addiction symptoms (11% of the variance,  $p < 0.001$ ; 9% of the variance,  $p < 0.05$ , respectively). Extroversion did not have any contribution to the model. Perfectionism and Negative-Affect had a significant correlation with exercise dependent symptoms, but did not have unique contribution to the model. Unexpectedly, family status had a unique contribution prediction (10% of the variance,  $p < 0.05$ ); divorced and single people were at a higher risk for addiction compared to married people. Overall, the model explained 30% of the variance in exercise addiction.

## **Effects of 'Green Exercise' on Neurocognitive Functioning in Healthy Young Adults**

*Arlene Maheu, Auburn University; Ford Dyke, Auburn University; Melissa Pangelinan, Auburn University*

In today's society, there is a rapidly growing presence of Attention Deficit Hyperactivity Disorder (ADHD). The primary treatment for such conditions is pharmaceuticals, which often have detrimental side effects to patients' long-term health and well-being. That said, the primary purpose of this research is focused on investigating an alternative treatment method. A sample of 24 healthy young adults, 12 with symptoms/diagnoses of ADD/ADHD and 12 without, were recruited and participated in the study. A computerized baseline cognitive test (Flanker) was

administered to measure participants' baseline cognitive impulsivity. Following baseline testing, participants experienced one of three different treatment conditions: 'GREEN' (nature/greenspace stimuli), 'URBAN' (cities/urbanspace stimuli), and 'BLUE' (water/bluespace stimuli). In each treatment condition, participants walked on a treadmill at a comfortable pace (2 mph) for 10-min. GREEN, URBAN, or BLUE visual and auditory stimuli accompanied each treatment condition; participants' brain activity was collected via electroencephalography (EEG). Participants performed a cognitive test identical to baseline following each treatment condition. Each participant completed all three treatment conditions in counterbalanced order on three different days, separated by at least 24 hours. Variations between final and baseline Flanker testing along with EEG readings were used by researchers to investigate relationships between the simulated environments, EEG and cognitive impulsivity. Notably, BLUE groups experienced the greatest improvements in behavioral performance among baseline and post-treatment cognitive testing (average +7.167), followed by GREEN (+4.833) then URBAN (-6.833). EEG results determined by active-state time showed decreased brain activity (alpha waves) among BLUE and GREEN groups, more significantly in blue (average time 6.67s) than green (9.67s), indicating heightened attentiveness in such conditions. Brain activity (alpha waves) associated with URBAN groups (101s) indicated a decrease in cognitive focus. Funding source: Auburn University College of Education.

### **Influence of Anxiety and Self-Confidence on Penalty Kick Performance**

*Prosper Narteh Ogom, University of Cape Coast, Ghana; Joseph Kwame Mintah, University of Cape Coast, Ghana; John Hagan, University of Cape Coast, Ghana*

The stressful nature of elite sport and the competitive environment surrounding it place many demands on participating players. Despite this empirically proven assertions or notion, research evidence on these psychological constructs from an interaction perspective with truly elite performers is sparse. This study sought to investigate the influence of demographic factors (age, experience, position), anxiety and self-confidence on penalty kick performance among a purposively selected 30 registered professional soccer players from a Premier League Club in Ghana. Using a descriptive survey design, results with one-way mixed repeated measures ANOVA and multiple regression revealed no significant interaction effects between age, experience, position and changes in anxiety, and self-confidence levels on penalty kicks ( $F [6, 22] = 0.70, p > 0.05, Wilks' \Lambda = 0.08, \eta^2 = 0.72$ ). However, the age of the players was significant in predicting the success or failure in penalty kick ( $\beta = .53, t = 2.42, p < .05$ ), with older players (aged 25 and above) executing their kicks successfully. Coaches should select older players (25 years and above) to execute penalty kicks since they are better penalty kickers.

