



**2019 SCAPPS Conference**  
**Academic Program**  
**Abstracts**

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## Abstracts

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**Note:** Abstracts are listed in chronological order according to the program order and topic (Exercise Psychology, Sport Psychology or Motor Control & Learning). The number on the top left is for reference only (based on submission order). It only has relevance for converting online abstracts to the conference journal JEMS (Jn of Exercise, Movement & Sport). For citation of SCAPPS abstracts, the 2019 conference will be Vol 51. Please see website: <https://www.scapps.org/jems/index.php/1/issue/archive>.

**Franklin Henry  
Young Scientist Award  
Abstracts**

11.

## **APPLYING IN LIFE THE SKILLS LEARNED IN SPORT: A GROUNDED THEORY**

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**Objectives:** The life skills process (i.e., sport to life) involves three interrelated stages: (a) life skills learning in sport, (b) life skills transfer, and (c) life skills application in at least one life domain beyond sport (Pierce, Gould, & Camiré, 2017). The purpose of the study was to examine how athletes apply in life the skills learned or refined in sport in order to develop new theoretical explanations for the third stage of the life skills process (i.e., application). **Design:** A grounded theory methodology (Corbin & Strauss, 2015). **Method:** Data collection occurred over 10 months, involving interviews, chronological charts, timelines, and journals with university intramural athletes (n = 13). Social agents (n = 29) playing key roles in the athletes' lives (e.g., parents, partners, work colleagues) were theoretically sampled and interviewed. **Data Analysis:** Data analysis involved an iterative process of open coding, axial coding, and theoretical integration. **Results:** The substantive grounded theory is constructed on the core category of "mutually beneficial person-context regulations". Within the theory, skill application is framed as an ongoing process that involves four steps (a) decision-making, (b) application, (c) appraisal, and (d) adaptation. **Conclusions:** The substantive grounded theory puts forth theoretical explanations as to how athletes apply in their everyday lives the skills they deem to have learned in sport.

12.

## **A PILOT RANDOMIZED CONTROLLED TRIAL OF A 12-WEEK PHYSICAL ACTIVITY INTERVENTION FOR ADOLESCENT AND YOUNG ADULT CANCER SURVIVORS**

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**Background:** Few researchers have explored the effects of physical activity (PA) on physical and psychological outcomes among adolescent and young adult (AYA) cancer survivors. Prior to conducting a definitive randomized controlled trial (RCT) to fill this gap, we conducted a pilot RCT to assess the feasibility and acceptability of our methods and intervention. **Methods:** A two-arm, mixed-methods pilot RCT was conducted. Participants were randomized to a wait-list control group or a 12-week PA intervention. Feasibility (ie, numbers of AYA cancer survivors referred/self-referred, eligible, recruited, adherence to the PA intervention, percentage of missing data) and acceptability of trial methods was assessed. **Results:** Over a 12-month period, 31 AYA cancer survivors were referred/self-referred and 16 were eligible and consented to participate. Retention to the trial was 94% and adherence to the PA intervention ranged from 50-92%. With the exception of the assessment of aerobic capacity and directly measured physical activity, there were no missing data. Participants generally reported being satisfied with the methods and intervention; however, key issues related to delivery of the PA intervention were identified. **Conclusion:** The methods and intervention piloted require modification and further testing in advance of a definitive RCT. Making the trial multi-site, using additional recruitment strategies, refining select assessment procedures, and incorporating behavioural support into the intervention may improve feasibility and acceptability. This study highlights the critically useful data that can be gained from pilot trials, offering guidance to refine studies seeking to assess causation and optimize PA interventions for AYA cancer survivors.

30.

## **EXAMINING THE SENSORIMOTOR INTEGRATION PROCESSES PRIOR TO AND DURING MOVEMENTS TO SOMATOSENSORY TARGETS**

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Previous research on multisensory integration for movement planning and control has focused on movements to targets external to the body. In this work, three studies were conducted to examine the sensorimotor transformation processes underlying goal-directed actions to targets defined by body positions (i.e., somatosensory targets). The goal of the first study was to investigate if the modality of the cue used to indicate the location of a somatosensory target affects the body representation used to encode the target's position during movement planning. The results showed that auditory cues prompted the use of an exteroceptive body representation for the encoding of movements to a somatosensory target in visual coordinates. The goal of the second study was to examine the neural processes associated with the visual remapping of an auditory-cued somatosensory target. It was found that the sensorimotor transformation processes responsible for the conversion of a somatosensory target position into visual coordinates engages visuomotor cortical networks to a greater extent than movements to external visual targets. The goal of the third study was to examine the sensorimotor transformation processes employed for the online control of movements to a somatosensory target. The results of this study revealed that the remapping of a somatosensory target into visual coordinates may not occur prior to online corrections. Altogether the findings of this work reveal that sensory cues can facilitate the remapping of a somatosensory target prior to goal-directed actions. However, these remapping processes may be too costly for use during online control when there is no vision of the reaching limb.

# **Exercise Psychology Abstracts**

# **Exercise Psychology**

## **Verbal Session I**



281.

## **CAN SMALL STEPS RESULT IN BIG CHANGES? PRELIMINARY EFFECTIVENESS OF A COMMUNITY-BASED DIABETES PREVENTION PROGRAM**

Sean Locke<sup>1</sup>, Corliss Bean<sup>1</sup>, Tineke Dineen<sup>1</sup>, Megan MacPherson<sup>1</sup>, Alexandre Santos<sup>1</sup>, Alissa Smith<sup>1</sup>, Kaela Cranston<sup>1</sup>, Mary Jung<sup>1</sup>

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Efficacy trials use highly controlled designs under “ideal conditions”. Once demonstrated, interventions can be translated into the community and the “real-world” effectiveness is examined to optimize their potential public health impact. Small Steps for Big Changes (SSBC) is a diabetes prevention program that has been translated into the community and is currently being run out of the local YMCA. SSBC is a theory-based three-week program consisting of one-on-one exercise and diet counselling, and supervised exercise training. The purpose of this study was to evaluate the effectiveness of the community-based SSBC program in reducing a variety of diabetes risk factors six months post-intervention. Participants with prediabetes (N=90, 71% female, Mage = 42.7 ± 5.6 years) completed the following measures pre-, post- and six months post-program: self-report physical activity and food frequency measure, weight, waist circumference, and a six-minute walk test. From pre-program to six-months post-program: Weight decreased (?-3.37kg), waist circumference decreased (?-4.19cm), and six-minute walk distance increased (?+6.8%). There were significant improvements observed in self-reported physical activity and food frequency. The effects observed from pre- to the six-month post-program were small to moderate (Cohen’s ds from .14 to .56). Preliminary evaluation suggests that the SSBC counselling program is effective at promoting diet and physical activity behaviours to help reduce their risk of developing type 2 diabetes. Continued evaluation is required to determine whether the community-based SSBC program produces changes in clinically relevant outcomes (i.e., A1C) one year following the three-week program.

42.

## **ENGAGING STAKEHOLDERS IN THE PROCESS OF EMBEDDING A TYPE 2 DIABETES PREVENTION LIFESTYLE PROGRAM INTO A COMMUNITY SETTING: A COLLABORATIVE APPROACH**

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Translation of efficacious health interventions into the community are often not applied in practice. The gap between research and practice is concerning for community members who can benefit from early access to effective health interventions. Knowledge translation activities and community partnerships are demonstrated methods to close the gap, yet there is a need for quality partnerships to ensure research findings are implemented into communities to ensure sustainability, rigour and quality programming through planning, preparation and time to foster the partnership. This presentation outlines the preparation process of translating an evidence-based program for improving health and exercise adherence in individuals with prediabetes into a community setting through a case example of a partnership between the YMCA of Okanagan and the Diabetes Prevention Research Group. The process involved three formalized translation events that enabled the group to work towards a long-term, successful partnership. These events included key stakeholders from research, community, and clinical settings. Stakeholder input was gathered to (a) identify roles and responsibilities of each partner in program sustainability and ongoing fidelity, (b) establish a training program and plan, and (c) develop a translational timeline. A video knowledge product was also created that documents the process of the partnership and program evolution to promote the program across the region. Insights from this process were imperative in informing the pilot implementation of the diabetes prevention program in the community, which is now ongoing. Moreover, this research provides insight into how community-research partnerships can collaboratively plan for and deliver programs within communities.

35.

## **YOU SPOKE, WE LISTENED (AND ACTED): CONTINUING TO SUPPORT WOMEN WITH PREDIABETES IN MAKING BEHAVIOUR CHANGES POST-INTERVENTION**

Corliss Bean<sup>1</sup>, Lois Hourston<sup>2</sup>, Tineke Dineen<sup>1</sup>, Mary Jung<sup>1</sup>

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Lifestyle interventions involving exercise and diet can reduce the progression of type 2 diabetes, yet these interventions are often short-lived due to expenses and difficulty with sustainability. Progressing toward self-management and behaviour change maintenance is also challenging after intervention completion. If ongoing supports are in place to support individuals with the long-term behaviour change process beyond the immediate intervention, individuals are more likely to be successful on their journey. Small Steps for Big Changes is a 3-week counselling program housed within a community setting that aims to help people make exercise and diet lifestyle changes. Therefore, to understand how to best support participants beyond the duration of the program, a knowledge sharing event was held for 14 women who completed the intervention 1 year previously. The women engaged in one focus group (audio-recorded, lasting 85 min) to discuss challenges experienced throughout their behaviour change journey and recommendations for continued support. A thematic analysis was conducted and three recommendation areas were identified: (a) establishing support networks with peers (mentorship pairing, social media groups, walking groups, monthly meetings); (b) continuing support from trainers (drop-in hours, advisory groups); and (c) creating platforms to communicate prediabetes-related information (newsletter, pamphlets). Recommendations have been implemented into the community to support these women, and other individuals, throughout and beyond the 3-week program throughout and their behaviour change journeys. This research provides insight as to supports that can be utilized to improve the effectiveness of a community-housed intervention beyond immediate delivery.

92.

## **USING BEHAVIOURAL SCIENCE TO DEVELOP RECOMMENDATIONS FOR INTERVENTIONS THAT ENHANCE SOCIAL PARTICIPATION IN PEOPLE AGING WITH LONG-TERM SPINAL CORD INJURY**

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**Background:** Social participation is a promising target behaviour to support people aging with long-term spinal cord injury (SCI). Evidence suggests social participation relates to health, well-being, and life satisfaction. Behaviour change theory strengthens intervention development by providing a systematic and evidence-based approach. Additionally, use of an integrated knowledge translation (IKT) approach aims to improve the relevance and usefulness of interventions. **Objective:** Use an IKT approach to co-develop theory-based recommendations for interventions designed to enhance social participation while aging with SCI. To inform the recommendations, this study aims to identify a) barriers and facilitators to social participation, and b) intervention options. **Methods:** Semi-structured interviews were conducted with 22 people aging with SCI (Mean Age: 55.64, Mean Years Post-Injury: 32.27). To understand social participation, barriers and facilitators were deductively coded using the Theoretical Domains Framework. Behaviour change wheel analyses were used to identify intervention functions and policy categories. Methods of intervention delivery were extracted and coded using the mode of delivery taxonomy. All findings were synthesized into intervention recommendations, and assessed for feasibility using APEASE criteria. **Results:** Environmental context and resources, skills, and social influences were identified as the most influential barriers and facilitators. Six intervention functions and all policy categories were considered relevant to intervention design. Multiple methods of delivery (e.g. online, face-to-face) were identified as important. Four recommendations were co-developed and met APEASE criteria. **Conclusions:** Various interventions (e.g. individual, policy) delivered through multiple modes of delivery are needed. Continued efforts will allow for recommendations to be developed into real-world interventions.

# **Exercise Psychology**

## **Verbal Session II**

87.

## **WHAT DOES IT MEAN TO BE INCLUDED IN UNIFIED SPORTS: YOUTHS' PERSPECTIVES ON INCLUSION**

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Inclusion in the community is a human right and a major focus of government (e.g., Accessible Canada Act) and organizations (e.g., Special Olympics) alike. Specifically, Unified Sports is Special Olympics' global initiative to promote and provide an 'inclusive' sporting opportunity to athletes with and without intellectual disabilities. In May 2019, 1674 Special Olympics Unified Sports athletes took part in the inaugural Invitational Youth Games. The 'Games' united teams from around the world, affording an opportunity to explore the experiences and perspectives of athletes with and without disabilities with Unified Sports and, more broadly, inclusion. Over the four days of the 'Games,' 22 interviews with athletes were conducted (13 with disability; 10 girls/women; 2 athletics, 12 basketball, 7 bocce, 1 floor hockey; ages 13 – 22) by a team of researchers. An inductive thematic analysis was conducted from an interpretivist's perspective to explore the data. Two themes were interpreted, each having two sub-themes. The first theme, "Inclusion?", explores the youth athletes' perceptions, understandings, and expressions of inclusion in the sub-themes "Not As Described" and "Language Of Inclusion." The second theme, "Happy to Be Involved", explores the positive foundation for fostering inclusion beyond the sport environment and the shortcomings of such an endeavour: "Vehicle of Community Inclusion?" and "Welcoming Environment." Through our collaboration with Special Olympics Ontario, we can improve upon the Unified Sports opportunities provided via coach and teacher education. Specifically, we must improve on the practical 'meaning' of inclusion and its actualization in programs such as Unified Sports.

114.

## **THE ROLE OF PEERS AND THE BUILT ENVIRONMENT IN YOUTH EMOTIONAL SAFETY IN AFTERSCHOOL PROGRAMS.**

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After school recreational contexts can contribute to youth development if they are intentionally designed. Such programs can be particularly beneficial in low-income communities that have fewer opportunities for structured programs. An important feature is ensuring spaces facilitate emotional safety. Social relationships and the built environment have the potential to influence feelings of emotional safety; however, little research focuses on adolescents in the afterschool context. A collective case study was conducted to explore youth perspectives of their interactions with their peers and the recreational environment, and how these interactions may contribute to perceptions of emotional safety. Interviews were conducted with ten 11-15-year-old youth and ten program staff at two sites of an afterschool program in low-income urban neighbourhoods. Results of thematic analysis suggested that youth felt emotionally safe when they and their problems were understood and not hidden. The size of, familiarity with, and materials in a space; feelings of freedom; and the protection and trust shown by peers and staff had implications for emotional safety. When messages supporting emotional safety were spoken or displayed throughout the spaces, youth felt more emotionally safe. Findings suggest youths' choices of whether to share with peers may be motivated by a desire for acceptance. Environments that are home-like and relationships that provide an outlet to share can help youth to feel emotionally safe. Recommendations include using language that facilitates trust, including inclusive and non-divisive activities in programming, and having areas that allow youth to separate themselves if needed.

117.

## **INITIATION OF ADAPTED PHYSICAL ACTIVITY FOR MILITARY PERSONNEL AND CIVILIANS WITH ACQUIRED DISABILITIES: THE ROLE OF SOCIAL SUPPORT**

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<sup>3</sup>School of Kinesiology and Health Science, York University

<sup>4</sup>School of Kinesiology and Health Studies, Queens University

Limited research has explored the factors that promote initiation into adapted physical activity (PA). This critical knowledge gap results in a lack of understanding of how to optimally promote PA participation for individuals with acquired disabilities. With the aim of filling this gap, we conducted a secondary analysis of qualitative data relating to the PA experiences of individuals with physical disabilities. Specifically, we sought to examine the role of social support in initiating PA for individuals with acquired physical disabilities. Participants consisted of both civilians (n=15; age:19-73 years) and military personnel (n=18; age:30-68 years) with acquired disabilities (e.g., amputations, spinal cord injuries). Participants engaged in two semi-structured interviews, which explored PA engagement over time, as well as perceptions of PA. An inductive thematic narrative analysis was used to identify patterns relating to social support and PA initiation. Creative non-fiction was employed to present the findings in a way that fully detailed the depth and richness of participant experiences. Four distinct short stories were created, based on the identified social support networks (family, peers, coaches, and community outreach). The results illustrate the complexity and critical value of social support in the early stages of adapted PA participation. Findings also highlight the different roles of each social support network, as well as the nuances that arise in the availability and expression of social support based on whether participants were civilians or military personnel. This study provides the foundation for further exploration of the significance of social support in promoting adapted PA.



197.

## **“I’M A RUNNER NOT A SMOKER”: CHANGE IN IDENTITY AS A PREDICTOR OF SUCCESS IN THE RUN TO QUIT PROGRAM**

Carly S. Priebe<sup>1</sup>, Kelly Wunderlich<sup>1</sup>, Guy Faulkner<sup>1</sup>

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This study examined the influence of identity on activity and smoking within Run to Quit, a national multi-behaviour intervention that utilizes group-based learn-to-run clinics to assist participants in quitting smoking. It was hypothesized that the behaviour-change curriculum and running, especially in a group context, would not only help participants with physical symptoms of withdrawal but it would also facilitate changes in identity. Further, changes in identity were hypothesized to predict cessation and running in participants. Inactive adult smokers (n=249) completed 10-week clinics in Running Room locations across Canada. Within the mixed-methods pre-post design, participants completed questionnaires assessing identity, physical activity, running frequency, and smoking status (including carbon monoxide [CO] testing) at weeks 1 and 10, as well as post-program interviews. Consistent with hypotheses, in addition to significant changes in smoking status and activity, runner identity increased, and smoker identity decreased from beginning to end of program ( $p$ 's=.000). Further, two regression analyses were significant with changes in smoker identity being the significant predictor of CO levels ( $\beta$  =.302,  $p$ =.000) and changes in run identity best predicting running frequency ( $\beta$  =.235,  $p$ =.001). While runner identity was correlated to quit outcomes and smoker identity correlated to running ( $p$ 's=.000), they were not significant predictors in their respective models, and neither was the interaction between the two identities. Although future experimental research is required, these findings, along with complimentary qualitative feedback, suggest changes in identity may be one potential mechanism through which physical activity facilitates smoking cessation.

235.

## **SOCIAL SUPPORT FROM EXERCISE INSTRUCTORS IN GROUP PHYSICAL ACTIVITY PROGRAMS FOR OLDER ADULTS**

Meghan H. McDonough<sup>1</sup>, Evelyne Felber Charbonneau<sup>1</sup>, Jennifer Hewson<sup>2</sup>, Peter R.E. Crocker<sup>3</sup>, Ann Toohey<sup>4</sup>, Cari Din<sup>1</sup>, Stephanie Won<sup>5</sup>, AJ Masune<sup>5</sup>, Raynell A. McDonough<sup>6</sup>

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Physical activity can facilitate successful aging. Social support is associated with engaging in physical activity. A potential source of support is physical activity instructors, as they can affect the social climate and provide direct support to participants. However, little is known about older adults' expectations for social support from instructors and specific behaviours they experience as supportive. This study examined older adults' experiences with social interactions with instructors in group exercise programs, and their perspectives on instructor behaviours that support participation. Guided by interpretive description methodology, we conducted ten focus groups with N=38 older adults in group exercise programs at city recreation centers (n=29 women, 9 men; Mage=69.5 years). Responses were analyzed in light of successful aging, age-friendly cities, and social support frameworks. Instructor supportiveness was a key influence in the decision to engage in a particular program. Instructor characteristics that participants identified as supportive included: knowledge of aging and physical activity; ability to deliver individualized feedback; and including adaptations within class activities. Participants felt especially supported in classes where instructors were both caring and challenging, while remaining inclusive of different levels of ability. Participants felt less engaged in classes with instructors who controlling, versus those who respected autonomy. Some participants wanted support from instructors to address interpersonal problems among participants, but acknowledged that instructors were not always equipped to do so. Results highlight the importance of understanding instructors as a source of support, and the need for guidance on how instructors can provide effective support in this context.

# **Exercise Psychology**

## **Verbal Session III**

62.

## **MODERATE-TO-VIGOROUS PHYSICAL ACTIVITY CONFERS PROTECTIVE BENEFITS FOR INTERNALIZING DISORDERS AMONG CANADIAN CHILDREN AND YOUTH WITH DISABILITIES**

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<sup>2</sup>University of British Columbia

Children and youth with disabilities (CYD) have a higher prevalence of mental health problems than their typically developing peers. Extensive research has established the beneficial effects of physical activity (PA) for mental health outcomes, however, this relationship has received limited attention among CYD. Using a subsample of data derived from the National Physical Activity Measurement study, this study examined the relationship between PA and mental health outcomes for CYD. Parents (N = 334) of school-aged children and youth (276 boys) with single or comorbid diagnosis of developmental, sensory, physical and/or other disabilities completed online proxy-reported measures of their child's moderate-to-vigorous PA (MVPA) behaviour using the International Physical Activity Questionnaire as well as internalizing (i.e., emotional/peer symptoms) and externalizing (i.e., conduct/behavioural symptoms) problems using the Strengths and Difficulties Questionnaire. Results showed 59% and 53% of CYD scored at or above the "slightly raised" criterion for internalizing and externalizing problems, respectively. Using linear regression analysis, findings revealed MVPA significantly predicts internalizing problems ( $R^2 = .04$ ,  $\beta = -0.15$ ,  $p = .01$ ), but not externalizing problems ( $\beta = 0.01$ ,  $p = .83$ ), after adjusting for age and gender. Examining each disability type revealed MVPA is only a significant predictor of internalizing problems for children with developmental disabilities ( $R^2 = .04$ ,  $\beta = -0.16$ ,  $p = .03$ ). Overall, findings suggest MVPA may have protective effects for internalizing disorders among CYD, particularly those with developmental disabilities. Future studies using balanced designs should investigate whether the magnitude of this relationship differs depending on type of disability.

78.

## **AFFECTIVE AND SOCIAL COGNITIVE RESPONSES TO HIGH-INTENSITY INTERVAL TRAINING AND MODERATE-INTENSITY CONTINUOUS TRAINING AMONG INDIVIDUALS AT RISK OF TYPE 2 DIABETES**

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<sup>1</sup>Faculty of Health and Social Development, University of British Columbia, Kelowna, British Columbia, CANADA

Psychological constructs such as in-task affect, post-exercise enjoyment, and attitudes towards exercise have been implicated in the prediction of future physical activity behaviour for individuals not meeting physical activity guidelines. However, the relationship between such constructs during progressive exercise training protocols remains to be determined. The purpose of this study was to examine the affective and social cognitive responses to high-intensity interval training (HIIT) and moderate-intensity continuous training (MICT) over a progressive two-week supervised intervention. Ninety-nine adults not meeting physical activity guidelines were randomized into one of two exercise conditions and had affective and social cognitive measures assessed before, during, and after intervention implementation. Increases over time in post-exercise enjoyment, attitudes towards exercise, and intentions to exercise in the future were noted for both HIIT and MICT conditions ( $p < .05$ ). Patterns of change in affective responses over the course of the intervention were consistent for both conditions, with participants in MICT reporting more positive in-task affect and affective attitudes throughout the intervention ( $p < .001$ ). Positive correlational relationships between affective and social cognitive responses were revealed throughout the intervention ( $p < .05$ ), highlighting the intertwined relationship between affective responses and social cognitions. Overall, both HIIT and MICT may serve as appropriate modalities of exercise for this population. Further research is warranted to determine whether findings are a consequence of familiarization with exercise, whether such findings are translatable to real-world environments and non-progressive exercise protocols, and whether these affective responses and social cognitions are predictive of future exercise behaviour.

159.

## **UNPACKING THE DEBATE: A QUALITATIVE INVESTIGATION OF FIRST-TIME EXPERIENCES WITH HIGH-INTENSITY AND SPRINT INTERVAL EXERCISE AMONG MEN AND WOMEN WHO ARE INACTIVE**

Matthew Stork<sup>1</sup>, Toni Williams<sup>2</sup>, Kathleen Martin Ginis<sup>1</sup>

<sup>1</sup>University of British Columbia Okanagan

<sup>2</sup>Leeds Beckett University

**Objective:** There has been compelling debate about whether interval exercise should be promoted in public health strategies to increase physical activity participation, particularly among inactive populations. Despite a rapidly growing body of quantitative research, there is a notable absence of qualitative research on the topic. This study used a series of interviews conducted over time to develop a richer understanding of (1) inactive adults' experiences during and following moderate-intensity continuous training (MICT), high-intensity interval training (HIIT), and sprint interval training (SIT) trials completed in the laboratory; (2) how their perceptions of MICT, HIIT, and SIT changed over time and with experience; and (3) factors that may influence their ability to engage in real-world MICT, HIIT, and SIT. **Methods:** Thirty inactive young adults completed three trials of cycling exercise in a random order on separate days: MICT, HIIT, and SIT, and subsequently logged their free-living exercise over four weeks. Interviews were conducted at five timepoints and were subjected to a thematic analysis. **Results:** Three overarching themes were identified: (1) thoughts and beliefs about exercise, (2) physiological and psychological exercise experiences, (3) challenges with real-world exercise behaviour. **Conclusions:** The findings emphasize that people respond differently to different forms of exercise and their decisions to participate in interval or continuous exercise are far more complex than can be captured by quantitative methodologies alone. It appears that there is indeed a place for interval exercise in exercise plans and programs for the general population and interval exercise can be used concurrently with continuous exercise.

251.

## **THE EFFECTS OF ACUTE AEROBIC EXERCISE AND CAFFEINE ON CAFFEINE WITHDRAWAL SYMPTOMS AND WORKING MEMORY**

Anisa Morava<sup>1</sup>, Harry Prapavessis<sup>1</sup>

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Caffeine is one of the most widely used psychoactive substances worldwide (WHO, 2004). A primary motivator for caffeine consumption is its cognitive and mood-enhancing benefits (Temple, Dewey, & Briatico, 2010). Cessation of caffeine consumption often results in withdrawal symptoms such as headache, decreased mood, and difficulty concentrating (Juliano & Griffiths, 2004). Aerobic exercise has been associated with the reduction of withdrawal symptoms in tobacco cessation and cognitive benefits (Chang et al., 2012; Roberts et al., 2012). The effects of aerobic exercise in comparison to caffeine on reducing withdrawal symptoms and restoring cognitive performance following caffeine deprivation remains unknown. Twenty-five caffeine consumers (>150mg/day) (Mage = 23.44 ± 3.52, 14 females, 11 males, moderate physical activity levels) underwent a baseline working memory assessment (n-back task; Owen et al., 2005) and caffeine withdrawal symptom questionnaire (CWSQ). Following a 12-hour caffeine deprivation period, participants were re-assessed on the n-back task and CWSQ, then randomized to receive either twenty minutes of aerobic exercise (40-60% Heart Rate Reserve) or caffeine administration (1.2mg/kg). Post either intervention, participants were re-assessed on the n-back task and CWSQ. Post-hoc paired t-tests indicated caffeine administration and aerobic exercise reduced caffeine withdrawal symptoms, respectively ( $p = 0.018$ ,  $d = 1.15$ ;  $p = 0.617$ ,  $d = 0.730$ ). No differences were detected between baseline, deprived, and post-caffeine or post-exercise cognitive performance ( $p > 0.05$ ). Findings indicate aerobic exercise demonstrates utility in reducing caffeine withdrawal symptoms induced by a 12-hour deprivation period. A longer caffeine deprivation period may be required to detect withdrawal induced cognitive decrements.

224.

## **THE EFFECTS OF AN ACUTE BOUT OF SUB-MAXIMAL AEROBIC EXERCISE ON NEUROPATHIC PAIN AND FEELINGS OF PLEASURE FOR PERSONS WITH SCI: AN EXPLORATORY CASE SERIES**

Kendra Todd<sup>1</sup>, Gabriel Dix<sup>1</sup>, Jan van der Scheer<sup>1</sup>, Kathleen Martin Ginis<sup>1</sup>

<sup>1</sup>University of British Columbia

**Introduction:** Neuropathic pain (NP) affects approximately 50% of persons with spinal cord injury (SCI) and can be attributed to both physiological (e.g., spinal hyperexcitability) and psychological factors (e.g., affect). Exercise has been shown to reduce NP sensations for persons with SCI, and simultaneously increase feelings of pleasure. However, these effects have not been examined following a controlled bout of exercise. This study examined how NP and feelings of pleasure change from pre- to post- submaximal aerobic exercise versus quiet rest. **Methods:** This study employed a case series design. Six active individuals with SCI completed the Neuropathic Pain Scale (NPS) and Feeling Scale (FS) pre- and immediately post- 30 minutes of submaximal (60% VO<sub>2</sub>peak) arm-crank ergometry. One week later, participants completed the same measures pre- and post 30 minutes of quiet rest. Descriptive statistics were computed to evaluate changes in NPS and FS scores in each condition. **Results:** Three participants reported a greater decrease in NP sensations after exercise, compared with quiet rest. In contrast, one participant reported an increase in NP sensations following exercise compared with quiet rest. Regarding FS scores, one participant reported increased feelings of pleasure post-exercise. Similarly, one participant reported increased feelings of pleasure following quiet rest. **Conclusion:** These results suggest that a bout of exercise can reduce NP sensations, and improve feelings of pleasure for some persons with SCI. The heterogeneous pattern of results highlights the need for further research to evaluate relationships between specific exercise prescriptions, NP, and feelings of pleasure for persons with SCI.



# **Exercise Psychology**

## **Verbal Session IV**

### **(Symposium)**

## **Collaborating with Indigenous communities in sport and exercise research**

### **Overview**

The Canadian Sport Policy and the Framework for Recreation in Canada share a vision of increasing access and inclusion to meaningful sport, physical activity, and recreation opportunities for underrepresented populations. Researchers serve a critical role in supporting the development of evidence-based programming and policy, and the purpose of this symposium is to facilitate the flow and exchange of knowledge regarding respectful processes for engaging in sport, physical activity, and recreation research with Indigenous peoples in Canada. Drawing upon research projects conducted in partnership with Indigenous communities, the specific objectives of this symposium are to: (1) enhance critical understandings of the historical role of sport, physical activity, recreation, and research in the lives of Indigenous peoples in Canada; and (2) increase awareness of guiding principles and resources for engaging in respectful research with Indigenous peoples.

### **Speakers**

Leah Ferguson, Métis assistant professor in the College of Kinesiology at the University of Saskatchewan, will share an Indigenous sport research project focused on exploring Indigenous women athletes' sport meanings and experiences. She will describe and present examples of decolonizing research philosophies and processes, particularly through relationship-building and embracing athlete- or community-identified methods of gathering knowledge (i.e., data generation). She will also discuss creating respectful partnerships with Indigenous sport advisors and engaging in meaningful knowledge translation to share research results.

Heather Foulds is an assistant professor in the College of Kinesiology at the University of Saskatchewan and the Heart & Stroke/CIHR Early Career Indigenous Women's Heart and Brain Health Chair. She will share her experiences partnering with Indigenous communities to develop and implement research collaborations evaluating community-based physical activity interventions. Her examples include a community-initiated walking and running training program, and a collaboration to evaluate physical fitness and exercise potential of Indigenous cultural activities. Specifically, Métis Red River Jigging will highlight the importance of community voice and the shared journey of community and researcher.

Tara-Leigh McHugh, professor in the Faculty of Kinesiology, Sport, and Recreation at the University of Alberta, will describe a community-based participatory research project that is focused on enhancing the sport experiences of Indigenous youth through participation in northern games. She will outline the essential role of a cross-sector partnership in facilitating collaborative processes of data generation. As well, she will describe her commitment to ensuring that research findings are relevant to community members, researchers, and decision makers.

Moss Norman is an assistant professor in the School of Kinesiology at the University of British Columbia. Based on experiences gained from a six-year research collaboration with Fisher River Cree Nation (Manitoba, Canada), Moss will share thoughts about the role place and relationality occupy in Indigenous sport and physical activity research protocols. As a white settler scholar, he will argue that considerations of place and relationships, both of which are significant aspects of a Cree research paradigm, have been critical to fostering a ethical, relevant and reciprocal inter-cultural research collaboration with Fisher River Cree Nation.

# **Exercise Psychology**

## **Verbal Session V**

69.

## **PHYSICAL ACTIVITY AND LIFE SATISFACTION AMONG INDIVIDUALS WITH SPINAL CORD INJURY: EXPLORING LONELINESS AS A POSSIBLE MEDIATOR**

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Many individuals with spinal cord injury (SCI) experience high levels of loneliness and poor life satisfaction. Outside the SCI population, physical activity (PA) is associated with lower levels of loneliness and improved life satisfaction. Among people with SCI, PA is positively associated with life satisfaction, but the relationship between PA and loneliness is unknown. The current study examined the relationship between PA and loneliness among people with SCI, and examined loneliness as a possible mediator of the relationship between PA and life satisfaction. A cross-sectional telephone survey was administered to adults with SCI (N = 170). Measures of PA (i.e., The Leisure Time Physical Activity Questionnaire-SCI), loneliness (i.e., UCLA Loneliness Scale-3), and life satisfaction (i.e., Life Satisfaction Questionnaire-11) were administered. The sample was mostly male (n = 136), over 10-years post injury (n = 122), and had experienced a traumatic SCI (n = 149). Bivariate Pearson correlations revealed significant relationships between PA and life satisfaction ( $r = .18$ ,  $p = .02$ ), PA and loneliness ( $r = -.15$ ,  $p = .045$ ), and loneliness and life satisfaction ( $r = -.69$ ,  $p < .001$ ). Mediation analyses suggest that the relationship between PA and life satisfaction among people with SCI may be partially explained by loneliness (Sobel test:  $z = 2.00$ ,  $p = .046$ ). Further research using longitudinal and experimental designs are warranted. PA programs serving people with SCI might consider modifying program delivery and contextual factors to target changes in loneliness, and maximize life satisfaction outcomes among people with SCI.

70.