### **Cognitive Performance as a Mediator of the Relationship between Aerobic Fitness and Academic Achievement**

*SeYun Park, Chungnam National University; Jennifer Etnier, University of North Carolina at Greensboro; Dae-Hyun Yun, Chungnam National University; Hae-Yong Chun, Chungnam National University*

A positive relationship between aerobic fitness (AF) and academic achievement (AA) has been demonstrated in several studies, and a causal relationship between AF and cognitive performance (CP) has been shown experimentally. However, there is a lack of research on the role of CP in the relationship between AF and AA; hence, the purpose of this study was to investigate the mediating role of CP in this relationship. Participants were 221 high school students (99 males, 122 females, mean age = 15.9 yrs, SD = 0.28) who did not report any physical or mental health problems. We assessed AF with the 20-meter shuttle-run test, and CP was measured using the Stroop Word, Stroop Color, and Stroop Color-Word tasks. Math and Korean scores from The National Union Academic Achievement Assessment (NUAAA) were collected to assess AA. Pearson's correlations and parallel multiple mediation analyses were performed using SPSS and the PROCESS macro (Hayes, 2013). AF was significantly ( $p < .05$ ) correlated with Stroop Color-Word ( $r = .15$ ) and math ( $r = .16$ ). Both measures of AA were significantly ( $p < .01$ ) correlated with Stroop Word (math:  $r = .21$ ; Korean:  $r = .20$ ), Stroop Color (math:  $r = .23$ ; Korean:  $r = .23$ ), and Stroop Color-Word (math:  $r = .26$ ; Korean:  $r = .20$ ). In testing the mediating relationship between AF and math, the indirect effect of Stroop Color-Word was significant ( $b = .073, BCa CI (.002, .174)$ ) and reduced the direct effect of AF on math to non-significance. These results suggest that executive functions which are necessary for performance on the Stroop Color-Word task, fully explain the relationship between AF and AA. However, while processing speed (Stroop Word, Stroop Color) is related to AA, it does not explain the relationship between AF and AA. Furthermore, the mediating role of CP in the relationship between AF and AA appears to be more closely related to mathematical

tasks than language. Overall, these results suggest that AF influences math performance through its effects on the underlying executive functions of selective attention and inhibition.

### **Sport Psychology in the Community: A Realist Evaluation of the My Strengths Training for Life™ Programme**

*Benjamin Parry, University of Birmingham; Jennifer Cumming, University of Birmingham; Janice Thompson, University of Birmingham; Mark Holland, Newman University*

My Strengths Training for Life (MST4Life™) is a community-based programme working in collaboration with a housing service. The programme meets call to apply sport psychology to advance social change. As such, MST4Life™ is a complex social programme, informed by theory and structured to meet the diverse and complex needs of homeless young adults. The presented study adopted a realist evaluation framework to more clearly identify contexts, mechanisms and outcomes; with the aim of understanding why and how the programme works. The sample consisted of programme participants ( $N=23$ ;  $M_{\text{age}}=20.2$ ), their support workers ( $n=6$ ), and the outdoor instructors ( $n=5$ ) who helped to deliver the programme. Each participant received 10-weekly sessions followed by a 4-day/3-night residential trip to an Outdoor Education Centre. Contextual factors, mechanisms and outcomes (CMO) were captured through various qualitative methods (informal interviews, focus groups and diary rooms) during and 3 months following the programme. Data were thematically analysed first into separate CMO themes, and second, into CMO configurations constructed from individuals' narratives. Key contextual conditions identified were structure, empowering, group-based and novel (e.g., the outdoors). Programme activities that met these conditions were likely to facilitate feelings of intrinsic motivation and enjoyment, provide opportunities for structured reflections, group bonding and transfer of skills, and strengthen facilitator-participant relationships. Outcomes included social well-being, commitment and mental health benefits. Middle range theories proposed in this study can support the continued development of the MST4Life™ programme. More broadly, the results highlight possible contexts and mechanisms that facilitate the application of sport psychology to elicit positive changes in populations with complex and co-occurring problems. Findings from the evaluation may inform future community-based interventions which aim to address health inequalities. Funding source: University of Birmingham and St Basils.