## **A SYSTEMATIC SCOPING REVIEW: RESOURCES TARGETING THE TRAINING AND EDUCATION OF HEALTH AND RECREATION PRACTITIONERS TO SUPPORT PHYSICAL ACTIVITY AMONG PEOPLE WITH PHYSICAL DISABILITIES.**

Rebecca Leigh Bassett-Gunter<sup>1</sup>, Kelly Angevaere<sup>2</sup>, Jennifer Tomasone<sup>3</sup>, Jennifer Leo<sup>4</sup>, Benjamin Varughese<sup>5</sup>, Jason Langvee<sup>6</sup>, Katie Disimino<sup>1</sup>, Kathleen Martin Ginis<sup>7</sup>

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<sup>5</sup>University of Ontario Institute of Technology

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Persons with physical disabilities (PWPD) do not engage in adequate leisure-time physical activity (LTPA). Support from health and recreation practitioners can increase LTPA among PWPD. Unfortunately, many practitioners have poor attitudes toward LTPA for PWPD, and lack confidence and motivation to support LTPA for PWPD. Poor attitudes, confidence and motivation among practitioners may be the result of a lack of training and education necessary to provide practitioners with the basic knowledge, skills and resources required to support LTPA among PWPD. Little is known about existing LTPA information and training resources targeting health and recreation professionals, and there has been no known systematic effort to collect current resources. This study served to identify educational tools and resources that target the training of practitioners working with PWPD in LTPA settings. Searches of academic and grey literature, online materials and expert consultation were performed using systematic scoping review methodologies. Identified resources were then assessed for technical quality. Several resources (N=46) of high technical quality from academic, government, non-government and professional organizations were identified. Most resources indicated a target PWPD population (78%) but few clearly specified a practitioner group (37%). The review provides a listing of existing resources while acting as a foundation for further research regarding the analysis, design, development, implementation and evaluation of optimally effective tools targeting professionals to encourage LTPA among PWPD. Further research is necessary to identify and inform optimally designed resources that enhance practitioners' attitudes, confidence, motivation toward LTPA for PWPD through improved knowledge and skills.

128.

## **“ON-THE-GROUND” STRATEGY MATRIX FOR FOSTERING QUALITY PARTICIPATION AMONG PERSONS WITH DISABILITIES IN COMMUNITY-BASED EXERCISE PROGRAMS**

Jennifer R. Tomasone<sup>1</sup>, Krsitiann E. Man<sup>1</sup>, Jacob D. Sartor<sup>1</sup>, Kathryn E. Andrusko<sup>1</sup>, Kathleen A. Martin Ginis<sup>2</sup>, Amy E. Latimer-Cheung<sup>1</sup>

<sup>1</sup>School of Kinesiology and Health Studies, Queen's University

<sup>2</sup>Department of Medicine, University of British Columbia Okanagan Campus

Recent advances in the literature suggest what contributing factors to target when optimizing quality (i.e., positive subjective) experiences for persons with disabilities in community-based exercise programs: six elements (autonomy, belongingness, challenge, engagement, mastery, meaning), validation, and three conditions (physical environment, social environment, characteristics of the activity). A preliminary strategy list exists for how program providers can foster quality experiences in such programs; however, it is theoretically and practically limited. This study aims to (1) refine a preliminary strategy list to ensure resonance and applicability within community-based exercise programs for persons with disabilities, and (2) identify theoretical links between strategies and the contributing factors for quality participation. To address purpose one, drawing on recent published syntheses, strategies were added to the preliminary list. Next, using a modified Delphi procedure, a re-categorization and revision process was conducted. Providers from six and nine community-based exercise programs serving persons with physical and intellectual disabilities, respectively, were then asked to identify the strategies used within their programs. To address purpose two, 22 researchers with expertise in physical and/or intellectual disability, physical activity, participation and/or health behaviour change theory completed a closed-sort task to theoretically link each strategy to the contributing factors for quality participation. The resulting list of 86 strategies is presented in a matrix. Each strategy has explicit examples and proposed theoretical links to contributing factors of quality participation. The resulting matrix offers a menu of strategies that can be practically implemented “on-the-ground” by providers who offer community-based exercise programs to persons with disabilities.

137.

## **THE EFFECTS OF PHYSICAL ACTIVITY MESSAGES ON PHYSICAL ACTIVITY SUPPORT BEHAVIOURS AND MOTIVATION AMONG PARENTS OF CHILDREN WITH DISABILITIES**

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<sup>3</sup>York University

Media messages can motivate parent support for children's physical activity (PA).

Unfortunately, many PA messages targeting parents are not necessarily inclusive of parents of children with disabilities (CWD) and the effects of messages on the support behaviour of parents of CWD is unknown. Guided by the Theory of Planned Behaviour and Multi-Process Action Control model, the relative effects of PA messages were examined among parents of CWD. Parents (N=135) were randomized to view one of the following messages: a) targeted (i.e., CWD in sport/competitive context), b) generic (i.e., no children included), c) non-inclusive (i.e., able-bodied children only), and d) inclusive (i.e., able-bodied and CWD). Parent PA support and various psychosocial antecedents (e.g., attitudes, subjective norms, PBC, intention, behavioural regulation) were assessed before, immediately post- and two-weeks post message viewing. A multivariate main effect for time was observed. Post-hoc analyses identified baseline parent support as a moderator of the effects of message viewing: parent support increased post-viewing among parents with low baseline support, and decreased among parents with high baseline support. Subjective norms also increased among parents with low baseline parent support. Planning increased among parents with low baseline parent support, and decreased among parents with high baseline parent support. The results of this study can inform the development of optimally effective messages to motivate parent PA support among parents of CWD.



170.

## **EXPLORING GAZE BEHAVIOURS TOWARD VIDEOS OF PHYSICALLY ACTIVE INDIVIDUALS WITH A PHYSICAL OR INTELLECTUAL DISABILITY**

Shannon Weissman<sup>1</sup>, Timothy Welsh<sup>1</sup>, Amy Latimer-Cheung<sup>2</sup>, Celina Shirazipour<sup>3</sup>, Kelly Arbour-Nicitopoulos<sup>1</sup>

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<sup>3</sup>Research Center for Health Equity, Cedars-Sinai Medical Center

Having a disability can elicit ostracizing behaviours from others, such as staring. Research grounded in the stereotype content model (SCM) suggests that depicting people with physical disabilities (PD) as physically active may improve how they are perceived and treated. Specifically, able-bodied adults gazed less at images of individuals with PD when they were shown engaging in physical activity (PA) versus sedentary. However, the influence of PA information on gaze behaviour toward individuals with other disability types remains unknown. The present study compared gaze behaviours toward videos of people with intellectual disabilities (ID), PD, and no disability depicted as physically active or sedentary. A secondary objective was to assess the features participants gazed at. Thirty adults (males=11) without disabilities (Mage=22.13±3.28 years) viewed six, 30-second videos of people with ID, PD, and no disability performing bicep curls (active) or watching television (sedentary). Eye movements were recorded during each video. Repeated measures ANOVAs revealed statistically significant main effects of ability and activity conditions on gaze behaviour. Participants gazed most at individuals with ID and least at individuals without disabilities, with greater gaze behaviours directed toward those who were active versus sedentary. Greater gaze behaviours were directed toward the body in the active versus sedentary condition. Findings support the SCM assumptions regarding the effect of disability type on gaze behaviour, but challenge the assumptions regarding the effect of activity status. This research provides novel insight into the gaze people with different disabilities receive from onlookers, and the influence of PA on these gaze patterns.

# **Exercise Psychology**

## **Verbal Session VI**

259.

## **LEARNING TO PROMOTE PHYSICAL ACTIVITY: EVALUATING CHANGES IN STUDENTS' MOTIVATIONAL INTERVIEWING SKILL AND SELF-EFFICACY**

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<sup>1</sup>Department of Kinesiology, California State University, Fullerton

<sup>2</sup>California State University, Fullerton

Motivational interviewing (MI) and behavior change techniques are beneficial when promoting physical activity (PA) (Samdal et al., 2017). However, less is known about the effectiveness of training individuals to use these techniques in a PA setting. The purpose was to evaluate changes in students' self-efficacy to promote PA, MI skills and cultural competence over a semester. Students (N=78) from three semesters of an applied exercise psychology course received training on motivational interviewing and behavior change strategies. To apply their skills, students served as PA coaches at local parks, promoting PA among park users. Students completed surveys at the beginning and end of the semester that included a 10 item self-efficacy questionnaire, the Cultural Competence Assessment (Doorenbos et al., 2005), and an adapted Helpful Responses Questionnaire (HRQ; Miller et al., 1991) to assess MI skills. Dependent t-tests were computed to compare pre and post test scores. In terms of MI skills, students reported fewer average roadblocks to communication at post (M=0.9, SD=0.5) when compared with pre (M=1.3, SD=0.3;  $t(64)=6.08$ ,  $p<.001$ ) as well as an improved total score at post (M=2.9, SD=2.0) when compared to pre (M=1.2, SD=0.8;  $t(64)=-7.17$ ,  $p<.001$ ). There was no difference in cultural competence ( $t(63)=0.37$ ;  $p=.71$ ) and students' self-efficacy showed a trend towards improvement from pre (M=77.3, SD=12.8) to post (M=80.2, SD=13.3;  $t(63)=-1.88$ ,  $p=.06$ ). While some positive changes were seen in terms of confidence and MI skills, further research is needed to evaluate what types of training and experiences are necessary to develop such skills.

130.

## **INVESTIGATING DEMOGRAPHICS, PHYSICAL ACTIVITY INTENSITY, AND SEDENTARY BEHAVIOUR AS PREDICTORS OF BURNOUT IN FIRST TO FOURTH YEAR MEDICAL STUDENTS**

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<sup>3</sup>Department of Kinesiology and Physical Education, McGill University, Montreal, Quebec

Medical students are at an increased risk for burnout compared to the general population (Dyrbye et al., 2014). Research has identified certain demographics as predictors of burnout in medical students (Cecil et al., 2014; Dyrbye et al., 2007; Dyrbye & Shanafelt, 2016), but most research has not examined a combination of demographic variables in one model. Moreover, physical activity (PA) and sedentary behaviour are two modifiable risk factors for burnout (Naczenski et al., 2017; Sloan et al., 2013). However, less is known about how PA intensities and sedentary behaviour influence burnout in medical students. This research investigated how demographics (gender, ethnicity, age, level of education, year of study, proposed specialty) and health behaviours (mild, moderate, and vigorous PA, and sitting) predicted burnout in medical students. Medical students (N=129) completed surveys of validated questionnaires assessing demographics, PA, sitting, and burnout. Data were analysed using multivariate linear regression. Results showed that female gender ( $\beta=.221$ ,  $p=.016$ ), 'other' ethnicity ( $\beta=.185$ ,  $p=.040$ ), third year ( $\beta=.435$ ,  $p<.001$ ), and fourth year ( $\beta=.229$ ,  $p=.029$ ) were significant positive predictors of burnout. Approaching significance, the regression also showed that mild PA was a negative predictor ( $\beta=-.159$ ,  $p=.071$ ) and moderate PA was a positive predictor ( $\beta=.155$ ,  $p=.092$ ) of burnout. These results suggest certain medical students may be more at-risk for burnout and should be targeted in interventions and that burnout may be prevented by engaging in mild versus moderate PA. This knowledge fills many gaps in the literature and can inform medical stakeholders in developing targeted programs for our future physicians.

256.

## **MIND IN MOTION: ASSESSING THE FEASIBILITY OF AN EXERCISE INTERVENTION FOR UNIVERSITY STUDENTS SEEKING MENTAL HEALTH TREATMENT ON CAMPUS**

Mahabhir Kandola<sup>1</sup>, Krista Glowacki<sup>1</sup>, Isabella Cina<sup>1</sup>, Guy Faulkner<sup>1</sup>

<sup>1</sup>School of Kinesiology, UBC Vancouver

**Background:** Despite the increasing utilization of mental health services on campus, many students are wait-listed due to high demand and/or may not receive the required care. Mind in Motion is a 6-week structured, supervised exercise program for students seeking mental health services at UBC Vancouver. Students attend two sessions a week with a personal trainer, followed by 6-weeks of optional maintenance. An evaluation was conducted from Sept 2018 – May 2019 to assess the feasibility of the pilot program. **Methods:** Students were referred by counselling services and screened by phone for eligibility. Eligible participants completed self-report survey assessments at weeks 1, 6, and 12 which included self-reported measures of physical activity, depression severity, and program experience. **Results:** Fifteen participants enrolled in the program and seven completed it. Mean depression severity decreased from baseline ( $M=11.7$ ,  $SD=6.1$ ) to week 12 ( $M=9.9$ ,  $SD=5.8$ ). Six of nine participants felt they required fewer or no counselling services by week 6 and all but one participant would recommend it to others. Participants expressed satisfaction with the quality of instruction and gym environment. Scheduling conflicts were the most common reason for drop-out. **Discussion/Conclusion:** The results support the feasibility and potential of an exercise intervention to improve the mental health of students who complete the program. Mind in Motion will be re-implemented and evaluated in Fall 2019 after program modification aimed to improve participant retention.

47.

## **CHANGES IN UNIVERSITY STUDENTS' MENTAL HEALTH FOLLOWING A SIX-WEEK PHYSICAL ACTIVITY INTERVENTION**

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<sup>2</sup>University of Windsor

The rise in mental health concerns among university students has led to an increased demand for counseling services across post-secondary institutions. Consequently, additional resources are needed to improve the mental health of university students. The purpose of the present study was to test the effects of a six-week physical activity (PA) intervention on university students' mental health. Participants included 49 (32 female, 16 male, 1 gender-variant, Mage= 23.08, SD= 4.96) low-risk sedentary students enrolled at a Canadian university. Participants varied in year of study (first year to graduate studies) and educational program (e.g., Engineering, Law, Science). The intervention comprised two personal training sessions (45 minutes each), including cardiovascular and resistance exercises, and one individual PA counseling session (30 minutes) per week. A pretest-posttest design was implemented wherein the following mental health outcomes were measured: a) psychological distress, b) psychological well-being, and c) quality of life. Paired samples t-test revealed a significant decrease in psychological distress from pre (M= 77.31, SD= 17.03) to post (M= 67.22, SD= 17.97) intervention ( $p = .000$ ). There was also a significant increase in psychological well-being from pre (M= 45.84, SD= 10.87) to post (M= 50.53, SD= 13.56) intervention ( $p = .009$ ). Similar results were found for quality of life from pre (M= 29.61, SD= 7.17) to post (M= 36.18, SD= 7.17) intervention ( $p = .000$ ). The results highlight PA as an effective method to improve university students' mental health, which may reduce their need for counseling services. Recommendations for future development of PA interventions with this sample will be provided.

213.

## **PRESCRIPTION EXERCISE AT QUEEN'S: A PROSPECTIVE PROGRAM EVALUATION OF PHYSICAL ACTIVITY EFFECTS AMONG UNIVERSITY STUDENTS WITH DEPRESSION AND ANXIETY**

Stephanie M. Flood<sup>1</sup>, Priscilla P. Leung<sup>1</sup>, Freeman Woolnough<sup>2</sup>, Beth Blackett<sup>2</sup>, Tiffany Bambrick<sup>3</sup>, Jennifer R. Tomasone<sup>1</sup>

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<sup>2</sup>Health Promotion, Queen's University

<sup>3</sup>Fitness and Wellness, Queen's University

Participation in physical activity (PA) may lead to positive improvements in mental health status. Prescription Exercise at Queen's (PE-Q) is an eight-week PA program that offers students with mild to moderate depression and/or anxiety with the option to supplement their treatment with exercise. The program includes personal training sessions, self-selected PA, and a peer-delivered 'Brief Action Planning' self-management component. The purpose of this study was to evaluate the impact of the PE-Q program on participants' mental health symptoms and PA behaviour and social cognitions (based on the Health Action Process Approach). Twenty-one participants completed pre-, mid- and post-program online questionnaires. Separate repeated measures ANOVAs and post-hoc t-tests evaluated changes in participants' mental health symptoms, PA behaviour and social cognitions. Significant decreases in participants' depression symptoms and anxiety symptoms were reported from pre- to mid-program ( $d_s \approx 0.98$ ;  $p_s < 0.05$ ), which were maintained from mid- to post-program. Significant increases in participants' PA planning and action control were reported from pre-to mid-program ( $d_s \approx 1.04$ ;  $p_s < 0.05$ ), which were also maintained from mid- to post-program. In general, students provided high ratings for program instructiveness, usefulness, credibility, and personal importance (all  $M_s \approx 5.57$  out of 7). While these findings contribute to existing literature on holistic treatment programs for students with mental illnesses, further testing with a control group and an adequately-powered sample is warranted.

239.

## **THE EFFECTIVENESS OF A PILOT PEER-BASED PHYSICAL ACTIVITY MENTORING PROGRAM TO PROMOTE MENTAL HEALTH ON CAMPUS**

Kelsey Sick<sup>1</sup>, J. Kevin Shoemaker<sup>1</sup>, Deborah Chiodo<sup>1</sup>, Eva Pila<sup>1</sup>, Alan Salmoni<sup>1</sup>

<sup>1</sup>The University of Western Ontario

The pervasiveness of psychological concerns among university students has been deemed a “campus mental health crisis”. As such, campus mental health services necessitate sustainable and feasible promotional strategies targeted towards prevention. Campus-based physical activity interventions may be effective at promoting student mental health. As such, the purpose of the present investigation was to evaluate the effectiveness of two pilot yearlong peer-to-peer physical mentoring programs in improving indices of mental health (e.g., resilience, anxiety symptoms, depressive symptoms). First-year students participated in Study 1 ( $n = 79$ ; 70.9% female;  $Mage = 20.00 \pm .77$ ) and Study 2 ( $n = 217$ ; 67.3% female;  $Mage = 19.13 \pm 1.19$ ). In both studies, students demonstrated improved levels of resilience (Study 1:  $F(1.77, 99.24) = 2.77$ ,  $p = .07$ ,  $\eta^2 = .05$ ; Study 2:  $t(109) = -1.71$ ,  $p = .09$ ,  $d = .15$ ) and lower levels of anxiety (Study 1:  $F(1.90, 110.36) = 3.88$ ,  $p = .03$ ,  $\eta^2 = .06$ ; Study 2:  $t(109) = 1.70$ ,  $p = .09$ ,  $d = .14$ ) between baseline and post-program. However, only anxiety scores differed significantly in Study 1. Evaluations suggest that a physical activity peer-mentor program is feasible to implement on campus and is a potential strategy improve mental well-being. However, program characteristics and structure may need to be further reviewed in order to evaluate changes in mental health more broadly, and mechanisms for anxiety specifically. Further research efforts are needed to address gaps in empirical knowledge and advance this unique peer-based intervention to a campus-wide mental health promotion strategy.



# **Exercise Psychology**

## **Verbal Session VII**

89.

## **EXAMINING THE EFFECTS OF A 12-WEEK LIFESTYLE MODIFICATION INTERVENTION ON PHYSICAL ACTIVITY AND RELATED PSYCHOLOGICAL OUTCOMES AMONG OVERWEIGHT AND OBESE ADOLESCENT GIRLS**

Amanda McKinnon<sup>1</sup>, Nicholas Santino<sup>2</sup>, Paula M Watson<sup>3</sup>, Andrea R Josse<sup>2</sup>, Melissa Calleja<sup>4</sup>, Rebecca Bassett-Gunter<sup>2</sup>

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<sup>3</sup>Institute for Sport and Exercise Sciences, Liverpool John Moores University

<sup>4</sup>Brock University

**BACKGROUND:** Adolescents typically experience sharp declines in physical activity. This is especially true for overweight and obese girls, whose efforts are often thwarted by feelings of guilt, shame, and failure. Therefore, interventions for improving physical activity behaviours among this population should also aim to promote favorable psychological outcomes.

**PURPOSE:** Guided by Self-Determination Theory (SDT), this study examined the effects of a 12-week lifestyle modification intervention for overweight and obese adolescent girls on physical activity and related psychological variables. **METHODS:** Participants (N=54; mean age =14.8±2.25 years) were randomized to one of three groups; two intervention groups (G1 n= 24; G2 n=23) which undertook a 12-week intervention including supervised exercise, dietary counseling and behaviour-management, and one control group (Con n=7). Intervention groups differed by the type of dietary program followed. Leisure time physical activity (LTPA), exercise motivation, perceived competence, and physical self-perceptions were measured at 0 and 12 weeks. **RESULTS:** Significant time by group interactions were observed for LTPA ( $F(1,51)=4.3$ ,  $p=0.019$ ), physical self-worth ( $F(1,51)= 9.03$ ,  $p<0.001$ ) and body satisfaction ( $F(1,51)= 8.78$ ,  $p=0.001$ ). Post-hoc analyses identified that participants in both intervention groups had increases in LTPA (G1/G2;  $p<0.001$ ), physical self-worth (G1;  $p=0.004$ , G2;  $p<0.001$ ) and body satisfaction (G1;  $p=0.001$ , G2;  $p<0.001$ ) from baseline to week 12. **CONCLUSION:** Positive changes in LTPA and related psychological outcomes suggest that this lifestyle modification intervention, guided by SDT, was beneficial for overweight and obese adolescent girls. Future research should further explore strategies to facilitate positive changes in motivation to ensure that these outcomes persist over time.

271.

## **USING SELF-COMPASSION TO PROMOTE PHYSICAL ACTIVITY: A RANDOMIZED PILOT STUDY FOR WOMEN DIAGNOSED WITH MOOD DISORDERS**

Eva Pila<sup>1</sup>, Valerie Taylor<sup>2</sup>, Sean Wharton<sup>3</sup>

<sup>1</sup>Western University

<sup>2</sup>University of Calgary

<sup>3</sup>Wharton Medical Clinic

Up to 55% of higher-weight individuals experience clinical depression or bipolar disorder, and this significant overlap is disproportionately observed among women. Women are also three times more likely to seek weight management, yet those with mood disorders experience the highest rates of attrition. Indeed, higher-weight women with mood disorders report avoiding physical activity due to the ubiquitous experience of weight bias, stigma, and discrimination in these contexts. Since increased physical activity can improve mood symptoms and reduce disease risk, regardless of changes in weight – intervention strategies aimed at enhancing women's experiences in physical activity are imperative. The present investigation assesses the feasibility of a compassion-focused education program delivered to higher-weight women with mood disorders seeking behavioural treatment (i.e., nutrition, physical activity), and examined changes in physical activity. Treatment-seeking women with a diagnosed mood disorder ( $n = 47$ ) were randomized into either the 6-week education program ( $n = 24$ ) or a waitlist control ( $n = 23$ ). The intervention showed evidence of acceptability as assessed by the proportion of eligible participants who agree to participate in the study (82%), adherence (70% attended all sessions), and time spent engaging in program components ( $n = 45$  minutes/week). Within-person effect sizes suggest a meaningful increase in minutes engaged in physical activity in the intervention group ( $d = -0.23$ ), compared to the control group ( $d = 0.54$ ). As such, programs that focus on building self-compassion may be an acceptable intervention that holds promise for enhancing engagement in physical activity among higher-weight women with mood disorders.

254.

## **EXPLORING THE EFFECTS OF A 12-WEEK EXERCISE INTERVENTION ON BODY IMAGE IN OLDER ADULTS**

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By 2030, 1 in 4 Canadians will be a senior. This aging population experiences several physical and psychological changes that can negatively impact health and lead to strain on the health care system. Physical activity has been associated with many physical and psychological benefits, such as decreased risk of chronic disease, improved cognitive functioning, ability to perform activities of daily living, higher quality of life, and decreased depression. One benefit that remains understudied in older adults is body image. Exercise can potentially alleviate the negative effects of aging on body image, however, older adults' participation rates in physical activity remain low. The purpose of this study was to examine the effects of a 12-week general physical activity program on body image in men and women 55 years and older. Participants (81 men and 217 women) were randomly assigned to an exercise group (60 minutes of supervised cardiovascular, strength, balance, and flexibility training three times per week) or a wait-list control. Measures of evaluation and investment in appearance, health, and illness as well as anxiety about the body were completed at baseline and 12 weeks later. Repeated measures analyses, controlling for gender, were conducted. The results showed no significant group (exercise, control) x time (pre, post) interaction, indicating no improvements on any of the outcomes following exercise (all  $p$ s > .05). Overall, the sample was healthy and active prior to participation; future research should investigate changes in a less active sample.

83.

## **FEASIBILITY AND ACCEPTABILITY OF A BRIEF INTERVENTION PROMOTING SELF-CARE BEHAVIOURS AMONG CANCER CAREGIVERS**

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**Background:** To help caregivers manage the unique demands of providing care for someone who has been diagnosed with cancer, we developed a brief self-determination theory-based eHealth intervention to increase caregivers' self-care behaviours (operationalized as physical activity and fruit and vegetable consumption). Using a mixed-methods approach, the main objective of this study was to assess the feasibility and acceptability of our intervention. **Methods:** Our intervention included 4 weekly one-on-one autonomy supportive interactive video-calls with a health and wellness advisor. Quantitative data were collected pre- and post-intervention and analyzed descriptively. Semi-structured interviews were conducted post-intervention and analyzed using thematic analysis. **Results:** From January to June 2019, 7 caregivers (Mage=63.9, SD=12.2, 71.4% female) were recruited via community organizations, social media, and word of mouth. Recruitment/enrollment (53.8%) was low; however, adherence (100%), fidelity (99%), and retention (100%) rates were high after enrollment. Participants generally expressed satisfaction with the intervention content, delivery mode, frequency, personalized approach, and support received from the advisor, though some desired more sessions over a longer period of time. Three themes captured caregivers' experiences within the intervention: (1) building and maintaining supportive relationships; (2) refocusing on self-care; and (3) engaging in self-care to be a better caregiver. **Conclusions:** Individually tailored interventions may empower cancer caregivers to prioritize self-care and focus on their own social, emotional, and physical health, and in turn enhance their ability to provide care. Co-designing recruitment strategies with caregivers and partnering with organizations who provide services to cancer survivors and caregivers may facilitate recruitment for future interventions.

192.

## **EVALUATING THE EFFECTIVENESS AND COST EFFECTIVENESS OF THE PARTICIPATION “BUILD YOUR BEST DAY” CAMPAIGN**

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The Canadian 24-Hour Movement Guidelines for Children and Youth (Guidelines) recommend that children and youth Sweat, Step, Sleep, and Sit the right amounts. This integrated movement approach shifts from traditional guidelines' that focus on isolated behaviours. An innovative online activity hub - Build Your Best Day (BYDB) was developed in 2016 in partnership with Guideline stakeholders to disseminate the Guidelines among parents. Using the Hierarchy of Effects Model (HOEM) and cost-effectiveness analysis (CEA), the objective of this study was to determine if BYDB was an effective and cost-effective means of Guideline dissemination. Effectiveness was measured by HOEM measures, parental support and hub utilization. An online survey was administered to three different cohorts of parents (n=1208, 939, 751) at three time points (3-, 12-, and 17-months post BYDB release). ANOVA's were used to analyze survey responses. To assess the hub's utilization, data from Google analytics were collected and analyzed. Costs consist of personnel, and hub development. The results revealed negligible changes in social cognitions (e.g. attitudes, intentions) over time ( $p > .05$ ). Parental support for moderate-to-vigorous physical activity increased over the three timepoints ( $p < .001$ ). There was minimal change in BYDB engagement, varying from 746 to 21,424 users per month, despite promotional activities. A total of 93,068 users visited BYDB over a 12-month period, however only 10% completed the full planning activity. We estimated a cost of \$183.50 per user to complete the hub experience. These results suggest that BYDB was neither an effective nor cost effective method for disseminating the Guidelines among parents.

147.

## **PROSTATE CANCER PATIENTS' AND CAREGIVERS' USE OF BEHAVIOUR CHANGE TECHNIQUES DURING A WEB-BASED PHYSICAL ACTIVITY AND SELF-MANAGEMENT PROGRAM**

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Prostate cancer patients and their caregivers can face physical and psychological challenges navigating the diagnosis, treatment, and survivorship stages. To address the needs of the patient-caregiver dyad, TEMPO, a web-based, dyadic, physical activity and psychosocial self-management program was created, with a primary focus on improving quality of life. Behaviour change techniques (BCTs) were implemented as a main strategy to facilitate behaviour changes. Identifying the BCTs that successfully modify behaviour and understanding how BCTs are used may be beneficial for assessing the feasibility of TEMPO and future interventions. The goal of this study was to explore which BCTs were used and the dyads' experiences using BCTs in TEMPO. Seventeen dyads enrolled in TEMPO completed three interviews throughout the program. Interviews were transcribed verbatim and analyzed using deductive and inductive thematic analyses. The deductive analysis was guided by Michie's BCT Taxonomy to identify the BCTs discussed and the inductive analysis identified common experiences using the BCTs. The dyads described learning how to use BCTs from the step-by-step descriptions and examples provided in TEMPO. The dyads commonly referred to BCTs like goal setting, self-monitoring, and reviewing goals to enhance their behaviour changes. The dyads also described the positive outcomes as a result of using BCTs to change behaviour, like increased physical activity and improved communication. The results highlight how the dyads engage with BCTs in a behaviour change intervention. These findings can help enhance the development, design, and delivery of programs by gaining a deeper understanding of how BCTs are used by participants.

# **Exercise Psychology**

## **Poster Session I**



36.

## **EXPLORING CANCER SURVIVORS' EXPERIENCES IN A GROUP-BASED WALKING PROGRAM INCORPORATING BEHAVIOUR CHANGE TECHNIQUES**

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<sup>1</sup>University of Ottawa

Background: Many cancer survivors report difficulties participating in physical activity (PA) regularly. Instructor-led, group-based PA programs can facilitate PA. Yet, behaviour change techniques (BCTs) are infrequently used during group-based programs to increase participants' knowledge and confidence to maintain PA post-program; this may partly explain the limited impact these programs have on PA post-program. We conducted a single-arm study to explore how an 8-week group-based walking program incorporating BCTs within weekly structured small group discussions can help cancer survivors develop an active lifestyle. Methods: Seven female cancer survivors (Mean=49.29±7.72 years) participated in our program and were interviewed separately after its completion. Data were thematically analyzed. Results: Participants' experiences in our program were organized into three main themes: (1) taking steps for better health, (2) being supportive but not a support group, and (3) gaining competence. Initially, the program was an additional means for participants to accumulate PA as the 'group' created a culture of accountability. However, over time, the on-going encouragement, compassion, and understanding provided by the instructor and other participants was a greater motivator to participate in PA than walking itself. Though the BCTs utilized during the small group discussions (e.g., goal setting) were familiar to most participants, the opportunity to have personal struggles validated and discuss potential solutions amongst peers while learning the BCTs facilitated a sense of competence for PA post-program. Conclusion: Our study helps illustrate the importance of providing a caring social environment and incorporating BCTs into a group-based PA program for cancer survivors.

41.

## **EVALUATION OF CHRONIC PAIN AND PHYSICAL ACTIVITY TRAINING ON PROVIDERS' PAIN KNOWLEDGE AND SELF-EFFICACY**

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**Background.** Twenty percent of Canadian adults experience chronic pain. Physical activity (PA) is an effective management strategy, yet most adults with chronic pain struggle to participate. In pilot work, we found that adults with chronic pain preferred receiving integrated information on PA and chronic pain from PA providers, including fitness instructors and personal trainers. However, PA providers do not receive integrated training (instruction on pain, PA, adherence-promoting self-regulatory skills) during certification or continuing education opportunities. This feasibility study aimed to evaluate whether a face-to-face integrated training session for PA providers increased their pain knowledge and self-efficacy to educate and instruct adults with chronic pain on being physically active. **Methods.** Forty-eight PA providers ( $Mage = 44.38 \pm 11.03$  years) attended 1 of 4, 3-hour training sessions offered in three communities. Pre- and post-training surveys assessed pain knowledge, self-efficacy, and demographics. A mixed multivariate analysis of variance compared pre- vs post-training scores by training location. **Results.** The within-subjects effect was significant ( $p < .001$ ). Follow-up univariate comparisons revealed PA providers' pain knowledge and self-efficacy significantly improved ( $p$ 's  $< .001$ ). The between-subjects effect was non-significant ( $p > .05$ ). **Conclusion.** Promising feasibility findings warrant future pilot RCT investigation to evaluate the impact of the integrated training among a larger, more representative sample of PA providers. If successful, there is potential for widespread adoption in collaboration with PA provider certification organizations.

51.

## **DO PHYSICAL ACTIVITY RECOMMENDATIONS MATTER FOR LONG-TERM MAINTENANCE?**

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One in five Canadian adults meet the national physical activity recommendation but do they maintain this goal? The purposes of this study were to (a) examine whether psychosocial factors theorized as associated with long-term exercise maintenance differ between those who do and do not meet the recommendation and (b) assess their awareness of current recommendations. The sample included 357 self-identified exercise maintainers (M age =  $32 \pm 12$  years) who maintained their activity for an average of  $6.98 \pm 3.92$  years. An online survey assessed psychosocial variables related to exercise maintenance and awareness of recommendations. Two groups were identified: participants approaching/meeting ( $n = 71$ ) or those exceeding ( $n = 286$ ) the recommendation. A MANOVA compared the groups on the psychosocial variables. The MANOVA was significant,  $p < .0001$ , partial  $\eta^2 = .116$ . Follow-up univariate comparisons revealed that exercise maintainers exceeding the recommendation reported significantly higher distal outcome expectations, satisfaction, self-regulatory efficacy, and recovery efficacy ( $p < .01$ ). Regardless of group, the majority of respondents either were unaware of the national physical activity recommendation or incorrectly identified it. Surprisingly, only 56 of 357 individuals correctly identified it. Although theorized social cognitions were strongest for maintainers meeting the recommendation all maintainers expressed high values possibly because maintenance has continued for years. Meeting personal expectations, being satisfied with these, and being efficacious about self-regulating activity appear more strongly related to maintenance than national physical activity recommendations. Messaging to encourage maintenance may need to emphasize salient psychosocial content versus national goals.

53.

## **KNOWLEDGE OF PHYSICAL ACTIVITY GUIDELINES FOR THE PREVENTION OF CANCER: POTENTIAL IMPLICATIONS FOR PHYSICAL ACTIVITY PROMOTION**

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<sup>3</sup>University of Moncton

<sup>4</sup>Nipissing University

**Background:** Although regular physical activity (PA) can reduce the risk of developing cancer, only one third of adults meet PA guidelines of 150 minutes per week of moderate-to-vigorous intensity PA (MVPA). Knowledge of PA guidelines for the prevention of cancer may provide an important pre-cursor to PA behaviour change. **Objectives:** We investigated the extent to which adults living in North America are aware of PA guidelines for the prevention of cancer, and whether knowledge of PA guidelines is associated with self-reported MVPA behaviour.