### **Health Outcomes of Physical Activity-based Positive Youth Development for Disadvantaged Young People: A Systematic Review**

*Benjamin Parry, University of Birmingham; Jennifer Cumming, University of Birmingham; Janice Thompson, University of Birmingham; Mark Holland, Newman University; Mary Quinton, University of Birmingham; Sam Cooley, Leicester University*

As young people transition from childhood to adulthood, rapid rates of physical and mental maturation can leave them vulnerable to poor health. Disadvantageous social determinants exacerbate these health disparities, with consequences extending into later life. Physical activity-based positive youth development (PYD) interventions promote life skills and well-being; however, their effectiveness in addressing health inequalities among disadvantaged young people is not well known. The current systematic review addressed this gap and contributes towards developing evidence-based guidelines for programme implementation. The review process followed PRISMA guidelines. Inclusion criteria were: participants aged between 10-24 years; definition of disadvantaging circumstances; a physical activity intervention adopting a PYD approach; and quantitative measurement of physical, social, or mental health outcomes. Eight databases were searched resulting in 17 papers meeting the inclusion criteria. Quality of papers was assessed using Joanna Briggs Institute critical appraisal tools. Outcomes were categorised using the Transdomain Model of Health. A narrative synthesis was conducted due to the heterogeneity of outcomes and measurement tools precluding a meta-analysis. Results indicated the short-term effectiveness of interventions for improving indicators of mental health, social skills and physical competencies. Follow-up measures were rare, but this limited long-term evidence suggested potential for these programmes to sustain health benefits. Physical activity-based PYD programmes can elicit a range of short-term health outcomes for disadvantaged young people, and may therefore be an effective method for addressing the multifaceted health inequalities facing this population. Further high-quality research is required to explore the effectiveness of these programme across a broader range of disadvantaged young people and the sustained impact over time. Funding source: University of Birmingham and St Basils.

## **How Children's Physical Activity Motivation Impacts their Fundamental Movement Skills**

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The aim of the study was to investigate the relationship between Self-Determination Theory's motivational regulations and fundamental movement skills (FMS) in primary school children. Quality of physical activity (PA) motivation has been found to be an important correlate and a potential determinant of PA. However, there are few that have investigated the quality of PA motivation's relationship with determinants and correlates of PA, such as fundamental movement skills (FMS). There is an increasing recognition of the relationship between FMS and PA in childhood, with studies beginning to show a causal relationship. Thus, this study investigates the relationship between children's quality of PA motivation and their FMS proficiency. The motivation and FMS of 865 children (47.7% female,  $10.9 \pm 1.16$  years) was collected. The TGMD-3 (Ulrich, 2017) was implemented to evaluate FMS. Meanwhile, quality of motivation was measured using the BREQ which was adapted for children (Sebire et al., 2013). A hierarchical multiple regression was conducted to assess the capacity of four measures (intrinsic motivation, identified, introjected and external regulations) on FMS proficiency, with separate male and female analysis. The four measures explained 8.9% of the variance in FMS for males ( $R^2 = .089$ ,  $p < .001$ ) and 5.5% for females ( $R^2 = .055$ ,  $p < .001$ ). For males, three measures were statistically significant ( $p < .05$ ): identified ( $\beta = .21$ ), external ( $\beta = -.14$ ), and introjected ( $\beta = .13$ ) regulation. Meanwhile, for females only external regulation ( $\beta = -.21$ ) made a significant contribution to FMS. The results of the current research are congruent with previous SDT research, demonstrating how motivation quality influences FMS proficiency. It is no surprise that FMS proficiency and intrinsic motivation do not have a significant relationship; perhaps developing FMS proficiency requires individuals to place value on the skills and to recognise the importance of FMS in terms of facilitating their participation and success in PA.