**Methods:** Socio-demographic characteristics, knowledge of PA guidelines for the prevention of cancer, and MVPA behaviour were self-reported by 654 adults (Mage=36.9±14.6 years; 79.1% female) who lived within Canada and the United States in an online survey. Data were analyzed descriptively and using multinomial unadjusted and adjusted logistic regression modeling.

**Results:** Results showed that 49.2% of the sample was aware of PA guidelines for the prevention of cancer. Also, they showed that greater knowledge of PA guidelines was associated with a greater likelihood of being active (unadjusted OR: 1.66, 95% CI: 1.18-2.34; p<.01; adjusted OR: 2.05, 95% CI: 1.36-3.11; p<.01). **Conclusion:** There is a lack of awareness about the levels of MVPA needed to help prevent cancer. This study gives an indication that those who demonstrate lesser knowledge are also less likely to meet MVPA guidelines. A better understanding of the characteristics of those who are unaware of the guidelines may help in the design of targeted interventions aimed at promoting MVPA to reduce the growing burden of cancer.

67.

## **SELF-REGULATORY EFFICACY TO OVERCOME CHRONIC PAIN AND RELATED BARRIERS: A POTENTIAL MEDIATOR OF THE PSYCHOLOGICAL FLEXIBILITY-PHYSICAL ACTIVITY RELATIONSHIP**

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Physical activity is considered beneficial and recommended for adults living with chronic pain. More information is needed to identify modifiable factors that affect their rates of physical activity. Two complementary, modifiable, adaptive responses to chronic pain that are related to levels of physical activity are psychological flexibility and self-regulatory efficacy (i.e., confidence) to overcome pain and related barriers to physical activity (SRE-pain). We wondered whether SRE-pain could be a potential mediator between psychological flexibility and physical activity. Thus, we prospectively examined whether SRE-pain mediated the psychological flexibility – physical activity relationship among adults living with chronic pain (i.e., pain for > 6+ months). Participants (N = 193) completed online surveys at baseline, two weeks and four weeks (Time 1 through 3 respectively). Baron and Kenny's (1986) regression steps for testing mediation were conducted. The final hierarchical multiple regression revealed that the relationship between Time 1 psychological flexibility and Time 3 physical activity was reduced after controlling for Time 2 SRE-pain,  $F(2, 191) = 17.40$ ,  $p < .001$ , accounting for 14% of the variance in Time 3 physical activity. A follow-up Sobel test confirmed that the reduction in that relation was statistically significant (Sobel  $z = 4.65$ ,  $p < .001$ ). Findings illustrated that SRE-pain could partially mediate the prospective relationship between psychological flexibility and later physical activity. The identification of a possible modifiable mechanism (mediator) that might allow adults living with chronic pain to be more flexible in their attempts to be active suggests future research should test this causal idea.

68.

## **PSYCHOSOCIAL DETERMINANTS OF EXERCISE IN INDIVIDUALS POST CARDIAC REHABILITATION: APPLYING THE COM-B AND TDF MODELS**

Natasha Kaushik<sup>1</sup>, Emilie Michalovic<sup>1</sup>, Shane N Sweet<sup>1</sup>

<sup>1</sup>McGill University

Little research has been conducted on the theoretical mechanisms of exercise post cardiac rehabilitation (CR). The Theoretical Domains Framework (TDF), as embedded within the Capability, Opportunity, Motivation, and Behaviour model (COM-B), can provide a theoretical understanding of exercise post-CR. This study aimed at identifying TDF-related psychosocial and environmental variables that were important for predicting moderate to vigorous physical activity (MVPA) in individuals post-CR. Eighty-four individuals (80% men; Mage=60 years, SD=15.83) who completed a CR program answered baseline questionnaires assessing ten TDF domains. Participants wore an accelerometer for 7 days three months after baseline assessments, from total minutes of were computed. Six multiple regressions were conducted to predict MVPA at three months. TDF domains for each COM-B sub-component (e.g., psychological capability) were tested in five separate regressions. A final regression included significant variables from the five regressions to determine the strongest TDF predictor. Decisional balance ( $\beta = .28$ ) as part of Capability, streets, walking/cycling, and neighbourhood surroundings ( $\beta = .20$ ) for the Opportunity component, negative affect ( $\beta = -.09$ ) and identity ( $\beta = -.14$ ) within Motivation were significant predictors of MVPA in separate regression models. The final regression explained 26% of the variance in MVPA at three months and intention was the sole significant predictor ( $\beta = .33$ ,  $p < 0.05$ ). Thus, it is important to promote participants' intentions to continue exercise post-CR to help sustained physical activity participation.

74.

## THE ROLE OF PHYSICAL LITERACY FOR MENTAL HEALTH

Denver Brown<sup>1</sup>, Dean Dudley<sup>2</sup>, Dean Kriellaars<sup>3</sup>, John Cairney<sup>1</sup>

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<sup>2</sup>Macquarie University

<sup>3</sup>University of Manitoba

Physical literacy (PL) has received increasing attention as a potential gateway to lifelong physical activity (PA) participation. Given the well-established health benefits associated with regular PA engagement, PL may be a critical determinant of health via its impact on PA. Only recently has a conceptual framework based on existing evidence that links PL to various health outcomes been put forth (Cairney et al., 2019). The purpose of this study was to examine whether PL influences mental health indirectly through PA. Data were derived from Wave 8 of the Physical Health and Activity Study Team longitudinal project. Children ages 12 to 14 (N = 874; 467 boys) completed measures to assess physical literacy (motor competence, perceived competence, motivation, enjoyment), PA and psychological distress. Structural equation modeling revealed a good fit for the data,  $\chi^2/df = 5.59$ ; CFI = .964; SRMR = .028; RMSEA = .072. Despite evidence of a significant negative bivariate correlation between PA and psychological distress ( $r = -.12$ ,  $p < .001$ ), findings revealed competitive mediation in which the dominance of the direct path (Effect =  $-.37$ ,  $p < .001$ ) resulted in an unexpectedly positive indirect effect (Effect =  $.07$ ,  $p = .01$ ). Although PL did not indirectly affect psychological distress through PA, Cairney et al.'s framework was partially supported as evidenced by PA acting as a suppressor variable that increased the magnitude of the buffering effect PL confers for psychological distress. Moving forward, public health should consider positioning PL as a foundational component within mental health promotion strategies.

99.

## **EXPLORING EXERCISE IN RECOVERY FROM SUBSTANCE USE DISORDER: A QUALITATIVE STUDY**

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**Background:** Many individuals in Canada struggle with substance use disorder (SUD) and over a quarter of these individuals are struggling with additional mental health disorders (i.e., polysubstance use disorder, or psychiatric comorbidity). There is a need for non-invasive, inexpensive and scalable interventions to assist in recovery. A possible adjunct intervention that warrants exploration is exercise. However, little is known about the acceptability of exercise in residential SUD treatment facilities. **Methods:** Semi-structured interviews were conducted with in-patients (n=15). The interviews were based on the Theoretical Domains Framework and included questions regarding physical activity knowledge, exercise preferences, and barriers/facilitators to exercise participation. A thematic analysis was conducted. **Results:** Four main themes were identified. First, there was a lack of knowledge regarding the recommended amounts of physical activity. Further, the participants lacked confidence in doing more difficult modalities of exercise (e.g., proper weight lifting form). Second, many environmental resources (e.g., cost, equipment and full schedule) were considered barriers to exercise participation both inside and outside the treatment facility. Third, technology (e.g., activity trackers/mobile phone applications) and social accountability were considered key to continued exercise participation. Finally, emotional and mood regulation seems to play an essential role as a facilitator for exercise (e.g., craving reduction, the alleviation of depression, the release of uncomfortable feelings). However, feeling anxious before exercise and self-conscious during exercise emerged as prominent barriers. **Implications:** The results from this work may inform future interventions in residential treatment facilities for SUD.



103.

## **EXPLORING HEALTH BELIEFS AS PREDICTORS OF MODERATE-TO-VIGOROUS INTENSITY PHYSICAL ACTIVITY BEHAVIOUR IN CANCER SURVIVORS**

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**Background:** Regular participation in physical activity (PA) may help mitigate adverse side effects and symptoms associated with cancer treatments. It is recommended that cancer survivors engage in 150 minutes of moderate-to-vigorous intensity physical activity (MVPA) each week, but most do not follow these recommendations. Identifying theory-based factors associated with MVPA is important to understand how to promote PA engagement in this population. We examined whether Health Belief Model (HBM) constructs (i.e., perceived susceptibility of cancer, perceived severity of cancer, perceived benefits of PA for reducing cancer risk, perceived barriers to PA, PA barrier self-efficacy) were associated with self-reported MVPA behaviour in cancer survivors. **Methods:** 98 adult cancer survivors (Mean age=48.9±15.2 years; 80.6% female) completed an online survey assessing sociodemographics, medical characteristics, MVPA behaviour, and HBM constructs. Data were analyzed using hierarchical linear regression analysis. **Results:** After adjusting for age, sex, body mass index, and time since cancer diagnosis, HBM constructs accounted for 31.5% of the variance in MVPA behaviour. Only perceived benefits of PA ( $B=7.96$ ,  $SE=2.66$ , 95% confidence interval (CI): 2.75-13.18,  $p=.003$ ) and PA barrier self-efficacy ( $B=0.44$ ,  $SE=0.09$ , 95% CI: 0.26-0.63,  $p<.001$ ) were significantly associated with MVPA behaviour. **Discussion:** Results suggest that perceived susceptibility and severity of cancer may not serve as cues to action for MVPA engagement in cancer survivors. Rather, they suggest that efforts aimed at highlighting the benefits of MVPA for the prevention of cancer recurrence and strengthening cancer survivors' self-efficacy to overcome PA barriers may be important targets for the promotion of MVPA engagement in this population.

112.

## **SOME PEOPLE CARE WHAT YOU THINK: NORMATIVE BELIEFS AND PHYSICAL ACTIVITY INTENTIONS IN THE PRESENCE OF HIGH AND LOW INTRINSIC REGULATION**

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The Theory of Planned Behaviour proposes that attitudes, subjective norms, and perceived behavioural control predict physical activity (PA) intentions and subsequently behaviour (Ajzen, 1991). Recently, the complexity of the subjective norm-intentions relationship was highlighted by Kim et al. (2019), who found the relationship between normative beliefs (i.e., perceptions of normative pressure) and PA intentions to be stronger for individuals with higher motivation to comply with those normative beliefs. However, individuals with lower motivation to comply still had moderate levels of PA intentions regardless of their level of normative beliefs. Interpreting this finding, a possible buffer against normative beliefs is the degree to which individuals' PA behaviours are already intrinsically regulated. The current study examined differences in the relationship between normative beliefs and PA intentions, as moderated by motivation to comply, for individuals with low vs. high intrinsic regulation. Analysis of data gathered from 204 undergraduate students (173 females, 30 males, 1 non-binary) at two time points revealed that for individuals with high intrinsic regulation, normative beliefs positively predicted PA intentions ( $b = .29$ ,  $p = .006$ ). However, for individuals with low intrinsic regulation, there was a significant interaction between normative beliefs and motivation to comply with respect to predicting intentions ( $b = .16$ ,  $p = .026$ ). Specifically, normative beliefs negatively predicted intentions for PA ( $b = -.49$ ,  $p = .008$ ) when individuals had lower motivation to comply. These findings indicate that individuals' existing levels of intrinsic regulation should be considered when attempting to exert social influence on PA behaviours.

116.

## **ENJOYMENT RATHER THAN AFFECT IS RELATED TO ADOLESCENTS' WILLINGNESS TO PERFORM HIIT AS AN ADJUNCT TO MENTAL HEALTH TREATMENT**

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There is growing support for the implementation of physical activity in the treatment of individuals with serious mental illness. The purpose of this study was to investigate whether affective response or enjoyment were related to adolescents' willingness to perform high-intensity interval training (HIIT) as an adjunct to mental health treatment. These secondary analyses examined data from 28 adolescent psychiatric inpatients who performed a single session of HIIT. Patients completed the Positive and Negative Affect Schedule (PANAS) before and after the exercise session. Following exercise, patients were asked to provide ratings from 1-10 for their enjoyment of HIIT and willingness to perform HIIT before therapy. Linear regression analyses were used to examine the association between enjoyment/affect responses to HIIT and willingness to perform HIIT before therapy, controlling for age and sex. Enjoyment of HIIT significantly explained willingness to perform HIIT when adjusting for age and sex,  $F(7,18)=2.6$ ,  $p=.05$ ,  $\eta^2=.50$  (adjusted  $R^2=.28$ ). Neither changes in positive ( $r=.09$ ,  $p=.66$ ) or negative affect ( $r=.28$ ,  $p=.15$ ) were related to patients' willingness to perform HIIT. Due to a bimodal distribution for participants' enjoyment of HIIT, correlation analyses examined the relationship between enjoyment and willingness to perform HIIT separately for low ( $\leq 5$ ,  $n=12$ ) and high-enjoyers ( $>5$ ,  $n=16$ ). There was a significant correlation between enjoyment and willingness to perform HIIT for low-enjoyers ( $r=.57$ ,  $p=.05$ ), however, this relationship was not observed for high-enjoyers ( $r=.03$ ,  $p=.91$ ). These findings suggest that exercise enjoyment may be an important factor for long-term engagement in HIIT as an adjunct for mental treatment.

120.

## **POLITICAL ORIENTATION AND PUBLIC ATTRIBUTIONS FOR THE CAUSES AND SOLUTIONS OF PHYSICAL INACTIVITY IN CANADA: IMPLICATIONS FOR POLICY SUPPORT**

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**Objectives:** To examine how public attributions for the causes and solutions of physical inactivity and individuals' self-identified political orientation are associated with support for different policy actions in addressing physical inactivity. **Methods:** A secondary data analysis was conducted with a sample of 2,044 Canadian adults. Two sets of 2 X 3 analyses of variance were conducted to assess (1) the mean differences by the causal attributions for physical inactivity and political orientation, and (2) responsibility for solutions and political orientation on support for least, moderate, and most intrusive policy actions. **Results:** No interaction effects existed between causal attribution and political orientation on policy support, but the main effect of causal attributions and political orientation was significant. Those who held internal causal attributions showed less support for policies compared to those who held external or both internal and external causal attributions. Conservative individuals reported the least support for all policy actions in comparison to liberals or centrists. There were interaction effects between responsibility for solutions and political orientation on policy support. Conservatives who perceived the responsibility for solving physical inactivity as a private matter had less support for all three policies. **Conclusions:** Public acceptance of policy actions addressing physical inactivity varies by the attributions the public have regarding causes and responsibility for solving the problem, and by political orientation. Advocacy and messaging for policy implementation in the physical activity arena need to be communicated in ways that encourage reflective and informed deliberation that is representative of the Canadian population.

163.

## THE PROMISE OF YOGA – IS THE HYPE JUSTIFIED?

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**INTRODUCTION:** Ross and Thomas (2010, p. 3) found in their meta-analysis that “yoga interventions appeared to be equal or superior to exercise in nearly every outcome measured except those involving physical fitness”. Therefore, it seems that the often-recorded more positive effects of yoga on stress (compared to exercise in general) may not be due to changes in physical fitness but are more likely to affect psychological resources in a way that physical exercise alone cannot. **METHOD:** This study examines the effects of a four-week yoga-intervention compared to a group-fitness-intervention on cognitive functions (LPS-2), mental (PSS-10; PANAS), and physical well-being (PSI) in young adults. Participants were randomly assigned to the yoga- (n = 16, n male/female= 4/12, Mage=26.25, SD=4.01) and the control-group (n = 15, n male/female= 3/12, Mage=21.67, SD=2.26). ANOVAs with group and between-subject-factor and age and sex as covariates were conducted. **RESULT:** Sex and age showed no significant effect on any of the measures. Both groups improved over time only in cognitive speed ( $F(1,27)=3.13$ ,  $p=.036$   $\eta^2=.153$ ). Significant group-time interaction effects were observable for perceived stress levels whereas the fitness group reported a greater reduction in stress levels ( $F(1,27)=4.39$ ,  $p<.05$ ,  $\eta^2=.14$ ). Likewise tendencies for interaction effects were observed for positive affect ( $F(1,27)=3.13$ ,  $p=.088$   $\eta^2=.109$ ) and physical self ( $F(1,27)=3.13$ ,  $p=.069$ ,  $\eta^2=.117$ ). **DISCUSSION:** The results are contractional to Ross et al. (2010). This might be due to differences in the design of the reviewed studies. Hence studies on adequate intervention-periods, sensitivity for yoga-interventions in different age-groups, and output-effects of different yoga types are needed.

160.