## **A Mixed Methods Approach to Female Triathlete Motivation**

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This study explored initial and maintenance of motivation of female triathletes via Self-Determination Theory (SDT) (Deci & Ryan, 2000; Ryan & Deci, 2000a, 2000b) whilst utilizing a mixed-methods approach. Further purposes of this study included the examination of how age and preferred race distance impact one's initial motivation. A total of  $n = 501$  female triathletes from various regions of the United States (U.S.) responded to the initial survey; of the  $n = 501$  respondents of the survey,  $n = 12$  were randomly selected for semi-structured interviews regarding initial and sustaining motivating factors for participation in triathlons. Data was analyzed utilizing paired-samples sign tests, Kruskal-Wallis tests, and content and thematic analysis. Findings revealed that amotivation, introjected regulation, identified regulation, integrated regulation, and intrinsic motivation significantly increased after participation in two or more triathlons. However, effect sizes were small and should be interpreted with caution. The most prevalent finding of this study is that female triathletes become significantly more motivated by their identity as a triathlete as time involved in the sport increases, which was unexpectedly consistent with the theory of Identity-Based Motivation (IBM; Oyserman & Markus, 1998). Implications of these findings have thus validated both SDT and IBM as theoretical models. Female triathletes aged 30-39 demonstrated significantly lower levels of initial integrated regulation in terms of triathlon, than female triathletes aged 60+. Overall, those who initially preferred longer-distance triathlons also demonstrated higher levels of initial integrated regulation. Additional significant findings include that female triathletes are initially motivated primarily by factors of variety and relatedness. Moreover, the most prominent factor sustaining motivation of female triathletes was the relatedness that may triathletes encounter in the sport (e.g., triathlons provide an opportunity for women to connect with significant others, family, and coaches).

## Associations Between Physical Activity, Sedentary Behavior and Single Substance Use among Adolescents and Young Adults: A Systematic Review

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Associations between physical activity and the two substances most commonly used by adolescents and young adults – alcohol and cannabis – have attracted great interest. Previous reviews have limited their search to narrow time frames and have not focused specifically on high-risk developmental periods. Furthermore, the full spectrum of movement-related behaviors has not been reviewed for relations with substance use. This systematic review evaluated whether physical activity and sedentary behavior were associated with substance use in adolescents and young adults. Electronic databases of PubMed, PsycINFO and Web of Science were searched from inception until August 8, 2018. A total of 5,334 unique articles were identified. Following title and abstract review, 327 full text articles were assessed for eligibility. Data were extracted from 99 articles. At all stages, two coders independently assessed eligibility and extracted data, and a third coder was used to settle disagreements. The majority of the articles (~68%) examined adolescents and over a third (~40%) examined sedentary behavior. Among young adults, physical activity tended to have a positive association with alcohol use, yet the strength of the correlation coefficient was relatively weak (Range = .003-.36). Sedentary behavior was typically associated with increased cannabis use but not necessarily increased alcohol use and was operationalized as screen time (e.g., computer, phone, video game use). Across all ages, physical activity was typically associated with less cannabis use and could be as strong as a 70% increase in odds of using if inactive. Physical activity may serve as a protective factor against cannabis use, but may be linked to increased risk for alcohol use, particularly in young adults. Screen time could be a risk factor for increased cannabis use. Future studies should assess these behaviors with wearable devices to determine if the associations remain when self-report biases are removed and to examine how these behaviors unfold over time. Funding source: T32 DA017629.

## Effects and Moderators of Physical Exercise on Sleep in Patients with Cancer: An Individual Patient Data Meta-analysis

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Exercise interventions significantly improve quality of life, physical fitness and mental health during and after cancer treatment. The aims of this study were to evaluate the effects of exercise interventions on sleep disturbances and sleep quality in patients with cancer, and to investigate whether the exercise intervention effects are moderated by demographic, clinical, and intervention-related factors, and baseline sleep disturbances. Individual patient data (IPD) and aggregated meta-analyses of randomized controlled trials (RCTs) have been carried out. Using data from the Predicting Optimal Cancer Rehabilitation and Supportive care project, IPD of 2173 adults with cancer from 17 RCTs were analyzed. A complementary systematic search was conducted to study the general effects and test the representativeness of analyzed IPD. Effect sizes of exercise effects on sleep outcomes were computed for all included RCTs. Linear hierarchical models were used to evaluate the effects of exercise on post-intervention outcome values, adjusting for baseline values and identify possible moderators (demographic, clinical and intervention-related factors). A total of 27 RCTs were eligible from the updated search. The exercise interventions significantly decreased sleep disturbances in adults with cancer ( $g = -0.09$ , 95% CI [-0.16; -0.02]). No significant effect was found for sleep quality. RCTs included in IPD meta-analyses constituted a representative sample of the published literature. The intervention effects on sleep disturbances were not significantly moderated by any demographic, clinical, or intervention-related factor, nor by sleep disturbances. Exercise interventions may improve sleep disturbances, but not sleep quality, in cancer patients. However, this effect was of a small magnitude. The effect on sleep disturbances was not moderated by investigated variables.

### **Analyzing Collective Synchrony in Team Sports Using a Regime-switching Dynamic Factor Model**

*Daniel M. Smith, Springfield College*

Collective synchrony is the simultaneous behavior, cognition, emotion, or physiology of teammates. Collective synchrony may stem from team members' mere copresence, from their engagement in a common task, and/or from deliberate online coordination as they pursue a collective goal. The notion of collective synchrony (or other terms such as collective behavior, group entrainment, shared emotion, etc.) is a research focus in a number of performance

domains including team sports, performing arts, and the military. Across many disciplines, a range of methods including time/frequency domain time series analysis and dynamical systems approaches have been used to quantify synchrony in dyads and collectives. Most commonly, cross-correlations are calculated pairwise for each dyad of teammates, then averaged to summarize synchrony at the team/group level. Although bivariate correlation is well suited to applications of dyadic synchrony, a multivariate approach is needed to give a better account of the extent to which each teammate synchronizes with the collective. The aim of this study was to explore the use of dynamic factor analysis to meet this need. Dynamic factor analysis extends conventional cross-sectional factor analysis to intensive longitudinal data. In particular, it enables the researcher to analyze the common dependence among several teammates' data streams captured intensively over time. Moreover, a regime-switching dynamic factor model (RSDFM) allows categorizing a team's collective synchrony as low or high on a moment-to-moment basis. Using movement data (speed and running cadence) from a NCAA Division I women's soccer team, captured with Polar Team Pro sensors during competitive games, I demonstrate how the results of a RSDFM can reveal certain features (namely, the magnitude and prevalence of collective synchrony) of substantive interest to researchers, practitioners, coaches, athletes, or other stakeholders in team performance settings.

### **Using Narrative Messages to Promote Health Behaviour Change: The Case of Parasport Advertising**

*Emily Tennant, Queen's University; Rebecca Bassett-Gunter, York University; Janet A. Lawson, Queen's University; Amy E. Latimer-Cheung, Queen's University*

Sport participation rates among persons with physical disabilities are low. Current narratives of parasport captured in parasport advertising, marked by their total focus on performance, likely perpetuate psychosocial barriers to parasport participation (e.g., low self-efficacy). Alternative narratives are needed to facilitate parasport participation. Objective: To explore what characteristics of parasport narrative messages influence parasport participation. Methods: This longitudinal randomized controlled trial was completed by 194 adults with a physical disability. Participation entailed completing quantitative surveys pre, post, and two weeks following three consecutive days of viewing a set of media messages capturing one type of parasport narrative, or control messages, and completing thought listing tasks. Results: A narrative that focuses on personal growth and discovery was the most promising facilitator. Chi-square tests and repeated-measures ANOVAs revealed this narrative to increase positive thinking about the self ( $X^2=6.32, p=.042$ ) and parasport ( $X^2=5.95, p=.05$ ), and to improve barrier self-efficacy ( $F=6.89, p=.002$ ). Through mediation analysis, identification with characters was revealed as important for motivating parasport participation; task self-efficacy ( $R^2=0.17$ ) and outcome expectancies ( $R^2=0.19$ ) mediated the relationship between identification with characters and intentions to participate in parasport. Conclusions: These findings emphasize the importance of (a) including characters in parasport media with whom persons with physical disabilities identify and (b) shifting the narrative focus in parasport advertising from performance to discovery to motivate parasport participation among persons with physical disabilities.