## **EXAMINING SERIAL MEDIATION OF PAST PHYSICAL ACTIVITY AND SELF-EFFICACY IN A THEORY-BASED PHYSICAL ACTIVITY INTERVENTION**

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<sup>1</sup>University of British Columbia (Okanagan)

Interventions provide a practical context to test core theoretical tenants. Small Steps for Big Changes was a randomized trial designed to modify self-efficacy beliefs to increase free-living physical activity for one year in adults at risk of developing type 2 diabetes. While many studies have examined psychosocial mediators influencing physical activity, few studies have examined serial mediation. The purpose of this study was to examine the serial mediating effects of 6-month physical activity with 12-month self-efficacy (self-regulatory efficacy or task self-efficacy) on participants' 12-month physical activity levels. Hayes' PROCESS macro was used to run a serial mediation analysis to estimate indirect and direct effects. Adults (N=99) who were overweight and had low physical activity levels (mean age=50.9 years, 69.7% female, mean BMI=31.4 kg/cm<sup>2</sup>) were randomized to receiving either high-intensity interval training (n=47; HIIT) or moderate-intensity continuous training (n=52; MICT). All participants received the same brief behavioural counselling to enhance their self-efficacy. Self-regulatory efficacy and 6-month physical activity levels were found to individually and sequentially mediate the intervention effects (total indirect effect: [29.80, 13.61-49.07]). Self-regulatory efficacy was found to be a causal mechanism in predicting greater physical activity adherence for those in the MICT compared to the HIIT. Task self-efficacy did not mediate intervention effects. Analytic methods used in this study present an innovative method for theory-testing. In line with the social cognitive theory, past physical activity in series with self-regulatory efficacy, was an important mechanism in predicting physical activity one year following a diabetes prevention program.

168.

## **WHO DO THEY THINK THEY ARE? A QUANTITATIVE CONTENT ANALYSIS OF EXERCISE BLOGGERS AND THEIR BLOGS**

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<sup>1</sup>University of Alberta

Social media, including blogs, are popular conduits of exercise information that may influence the reader's thoughts and behaviours. It is unknown however, how bloggers represent themselves online, if they are qualified to give exercise advice, and what types of information they most commonly share on their blogs. This may cause confusion for readers and has the potential to contribute to misinformation, or unhealthy behaviours (e.g., exercise addiction). The current study used quantitative content analysis to examine the features of 194 popular fitness and exercise blogs, with a focus on blog authors. Additionally, 722 content pages from the blogs were analyzed for content type, post format, and interactive features. Results suggest that only 16.4% of bloggers report having fitness/exercise certifications although 57% report being a fitness/exercise professional. In addition to fitness/exercise, blog posts included content about related topics such as nutrition, and unrelated topics like fashion and politics. Blogs were highly interactive with 76.3% including comments sections. Most blogs included multimodality for content sharing with Facebook (90.7%), Twitter (86.1%), and Instagram (68.0%) most predominant. Blogs may provide an online space for like-minded exercisers to connect, foster a community of support, and learn more about various exercise modalities and facilities. Yet given the ambiguity of authorship, consumers may be left unaware if fitness and exercise bloggers are exercise experts, and whether or not blog content is a reliable source of exercise information.

169.

## **PHYSICAL ACTIVITY PARTICIPATION AND MENTAL HEALTH PROFILES IN CANADIAN MEDICAL STUDENTS: LATENT PROFILE ANALYSIS USING CONTINUOUS LATENT PROFILE INDICATORS**

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Previous research on medical students' 'mental health' typically focuses on mental illness with minimal focus on positive mental health indicators, such as well-being and resilience. One malleable predictor of mental health is physical activity (Ravindran et al., 2016); though research on the relationship between different intensities of physical activity and mental health is inconsistent and none have included medical students. The primary purpose of this study was to examine relationships between physical activity, including mild and moderate-to-vigorous physical activity (MVPA), and mental health profiles in a sample of Canadian medical students. A total of N = 125 medical students completed an online survey. Latent profile analysis was performed in Mplus to identify distinct profiles using four continuous latent profile indicators (emotional well-being, social well-being, psychological well-being and resilience). The AUXILIARY function was used to test for differences in physical activity intensities between profiles. Three mental health profiles emerged, showing low (n = 18), moderate (n = 72) and high (n = 36) mental health. The classification quality was good (entropy = 0.81). Individuals in the high mental health profile participated in more mild physical activity (M = 144.28 mins/week; SD = 22.12) and less MVPA (M = 195.86 mins/week; SD = 25.67) compared to students in the moderate and low profiles, though not significantly. This suggests that mild physical activity might be the most effective intensity in supporting mental health among medical students.



211.

## **DETERMINING THE IMPACT OF AN EDUCATIONAL INTERVENTION ON FAMILY MEDICINE RESIDENTS' SOCIAL COGNITIONS AND BEHAVIOUR FOR DISCUSSING PHYSICAL ACTIVITY**

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Primary care providers are recognized as important advocates for physical activity (PA); yet, clinical PA discussions remain infrequent. Educational approaches promoting the uptake of strategies that are proven to increase patient PA levels are effective for improving primary care providers' social cognitions and behaviour for discussing PA with patients. However, research on the effectiveness of such educational interventions among family medicine residents is limited. Utilizing the Theory of Planned Behaviour (TPB), an interactive, educational intervention was developed to increase PA discussion between first year family medicine residents and their patients. This study aimed to determine the impact of the intervention on residents' social cognitions and behaviour for discussing PA with patients. The intervention condition was comprised of 15 2017/2018 residents who received: (1) the full intervention, and (2) completed both the pre- and post- intervention TPB questionnaires assessing changes in PA discussion social cognitions, and (3) had their medical charts reviewed for PA discussion behaviour. The non-intervention condition was comprised of 15 2016/2017 residents who were randomly selected to have their medical charts reviewed for PA discussion behaviour. While no significant differences in social cognitions or behaviour were observed pre- vs. post-intervention, intervention condition residents' perceptions of feeling adequately trained to discuss PA improved post-intervention ( $p = 0.005$ ). A significant difference in post-behaviour was observed between conditions ( $p = 0.011$ ), where PA was discussed at more patient visits within the intervention condition. Findings suggest that theory-based, educational interventions are sufficient to prevent declines in resident PA counselling behaviour.

223.

## **EXERCISING FOR APPEARANCE VERSUS HEALTH REASONS: ASSOCIATIONS WITH LATENT CLASSES OF MENTAL HEALTH**

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Individuals who are motivated to exercise for appearance versus health reasons are likelier to report worse body image and disordered eating. It is also possible that mental health may be negatively impacted more broadly when exercising to manage appearance. The present investigation examined how appearance and health motives for exercise are associated with indices of mental health and well-being. A community-based sample of adults (N = 520; 57.5% male; Mage = 35.43, SDage = 10.01) completed an online survey and self-reported the extent to which they exercise for appearance and health motives, and a range of mental health constructs (i.e., depressive symptoms, anxiety symptoms, psychological distress, self-compassion, flourishing, life satisfaction). Latent class analysis was used to identify distinct patterns of mental health, and appearance and health motives were used to predict class membership after controlling for age, gender, body mass index, and physical activity. A three-class model of mental health indicators provided the best fit to the data and consisted of a well-being (42%), psychopathology (24%) and a mixed group (34%). Exercising for appearance motives predicted membership in the psychopathology class (OR = 1.20) and mixed classes (OR = 1.14), while exercising for health motives was associated with decreased odds of belonging to either the psychopathology (OR = 0.77) or mixed class (OR = 0.90), relative to the well-being class. Collectively, these findings extend research that has focused on body image and disordered eating, and suggest that exercising for appearance reasons may undermine mental health and well-being more broadly.

258.

## **DOES PLANNING MORE BITE-SIZED EXERCISE SESSIONS LEAD TO MORE BITES OF BROWNIE? AN EXPERIMENTAL TEST OF SELF-CONTROL PERFORMANCE**

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<sup>1</sup>University of British Columbia (Okanagan)

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Complex behaviours like physical activity (PA) require considerable cognitive resources, such as planning and deliberation. In line with the strength model of self-control, the cognitive resources needed to engage in planning may also contribute to subsequent failures in self-control. National PA guidelines have suggested that aerobic activity could be broken up into multiple 10-minute bouts accumulated throughout the day as opposed to performing one 30-minute bout. Does the task of planning multiple bouts exert more cognitive resources than planning one longer single bout? This acute study compared the effects of planning three, 10-minute bouts of PA (Multiple Plan [MP]) compared to planning one, 30-minute bout of PA (Single Plan [SP]), on subsequent tasks requiring self-control. Sixty-five low-active university students were randomly assigned to two experimental conditions: SP (planned one 30-minute exercise bout) or MP (planned three 10-minute exercise bouts). Participants then completed the cold pressor task and were given the opportunity to eat a self-selected amount of brownies. Contrary to hypotheses, there were no statistically significant between-group differences in the duration of the cold pressor task between (MSP = 107.97 vs. MMP = 126.56,  $p = .29$ ) or the amount of the brownies eaten between (MSP = 33.90 vs. MMP = 40.69,  $p = .37$ ). Our study is the first to examine the potential negative effects of planning multiple versus single bouts of PA on self-control performance. Future experimental research is needed to elucidate whether planning expends enough self-regulatory resources to reduce performance on subsequent tasks requiring self-control.

260.

## **EXAMINING THE ROLE OF PHYSICAL ACTIVITY BETWEEN GRIT AND SELF-CONCEPT IN CHILDREN AND ADOLESCENTS**

Maeghan E. James<sup>1</sup>, Jeffrey D. Graham<sup>2</sup>, Karina De Lisa<sup>1</sup>, Emily Bremer<sup>1</sup>, John Cairney<sup>1</sup>

<sup>1</sup>University of Toronto

<sup>2</sup>McMaster University

**Background:** Self-concept, which refers to one's beliefs towards their personal worth and capabilities, is a predictor of mental health and well-being. Research suggests that, independently, higher perceptions of grit, and regular engagement in physical activity (PA) can lead to positive perceptions of self. While research has examined these direct relationships, how all three variables work together in predicting self-concept in children and adolescents remains limited. The purpose of this study was to investigate whether PA plays a mediating and/or moderating role on the relationship between grit and self-concept. **Methods:** Participants (N = 362, 186 girls, Mage = 11.70 ± 1.30) in the current study were part of a larger study examining the impact of a daily classroom PA program on aspects of psychosocial well-being. Baseline data is presented here. Grit, PA, and self-concept (i.e., self-esteem and mastery) were measured using validated questionnaires. Mediating/moderating effects of PA on the relationship between grit and self-concept were examined using the PROCESS macro in SPSS v24. **Results:** Results showed that PA moderated the relationship between grit and self-esteem (b[SE] = 0.22[0.09], p = .01), but not between grit and mastery (p > .05). PA did not mediate the relationship between grit and self-esteem (effect = 0.03, 95%CI: -0.02-0.08) or mastery (effect = 0.01, 95%CI: -0.01-0.03). **Conclusion:** This study highlights the important role of PA in the relationship between grit and enhanced self-esteem. The results suggest that both grit and PA could be areas of intervention to improve self-concept in children and adolescents.

# **Exercise Psychology**

## **Poster Session II**

2.

## **UNIVERSITY STUDENTS' KNOWLEDGE, SELF-EFFICACY, OUTCOME EXPECTATIONS, BARRIERS AND IDEAS RELATED TO REDUCING SEDENTARY BEHAVIOUR: A QUALITATIVE STUDY**

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<sup>4</sup>College of Nursing, Rady Faculty of Health Sciences

High levels of sedentary behaviour are associated with detrimental health outcomes. University students are a subpopulation at high risk of excessive sedentary behaviour. Research examining university students' perceptions related sedentary behaviour is limited. Accordingly, we conducted a qualitative study that sought to extend our understanding of Canadian university students' knowledge and perceptions related to sedentary behaviour, including their understanding of the concept and health risks, self-efficacy, outcome expectations, barriers, and intervention ideas related to reducing sedentary behaviour. Four focus groups were conducted with 19 undergraduate and graduate students (female=13; mean age=24.6 ± 7.10 years) from a large Canadian university. Discussions were audio recorded, transcribed verbatim, and coded to identify categories and themes using commonly practiced methods used in qualitative analysis. Findings revealed that some students did not fully understand the concept of sedentary behaviour, but that most were aware of health risks associated with sedentary behaviour. Most students were confident they could reduce their sedentary behaviour, but expressed how it would be unlikely they would actually do so because they believed that: (a) sitting less is not an important priority, (b) health consequences of excessive sitting are distal, (c) increasing standing and light-intensity activity would not provide meaningful health benefits, and (d) class schedules/norms/infrastructure encourage sitting and are not under their control to change. Although more research in this area is needed, the findings from this study may help inform interventions to decrease excessive sedentary behaviour among university students.

34.

## **UNIVERSITY STUDENT PERCEPTIONS OF USING ALTERNATIVE WORKSTATIONS WHILE STUDYING**

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<sup>1</sup>Western University

Students almost exclusively sit while studying, which translates to large amounts of forced sedentary behaviour and this in turn may have negative health consequences. The perceptions university students have of using alternative postures while studying remains unknown. This study investigated the quantitative and qualitative perceptions of university students in using alternative workstations (standing, sit-stand, and dynamic sitting) while studying. University students (N=1005) completed a mixed-method online survey assessing their perceptions of using alternative workstations while studying. A large portion of students believed standing, sit-stand, dynamic sitting options should be available for students while studying. A majority of the students also stated that they would use these options if they were available for studying. Qualitative themes included overall perception (supportive, undecided, and opposed), personal factors (performance and health/ injury) that acted as facilitators and barriers, and environmental factors (depends on the day, depends on the location/ availability, depends on the social norm, depends on the time/ task). These factors must be considered when designing interventions to reduce sedentary behaviour or when implementing alternative workstations. Hence, at this early stage of inquiry there is no evidence to recommend against providing dynamic sitting, sit-stand and standing options in university libraries.

63.

## **WHY I CHOOSE TO GET OFF MY BUTT: OLDER ADULTS MOTIVES TO REDUCE SEDENTARY TIME FROM A SELF-DETERMINATION THEORY PERSPECTIVES**

Liam Collins<sup>1</sup>, J. Paige Pope<sup>1</sup>

<sup>1</sup>Department of Kinesiology and Physical Education, University of Lethbridge

Recent literature has demonstrated that engagement in prolonged sedentary bouts may be linked to detrimental physiological and psychological outcomes. Older adults, on average, spend more time sedentary relative to other age groups. While several studies have identified motives endorsed by older adults to reduce sedentary behaviour, few have been guided by a theoretical framework. The purpose of this study was to garner a comprehensive understanding of older adults' motives and the strategies they employ to reduce their sedentary time from a self-determination theory perspective (SDT). Utilizing a semi-structured interview guide, a sample of community-dwelling older adults (n = 27) participated in one of seven focus groups in which they were asked about their beliefs, motives, and strategies towards reducing sedentary time. Focus groups were transcribed verbatim and analyzed using a thematic approach. Results revealed that older adults were motivated to reduce the amount of time that they engaged in sedentary behaviours for a wide range of reasons, encompassing the full extent of the SDT continuum. Additionally, the results demonstrated that there is considerable variability in the strategies that older adults perceived as effective in motivating them to reduce their sedentary time. The study results rendered a list of items to be further tested in the development of an instrument to assess the motives of older adults towards sedentary time reduction while also identifying potential strategies that could be implemented to assist older adults in facilitating optimal motives for reducing their sedentary time.



73.

## **EFFECTS OF SEDENTARY BEHAVIOUR ON INTERNALIZING PROBLEMS IN CHILDREN WITH AND WITHOUT MOTOR COORDINATION PROBLEMS**

Rheanna Bulten<sup>1</sup>, Denver Brown<sup>1</sup>, John Cairney<sup>1</sup>

<sup>1</sup>University of Toronto

Children with motor coordination problems are at increased risk of both sedentary behaviour and internalizing problems relative to their typically developing (TD) peers. The purpose of this study was to examine the moderating role of sedentary behaviour on the relationship between motor skill proficiency and anxiety/depression scores in children at risk for Developmental Coordination Disorder (DCDr) and a sample of typically developing (TD) children. Data for the present study were derived from the Coordination and Activity Tracking in CHildren (CATCH) cohort study. 507 children aged 4-5 years (219 girls, 288 boys, mean age: 59.3 months) were classified as TD (>16th percentile), or DCDr (?16th percentile) based on Movement Assessment Battery for Children 2nd edition scores. Sedentary and physical activity behaviour was measured using an Actigraph GT3X+ activity monitor device. Parent-reported Child Behaviour Checklist (CBCL) scores were used to assess internalizing problems (i.e. anxiety/depression). Multiple linear regression (moderation) analysis showed sedentary behaviour significantly moderated the relationship between motor skill proficiency and anxiety/depression scores after adjusting for sex and physical activity behaviour,  $R^2$  change = .01,  $F(1,501) = 4.13$ ,  $p = .043$ . Johnson-Neyman technique revealed DCDr children begin to report significantly higher anxiety/depression scores when their sedentary behaviour is at least one minute per day above the group mean ( $M = 452$  mins/day). Above average levels of sedentary behaviour exacerbate internalized problems among DCDr children. Interventions should focus on incorporating strategies to reduce sedentary behaviour in order to buffer anxiety/depressive symptoms for children with poor motor skill proficiency.

85.

## **STANDUP UBC: IMPACT OF A LOW-COST STANDING DESK ON OCCUPATIONAL FATIGUE AND WORK ENGAGEMENT**

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**Purpose:** The StandUP UBC trial demonstrated that low-cost standing desk converters reduced sitting by 42 mins/day after 3 months. This secondary analysis aimed to assess the impact of providing these low-cost standing desks on occupational fatigue and work engagement. **Methods:** Forty-eight office-based workers were recruited for a registered RCT with a waitlist control. The treatment group received a cardboard, low-cost standing desk converter, and recommendations for use. Primary outcomes were objectively measured occupational sitting and prolonged sitting bouts. Secondary outcomes reported in this study were occupational fatigue (Need for Recovery measure) and work engagement (Utrecht Work Engagement Scale-9), which were collected via online surveys at baseline, 3- and 6-months. rANOVAs compared differences in outcomes from baseline to 6-months. ITT analyses are reported. **Results/conclusions:** No significant group X time interactions were observed for occupational fatigue ( $F(1.65,45)=.60$ , partial  $\eta^2=.01$ ) or total work engagement ( $F(2,45)=.18$ , partial  $\eta^2=.004$ ;  $p's>.05$ ). There were also no group X time interactions in the work engagement subscales (vigour, dedication, absorption), or in the complete case analyses. Although reductions in sitting time were comparable to findings from studies using costlier alternatives, there were no changes in work-related measures of work engagement and occupational fatigue. These results are consistent with previous literature and suggest that reductions in daily workplace sitting are not associated with improvements in work-related outcomes. One interpretation is that reduced sitting does not increase fatigue or reduce engagement among employees. Therefore, standing desk converter interventions are potentially scalable without harming outcomes of particular relevance for employers or employees.

86.

## **PHYSICAL ACTIVITY PROMOTION TO PEOPLE WITH SPINAL CORD INJURY BY HEALTH AND EXERCISE PROFESSIONALS: A SCOPING REVIEW**

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<sup>1</sup>Queen's University

<sup>2</sup>Leeds Beckett University

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Health and exercise professionals (HEPs) are ideal promoters and valued messengers of physical activity (PA) information among people with spinal cord injury (SCI). However, little is known about what strategies HEPs should use to increase PA behaviour of, or what facilitators or barriers HEPs face when promoting PA to, people with SCI. The purposes of this scoping review were to 1) ascertain the extent, range and nature of the literature, 2) identify the strategies targeted and/or strategies used by HEPs that are associated with an increase in PA behaviour for people with SCI, 3) identify the facilitators and barriers to PA promotion by the HEPs, and 4) identify what study authors' suggestions for future research and practice. In line with scoping review methodology, a comprehensive search of key databases was undertaken following an established guideline. Within the 19 included articles, HEPs predominantly consisted of physiotherapists, occupational therapists, and leisure trainers/therapists. Most interventions were delivered by HEPs to people with SCI in in-patient rehabilitation centres and community-based settings. Tailored exercise programs and on-going counselling support were considered essential for increasing PA motivation, self-efficacy, and behaviour. HEPs' common barriers to PA promotion were perceived lack of time, education, and training. A need to improve and sustain SCI-specific PA knowledge and education was identified if PA promotion is to become a structured and integral component of practice. This study provides valuable information for the design of interventions to increase PA behaviour among people with SCI by improving PA promotion by HEPs.

91.

## **EXPLORING OUTCOME SATISFACTION IN PHYSICAL ACTIVITY MAINTENANCE AFTER CARDIAC REHABILITATION**

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**Background:** Adults who undergo cardiac rehabilitation have difficulty maintaining physical activity post-program. Little is known about the psychological factors that predict physical activity maintenance. Rothman (2000) proposes that outcome satisfaction is an important variable for maintenance. The purpose of this study is to explore whether outcomes satisfaction variables predict physical activity maintenance after cardiac rehabilitation. **Methods:** Adults having completed a 4-month cardiac rehabilitation program (N=90) responded to questionnaires at the end of the program, 2-months post-program and 8-months post-program. For outcome satisfaction, they reported (1) general satisfaction regarding physical activity, (2) perceived change on 17 health outcomes, and (3) satisfaction with the reported change. Participants also responded to the Godin Leisure Time Exercise Questionnaire. A maintainer was defined as someone who met the physical activity guidelines at two specific time points. Logistic regression analyses were performed to predict the likelihood of maintaining physical activity at 2- and 8-months post-program. **Results:** Only the logistic regression model to predict maintenance eight months post-program was statistically significant,  $\chi^2(3) = 19.129$ ,  $p < 0.001$ , explaining 33.7% of the variance (Nagelkerke R<sup>2</sup>). Of the three predictor variables, two were statistically significant: general satisfaction regarding physical activity (odds ratio = 4.505,  $p = 0.007$ ) and perceived change regarding physical health outcomes (odds ratio = 2.078,  $p = 0.012$ ). **Conclusions:** As per Rothman's hypothesis, outcome satisfaction appears to be an important variable for maintenance, especially 8 months post-program. To help maintain physical activity, cardiac rehabilitation programs may want to help participants make links between their physical activity participation and health or physical activity related outcomes.

109.

## **PHYSICAL ACTIVITY AMONG PEOPLE WITH SPINAL CORD INJURIES WHO AMBULATE: A SCOPING REVIEW AND META-ANALYSIS**

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**Introduction:** Minimal research has investigated physical activity (PA) participation among people with spinal cord injury (SCI) who ambulate (e.g., Martin Ginis et al., 2017). The purpose of this project was to conduct a scoping review and meta-analysis to understand the amounts, types, correlates, and outcomes of PA participation for SCI ambulators. **Methods:** A systematic search was employed among five large databases and two theses/dissertation databases, yielding 3257 articles. Following a two-phase screening process among independent coders, 17 articles were included. Data were analyzed using meta-analysis techniques and correlates were coded using the COM-B model (Michie et al., 2011). **Results:** 11 studies were cross-sectional, 5 studies involved an exercise intervention, and 1 study used mixed-methods. Activity levels were low, and significantly lower for SCI ambulators than manual wheelchair users ( $k = 4$ ,  $g = 0.21$ ,  $p = <.01$ ). The type of PA investigated across all studies was leisure-time PA (e.g., sports, exercise). Psychological and physical capability (e.g., perceived behavioural control, fatigue), social and environmental opportunity (e.g., perceptions of disability, cost), and automatic and reflective motivation (e.g., boredom, intentions) were behaviour change correlates of PA measured within studies. The outcomes measured from exercise training were physical (e.g., strength, fitness) with one study assessing psychological factors (i.e., depression). No studies examined the quality of PA experiences. **Conclusions:** PA levels are low among SCI ambulators. Correlates of PA can be mapped onto all COM-B model constructs. Further investigation is warranted into the psychological outcomes of exercise training and the quality of PA experiences.

125.

## **THE IMPACT OF PHYSICAL ACTIVITY ON EXTERNALIZING BEHAVIOURS IN CHILDREN WITH DEVELOPMENTAL COORDINATION DISORDER**

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**Background:** Children with Developmental Coordination Disorder (DCD) often experience difficulties with motor coordination and externalizing behaviours (EB) such as rule breaking, aggression and attention problems. Literature has shown a positive impact of physical activity (PA) on internalizing problems, such as anxiety and depression, in children. However, a gap still remains regarding the effect of PA on EB. **Purpose:** To investigate whether PA mediates and/or moderates the relationship between DCD and EB in young children. **Methods:** Participants (N=589, 338 boys, Mage= 4.9±0.6 years) were part of a longitudinal cohort study, the Coordination and Activity Tracking in Children study. Motor coordination was assessed using the Movement Assessment Battery for Children – 2nd Edition. EB and ODD were measured using the Child Behaviour Checklist. Regression analyses were conducted for symptoms of ODD and EB separately. Mediating and/or moderating effects of PA on the relationship between DCD and ODD/EB were conducted using the PROCESS macro in SPSS v24. **Results:** Children with DCD had higher levels of ODD ( $b = -0.77$ ,  $p < 0.001$ ) and EB ( $b = -.322$ ,  $p < 0.001$ ) relative to typically developing children. However, PA neither mediated nor moderated this association. **Conclusion:** The skill gap hypothesis may be one explanation as to why PA may not be mediating or moderating this relationship. Motor skill demands for participating in PA are quite low in children, and therefore may not impact PA at this age. These results highlight the importance of early motor skill interventions to promote PA participation as children get older and skill demands increase.

## **EXPLORING QUALITY PARTICIPATION AMONG ADULTS WITH PHYSICAL DISABILITIES IN A COMMUNITY-BASED EXERCISE PROGRAM: A MIXED METHODS COLLECTIVE CASE STUDY APPROACH**

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Previous explorations of quality participation in physical activity opportunities for persons with disabilities (PWD) have yet to address whether one's perception of quality participation can change over time. Using triangulation within a mixed methods study, we sought to explore the experiences that PWD associate with their participation in a community-based exercise program (CBEP). Over one year, five individuals completed a baseline interview grounded in a life course approach, and subsequent interviews at 4-, 8-, and 12-months. Participants also completed questionnaires (a) twice weekly to capture their 'acute' quality experiences after each exercise session, and (b) at baseline, 4-, 8-, and 12-months to elicit their 'global' perceptions of quality participation. Situated within social constructionism, we (a) conducted dialogical and structural narrative analysis of interviews; (b) 'qualitized' mean scores from the quantitative measures, and (c) engaged in comparative profiling to explore similarities and differences between the two types of data, on a case-by-case basis. Five distinct narrative types represented the progression of quality participation over time, with each case drawing upon existing discourse and cultural narratives of disability (i.e., supercrip, embodiment and body-self), and participation in society (i.e., quest, restitution). The findings illustrate the immediate and latent psychosocial, emotional, and physical complexities that accompany participation in a CBEP for PWD. These unique, temporally nuanced understandings of quality participation offer insight on the highly contextualized nature of how PWD might achieve full and effective participation, and may be used to inform the development and delivery of optimal programming.

141.

## **ACCESSING ADAPTED PHYSICAL ACTIVITY PROGRAMS: IT'S LARGER THAN THE PROGRAMS**

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Individuals with physical disabilities report difficulty in meeting their healthy living and leisure needs. The aim of this study was to explore how individuals with a physical disability experienced access to community physical activity programs. Twenty semi-structured interviews were conducted with four groups: 1) current, 2) past, and 3) non-members, and 4) staff of an adapted physical activity program in Montreal, Quebec. A qualitative approach with inductive thematic data analysis was used. Through four themes, participants highlighted a complex web of experiences that constantly influenced access to adapted physical activity programs. Participants discussed that the atmosphere of a space (e.g., judgement free), the presence of adapted equipment, and knowledgeable staff helped create 'Physical activity opportunities'. However, 'Infrastructure' is created to allow access for different ability levels, which influenced individuals' physical activity opportunities. 'Social Interactions' among people with and without disability, within or outside of adapted physical activity opportunities further accentuated participants' experiences. Being mobile in one's community played a role in individuals' experiences, as 'Policies and Public Services' offered by the province were perceived as accommodating (e.g., Public Adapted Transport) or lacking the political willingness to serve individuals' needs. The interaction of these elements allowed for social opportunities, which promoted relatedness, accountability, encouragement, and social comparisons. These experiences also led individuals to become advocates to promote equitable access for people with disabilities. Access to physical activity program cannot be understood by only looking at the program. The broader contexts of policies, infrastructure, and social interactions intertwined render a program's accessibility.



162.

## **UNIFIED' IS THE FUTURE: THE EXPERIENCES OF SPECIAL OLYMPICS UNIFIED SPORT COACHES AT THE YOUTH GAMES**

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<sup>4</sup>Special Olympics Ontario

Special Olympics (SO) is an international organization dedicated to enhancing inclusion of individuals with intellectual disabilities. SO's Unified Sports provides an inclusive sporting experience where athletes with and without intellectual disabilities compete together. This study explored the experiences of coaches leading Unified Sports teams within schools (grades 7-12). All coaches self-identified as teachers of academic classes, with few identifying physical education as their primary course. Semi-structured interviews were conducted with 14 Unified Sports coaches (71% females; 3 provinces) at the May 2019 Invitational Youth Games held in Toronto, Canada. Coaches from three of five sports were interviewed: basketball (6), bocce (5), and floor hockey (3). Data were analyzed using inductive thematic analysis. Three main themes with various subthemes were interpreted from the interview data. The Novelty of the Unified Sports Program was a negative and positive concept seen in the subthemes Not Yet a Priority and Unified is the Future, respectively. The theme of Requiring Specialized Education reflected the lack of experience many coaches described. Third, the Unique and Shared Coaching Strategies theme was explored through the subthemes They Can't Take the Lead and They're No Different. Coaches emphasized the need to use alternative coaching strategies for some SO athletes, whereas others highlighted the use of the same coaching strategies being used regardless of the athletes' abilities. Ultimately, this study highlights the need for further teacher education for those involved in SO Unified Sports, especially given the expressed buy-in of coaches to prioritize Unified Sports in the future.

183.

## **EXPLORING INTERACTION MODALITY AND FREQUENCY OF INTERACTION EMPLOYED BY PEER MENTORSHIP INTERVENTIONS FOR PEOPLE WITH DISABILITIES**

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<sup>1</sup>The University of British Columbia

**Introduction:** Research has shown that peer mentorship can influence psychosocial factors (e.g. self-efficacy, social support) known to influence physical activity for persons with disabilities (PWD). To date, no review has examined characteristics of peer mentorship (specifically, interaction modality and frequency) that may influence the quality of this service. The objective of this scoping review was to synthesize the academic literature and report on the interaction modality and frequency employed in peer mentorship interventions for PWD. **Methods:** MEDLINE, EMBASE, PsycINFO, CINAHL, Web of Science, and SportDiscus were searched for articles that employed one-to-one peer mentorship interventions for people with spinal cord injury, cerebral palsy, multiple sclerosis, amyotrophic lateral sclerosis, stroke, spina bifida, spinal stenosis, amputee, muscular dystrophy, or fibromyalgia. A total of 2105 articles were screened, with 16 meeting the review inclusion criteria. **Results:** Five different forms of interaction modalities were reported across the 16 studies (i.e., face-to-face, telephone, text, email, video chat). The majority of studies (n=11) included face-to-face interactions and ten studies incorporated several interaction modalities. Intervention length varied greatly (R=6-104 weeks) as did the frequency of weekly interactions between mentors and mentees (R=0.17-2.16). Only five studies allowed participants to self-select their number of interactions. **Implications:** The results of this study could inform the development of new peer mentorship programming to support physical activity in PWD. Further research is needed to investigate the impact that interaction modality and frequency have on the quality of peer mentorship interactions for PWD and the effect this could have on physical activity participation.

201.

## **CLOSING THE GAP: AN ENVIRONMENTAL SCAN TO IDENTIFY PHYSICAL ACTIVITY RESOURCES FOR BREAST CANCER SURVIVORS IN ONTARIO**

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Physical activity (PA) can mitigate several negative physical and psychosocial effects following breast cancer diagnosis and treatment. Although PA is safe, feasible, and effective for breast cancer survivors (BCS), few are sufficiently active at levels known to yield health benefits. Many BCS experience a gap in informational support following BCS treatment completion and are unsure of how to access appropriate and effective cancer-specific PA resources. Further, understanding that PA program providers, instructors and trainers have an impact on survivors' experience and safety, little is known about existing PA educational resources for qualified exercise professionals (QEPs). Accordingly, the purpose of this study was to identify cancer-specific PA resources for BCS and QEPs in Ontario. Systematic scoping review methodologies were adapted to identify cancer-specific PA programs and educational resources, including cancer-specific rehabilitation (i.e., medically-led programs focused on recovery following diagnosis and treatment for cancer), exercise (i.e., structured exercise programs supervised by QEPs), recreation (i.e., low intensity activity supervised by QEPs), sport (i.e., team-based recreational pursuits) programs, and post-secondary courses and professional certifications in exercise and cancer. Our search identified 14 exercise programs, 8 rehabilitation programs, 39 recreation programs for BCS, and 11 post-secondary courses and 20 professional certifications for QEPs in Ontario. Practically, this information will be used to create a comprehensive inventory of cancer-specific PA programs and educational resources for BCS and QEPs respectively ([www.icanbeactive.ca](http://www.icanbeactive.ca)). Further, this inventory may also serve as a catalyst for the future development and implementation of cancer-specific resources for BCS and QEPs in Ontario.

216.