### **"It's about the athlete first": A Case Study of Positive Youth Development through Sport in Park City, Utah**

*Matthew Vierimaa, Utah State University; Travis Dorsch, Utah State University*

It is widely acknowledged that youth's participation in organized sport can facilitate physical, psychosocial, and personal development (Fraser-Thomas, Côté, & Deakin, 2005). In heeding past calls for the examination of real-world sport programs which facilitate positive youth development (Petitpas et al., 2005), research in this area has predominantly focused on the microsystem (i.e., youth's participation in specific sport programs). Specifically, researchers have identified the importance of adaptive proximal interactions between youth and coaches, parents, and peers (see Holt et al., 2017 for a review). However, youth's development through sport is also influenced by distal ecological systems (e.g., community, culture, policy; Holt, Deal, & Smyth, 2016). Thus, the purpose of this study was to explore stakeholders' perceptions of community factors related to positive youth development through sport in Park City, Utah. Nine focus groups were conducted with youth ( $n = 11$ ), parents ( $n = 10$ ), coaches ( $n = 13$ ), and administrators ( $n = 9$ ) from a variety of sports. Participants responded to questions regarding their personal philosophies about and experiences in youth sport, as well as about characteristics of the Park City community that influence the ways sport programming is implemented at a local level. Focus groups were audio recorded, transcribed verbatim, and analyzed using thematic analysis (Braun & Clarke, 2006). Findings highlight a shared belief among stakeholders in the importance of making sport accessible to all, developing physical literacy and life skills, and embracing multi-sport participation. However, the community's high-performance culture, growing

population, and limited facilities often leads sport organizations to adopt a pay-to-play mentality and encourages early sport specialization. This apparent conflict between idealized perspectives about youth sport and the reality of implementing and sustaining sport programming underscores the importance of considering how distal ecological systems shape positive youth development through sport. Funding source: Utah Olympic Legacy Foundation.

### **Other-efficacy and Performance: Examining Variance within and Across Four-person Cheerleading Groups**

*Danielle Whiddon, East Carolina University; Christine Habeeb, East Carolina University*

Other-efficacy (Lent & Lopez, 2002) is the belief in another's capability to perform a given task and is influenced by perceptions of the other's performances. For athletes performing conjointly with a teammate, however, it may be difficult to isolate perceptions of the other's performance from the group's performance. Habeeb, Eklund, and Coffee (2017) found that isolating perceptions of others' performances in dyads may depend, in part, on athletes' performance roles having a high- or low dependence on the other teammate. The purpose of this study was to extend findings to larger-sized groups to address two specific aims. Aim 1 was to examine, within groups, the extent other-efficacy and -performance differed by the actor role (i.e., the perceiver) and the partner role (i.e., the one being perceived). Aim 2 was to examine, across groups, the extent other-efficacy and -performance varied by role and rotation group. Female cheerleaders ( $n = 68$ ) from American universities performed their role in four cheerleading stunt-tasks, that were repeated with three athletes performing in the rotated high-dependence role (i.e., flyer role) and the other three low-dependence roles remaining static (i.e., base roles). Data were obtained, from flyers and bases, on other-efficacy and other-performance. In addressing Aim 1, actor role by partner role RM-ANOVAs revealed that, when rating other-efficacy, flyers tended to rate others (actor role) and were rated by others (partner role) significantly lower than the bases. There were no significant differences in ratings of other-performance. In addressing Aim 2, role by rotation group RM-ANOVAs revealed that, regardless of role, other-efficacy beliefs were rated significantly higher when performing with one's usual performance group. The main effect for rotation group was trending in the same direction for other-performance. Results suggest that in four-person groups athlete role influences the way athletes perceive and are perceived by teammates, and that inexperience with a group may inhibit initial other-efficacy beliefs.