## **BUILDING HEALTHY KIDS: DISSEMINATING THE CANADIAN 24-HOUR MOVEMENT GUIDELINES FOR CHILDREN AND YOUTH VIA A DIGITAL HUB**

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<sup>3</sup>University of British Columbia

**BACKGROUND:** Build Your Best Day! (BYBD) is an interactive website developed to assist in the dissemination of the Canadian 24-Hour Movement Guidelines for Children and Youth (“Guidelines”) to children, parents, and educators. Guided by Diffusion of Innovations Theory, the current study examined youth’s perceptions of the Guidelines before and after interacting with BYBD. **METHOD:** Youth aged 10-14 years participated in a mixed-methods interview, answering questions regarding the Guidelines before and after trialing BYBD. Outcomes included the perceived advantage of the Guidelines, complexity, compatibility, and intention to adopt the Guidelines. Qualitative data was analyzed with deductive content analysis. Pre-/post-BYBD changes in quantitative variables were assessed with t-tests and Cohen’s effect sizes. **RESULTS:** Seventeen youth participated. Prior to BYBD, youth rated the Guidelines as helpful ( $M=5.73/7$ ,  $SD=1.36$ ), not overwhelming ( $M=6.07/7$ ,  $SD=0.96$ ), and expressed intent to follow the Guidelines ( $M=5.67/7$ ,  $SD=1.68$ ). Ratings remained constant or improved following BYBD, with a significant increase in youth’s understanding of the guidelines,  $p<0.001$ . Youth consistently described the Guidelines as helpful and important, and noted that following the Guidelines would promote health. Youth responded favourably to BYBD, and often reflected on the variety of activities that fall under the Guidelines. **DISCUSSION:** Preliminary findings suggest that youth perceive the Guidelines as helpful and easy to understand, and are motivated to adopt the Guidelines. Youth’s understanding of the Guidelines significantly improved after completing the BYBD activity.

249.

## **PAIN-RELATED SELF-EFFICACY AMONG BACK PAIN PATIENTS: A SYSTEMATIC REVIEW OF ASSESSMENT TOOLS**

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<sup>1</sup>University of Muenster

**Background:** The aim of the present study was to provide a systematic review on which self-efficacy scales are being used among back pain patients and to evaluate their psychometric properties. **Methods:** A systematic search was executed in January 2019 and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses 2009 checklist served as a guide for conducting the study. Electronic databases included CINAHL, MEDLINE, PubMed, PsycINFO, PSYINDEX, and Sport Discus. Publications in English or German language that focused on adult patient population suffering from back pain and provided validation or reliability measures on pain-related self-efficacy were included. **Results:** A total of 1.306 records were identified resulting in 671 documents after duplicates were removed. 233 studies were screened full-text and a total of 52 studies addressing 23 different measures of pain-related self-efficacy were included in the quality analysis. The most commonly used instruments were the Pain Self-Efficacy Questionnaire and the Chronic Pain Self-Efficacy Scale. All studies reported internal consistency but many studies lacked other aspects of reliability and validity. **Conclusion:** Further research should focus on assessing validity and interpretability of these questionnaires, especially in pain-related target groups. Researchers should select questionnaires that are most appropriate for their study aims and back pain population and contribute to further validation of these scales to best predict future behavior and develop intervention programs. **Perspective:** Many pain-related self-efficacy questionnaires do not fulfill all psychometric properties, especially for the practical use in clinical populations. This systematic review aids selection of pain-related assessment tools in back pain both in research and practice.

250.

## **INFORMING BEHAVIOURAL INTERVENTIONS FOR FAMILY SUPPORT PROVIDERS OF PEOPLE WITH SPINAL CORD INJURY: A SCOPING REVIEW**

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<sup>4</sup>Spinal Cord Injury British Columbia

**Introduction:** Being a family support provider to someone with an SCI may negatively impact one's ability to engage in a range of health-promoting behaviours such as physical activity, self-care, or socializing. However, few interventions exist to promote health-promoting behaviours in this population. **Objective:** To conduct a scoping review to identify the components necessary to develop behavioural interventions for family support providers from peer-reviewed literature using the behaviour change wheel (BCW). **Methods:** Electronic databases were searched in May 2017 and articles relating to family support providers of people with SCI were identified. Necessary data for intervention development outlined by the BCW were extracted from these articles, including behaviours, behavioural determinants, intervention content, and evaluation methods. **Results:** Data was extracted from 59 articles. The most commonly identified behaviours included engaging in leisure time/daily activities (e.g., physical activity, self-care), problem-solving, and providing support. Individuals' physical and social environments most often influenced these behaviours. Barriers varied between behaviours and contexts. Only six interventions were identified, none were based on behaviour change theory, and all were based on the technique of problem-solving. **Conclusion:** This scoping review was the first to review the SCI family support provider literature through a behaviour change theory lens. The results of this study suggest that a promising intervention approach may be to use a theory which promotes change in support providers' contexts while encouraging behavioural strategies to overcome individual barriers. Future research should consider a theory-based approach to intervention design to examine additional intervention methods which may be effective.

257.

## **RELATIONSHIPS BETWEEN CIGARETTE SMOKING, LEISURE-TIME PHYSICAL ACTIVITY, AND SOCIAL PARTICIPATION AMONG PERSONS WITH SPINAL CORD INJURY**

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**Introduction:** People with spinal cord injury (SCI) are more likely than their able-bodied counterparts to report cigarette smoking, low leisure-time physical activity (LTPA), and barriers to social participation. Interventions targeting these behaviours may enhance the lives of persons with SCI, as targeting a single behaviour may affect the others. However, the relationship between these behaviours has not been assessed in the SCI population. This study aims to explore the relationships between smoking, LTPA, and social participation among people with SCI. **Methods:** Data were analyzed from the Study of Health and Activity in People with Spinal Cord Injury (SHAPE-SCI) regarding cigarette smoking rates, LTPA (Physical Activity Recall Assessment), and social participation (physical independence, social integration, and occupation subscales of the Craig Handicap Assessment and Reporting Technique – Short Form). LTPA was converted to a categorical variable: no LTPA, 40 minutes of LTPA. Social participation subscales were dichotomized: moderate-to-severe restriction and mild-to-no restriction. Chi-squared tests were used to assess the relationship between cigarette smoking, LTPA, and social participation. **Results:** Of the 693 participants, 151 (22%) smoked (117 males; 34 females). Participants who smoked were less likely to report moderate-to-severe restrictions to physical independence than those who did not smoke. ( $X^2=5.4$ ,  $p=.03$ ). No differences in levels of LTPA were observed between those who smoked or did not smoke ( $X^2=2.3$ ,  $p=.31$ ). **Conclusion:** Findings suggest that people with SCI who smoke may have greater levels of physical independence than non-smokers. These insights may inform development of SCI-specific smoking cessation interventions.

264.

## WALKING THE DOG: INDEPENDENT MOBILITY'S BEST FRIEND?

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Background: Children's independent mobility (CIM) may facilitate physical activity participation. It is important to examine the correlates of CIM to inform future research and interventions. Dog ownership is positively associated with children's physical activity, but few studies have examined the association between dog ownership and CIM. This study examined this relationship in grade 4,5,6 children in Vancouver, BC. Methods: Data came from the Active Transportation and Independent Mobility (ATIM) study. Parents (N = 751) reported their children's CIM, dog ownership, demographics, and their perceptions of the social environment. Linear mixed effects models were conducted assigning school as a random effect. Results: Child mean age was 10.1±0.9 years, 55% were girls, and 23.3% of families reported having a dog. Below child grade in school ( $\beta=.682$ ,  $p<.001$ ) and phone ownership ( $\beta=.427$ ,  $p<.001$ ), dog ownership was the strongest correlate of CIM ( $\beta=.375$ ,  $p<.001$ ). Child gender was negatively associated with CIM (ref: boy,  $\beta=-.280$ ,  $p<.01$ ). Parental perceptions of traffic ( $\beta=-.369$ ,  $p<.001$ ), concern about stranger danger ( $\beta=-.109$ ,  $p<.05$ ), barriers of crime ( $\beta=-.171$ ,  $p<.01$ ) and dangerous street crossings ( $\beta=-.154$ ,  $p<.01$ ) were negatively associated with CIM. Conclusions: This is one of the few studies to identify dog ownership as a correlate of CIM. Future studies could explore how dog ownership contributes to greater CIM. While individual factors (e.g., age, gender) are not modifiable, other factors like dog and phone ownership, as well as parental perceptions of the social environment, are modifiable. Future interventions should focus on these modifiable factors as a way to help increase CIM.



262.

## **WHAT'S IN A WEBSITE? DETERMINING EVIDENCE-BASED COMPONENTS OF EXERCISE PROGRAMS FOR DIABETES MANAGEMENT**

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**Introduction:** Lifestyle modification, including physical activity, is effective for preventing and managing diabetes; however, evidence-based interventions are essential for effective behaviour change. Although the internet is a popular hub for health information, website quality for diabetes exercise programs remains unclear. The purposes of this research were to evaluate websites providing exercise programs regarding a) behaviour change techniques (BCTs), b) theoretical domains, and c) technical quality of resources provided. **Methods:** A larger systematic grey-literature internet search was conducted to identify exercise programs for diabetes and obesity management in the Okanagan. For this sub-project, program descriptions were inductively coded for (1) Theoretical Domains Framework (TDF), (2) Behaviour Change Techniques Taxonomy (BCTTv1), and (3) technical quality of the websites using the Journal of the American Medical Association (JAMA) criteria. **Results:** The internet search identified 7 exercise programs for diabetes care in the Okanagan. 5/7 programs referred to the TDF and BCTTv1. 7/14 TDFs were referenced across the 5 program descriptions. TDFs mentioned in all 5 programs were behavioural regulation and social influences. 12/93 BCTs were addressed. Social support (unspecified), social support (practical), and goal setting (behaviour) were the most commonly mentioned BCTs. One website satisfied all 6 JAMA criteria, while the mean score was 4. Every website met the authorship, disclosure, and contact information criteria. **Conclusion:** A portion of the exercise programs utilized evidence-based interventions, however, coding specific frameworks was challenging. Future research should interview service providers to gain a more comprehensive understanding of BCTs and theoretical rationale employed in the programs.

# **Exercise Psychology**

## **Poster Session III**

52.

## **A FAMILY AFFAIR: GROWTH WITHIN INJURED VETERANS AND THEIR SUPPORT NETWORKS**

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The present study explored the potential for growth within an often-overlooked group of injured or ill Canadian Armed Forces (CAF) Veterans, and their support networks (spouse, sibling). Growth is most commonly understood as perceived positive changes experienced by individuals following a stressor which propel them to a higher level of functioning (Salim et al., 2015). The study sought to develop a unique, context-specific understanding of growth within the CAF. Additionally, the study focused on the potential impact of stress and trauma on support members and subsequent positive change experiences (secondary growth) following indirect exposure to a loved one's trauma (Dekel et al., 2015). The present study was guided by sport injury growth research (Roy-Davis et al., 2016) and caregiver growth research (Leith et al., 2018; Mavandadi et al., 2014; Savage & Bailey, 2004). Semi-structured interviews were conducted with 7 participants; 1 dyad, 1 triad, a single veteran, and a single support person. Six higher order themes emerged: relationships, power of the uniform, new perspectives, complex support paradox, letting go and moving forward, and the caregiver experience. Support members in the CAF context were highlighted as key pieces in the recovery and growth process but are often overlooked. With the evident lack of support highlighted by Veterans and support members, the present study provides a crucial first step to addressing support issues and developing strategies to support the CAF population following trauma. This presentation will focus on emergent themes and specific implications for the CAF population and their support members.

54.

## **EXPERIENCES WITH SOCIAL SUPPORT AMONG OLDER ADULT WOMEN PARTICIPATING IN GAY SQUARE-DANCING**

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<sup>2</sup>Faculty of Social Work, University of Calgary

Social support is important for health and well-being, and is associated with physical activity behaviour and positive experiences in physical activity contexts. Because of historical oppression of the LGBTQI2S community, opportunities for social inclusion and social support are important and may be fostered through participation in gay square dancing. The aim of this research was to understand the lived experiences of older adult female-identified participants in a gay square-dancing club, with attention to social support, social relationships, and social barriers. Fourteen self-identified female square dancers belonging to a gay square dance club participated. Most were white and all were over age 55. Participants self-identified as heterosexual (7), homosexual (3), pansexual (1), bisexual (1), and 2 did not identify with existing terminology. Semi-structured interviews were conducted during a gay square-dancing festival and thematically analyzed. Themes suggested participants experienced intentionally provided support which included both tangible (e.g. helping with transportation) and emotional support (e.g. offering words of encouragement). There was an emphasis on making connections and dancing with many people. First-time participants described overcoming shyness and feeling comfortable attending alone, which they noted was not always the case in heteronormative square dance groups. Perhaps novel to this context where touch is inherent to the activity, physical touch (e.g. hand holding, dance holds, hugging) was perceived as mostly supportive but at times was uncomfortable. Findings highlight the importance of exercise contexts with intentional acceptance of individuality, which can foster an inviting and supportive environment and contribute to positive experiences with participation.

57.

## **LONGITUDINAL ASSOCIATION BETWEEN THE SOCIAL CONTEXT OF PHYSICAL ACTIVITY AND MODERATE-TO-VIGOROUS PHYSICAL ACTIVITY**

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<sup>3</sup>Université de Montréal

<sup>4</sup>University of Ottawa

**Background:** Co-participating in physical activity (PA) with others is associated with higher levels of PA in youth. However, PA can occur in several social contexts and few researchers have longitudinally compared associations of different social contexts with moderate-to-vigorous physical activity (MVPA) or whether having many people available to participate in PA with is associated with greater MVPA. We examined whether changes in different social contexts of PA and variety of PA companions are associated with changes in MVPA across elementary/middle school (Grades 5-8) and secondary school (Grades 8-11). **Methods:** Youth (N=938) completed questionnaires tri-annually from Grades 5-11 on weekly frequency of PA participation in five social contexts (i.e., with teammates, siblings, friends, parents/grandparents, or alone) and number of days/week meeting recommended levels of MVPA (i.e., ≥60 minutes/day). Unstandardized path coefficients (B) within piecewise latent growth models are interpreted as change in MVPA for every one unit change in the social context of PA (multivariate model) or variety of PA companions (univariate model). **Results:** Declines in variety of PA companions was associated with decreases in days/week meeting MVPA recommendations in elementary/middle (B=1.53, SE=0.60, p<.05) and secondary school (B=1.10, SE=0.15, p<.001). Decreases in weekly frequency of PA with friends during secondary school was associated with declines in days/week meeting MVPA recommendations (B=0.63, SE=0.31, p<.001), whereas no associations were observed for elementary/middle school. **Conclusion:** Promoting PA engagement with a variety of companions during elementary/middle school and secondary school, and participation in PA with friends during secondary school may help reduce declines in MVPA.

59.

## **PEER SUPPORT IN TIANJIN HOSPITAL: PERSPECTIVES OF CHINESE ADULTS WITH SPINAL CORD INJURY.**

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<sup>2</sup>Rehabilitation Medicine Department, Tianjin Hospital

**Objective:** To explore the perspectives on hospital-based peer support of Chinese adults with spinal cord injury (SCI) in Tianjin Hospital. **Methodology:** Using a generic qualitative research design, six inpatients with SCI from Tianjin Hospital, China were interviewed twice to explore their background and life experiences and their thoughts about the potential role of peers in their rehabilitation. A thematic analysis was conducted. **Results:** Five higher-order themes were identified: 1) background and personal life, 2) rehabilitation experiences, 3) perspectives on peer support, 4) peer support delivery, and 5) anticipated outcomes. 1 & 2) Participants had unique family and employment backgrounds and varying degrees of satisfaction with their rehabilitation. 3) Their rehabilitation goals and focus shaped their perceptions for peer support. Participants who solely focused on the recovery of physical functioning highlighted that peers could supplement and help individualize rehabilitation exercise guidance while participants who concentrated on their future lives believed peers would help them learn skills to integrate in the community. However, other participants reported not being able to trust peers, especially because they are not healthcare providers. 4) Participants favored receiving peer support from online chat groups (i.e., WeChat), in-person conversations, and mentoring lectures. 5) Participants anticipated to obtain practical and emotional support from peers, as well be motivated and understood by peer models. **Conclusion:** Our findings suggest that Chinese inpatients with SCI have mixed perspectives on hospital-based peer support. Future research could attempt to design and customize peer support programs based on individual's rehabilitation goals to maximize its impact.

76.

## **BODY IMAGE AND PHYSICAL ACTIVITY OVER THE COURSE OF A PREGNANCY.**

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Research investigating body image in pregnant women has generally examined negative body image outcomes, finding pregnant women have more negative body image in early pregnancy compared to mid-to-late pregnancy. There has been a lack of research investigating how constructs of positive body image and self-objectification differ across pregnancy. Positive body image is associated with positive health behaviours (e.g., physical activity); thus, it is important to understand pregnant women's experiences of positive body image. Further, physical activity has been linked to positive body image through an increase in embodiment and a decrease in self-objectification; whether this holds true for the pregnant population is unknown. The purpose of this study was to determine whether body appreciation, self-objectification, and embodiment differed by trimester, and whether physical activity is associated with body appreciation via an increase in embodiment and decrease in self-objectification. Thirty-one women in the first trimester, 55 in the second trimester, and 75 in the third trimester completed measures of body appreciation, self-objectification, embodiment, and physical activity. Multivariate analysis of covariance showed all measures differed by trimester. Post-hoc tests showed body appreciation and embodiment were higher and self-objectification lower in third trimester compared to first trimester. Embodiment was also higher in the third trimester compared to the second trimester. A serial mediation analysis revealed physical activity was associated with higher body appreciation through an increase in embodiment and a decrease in self-objectification. This suggests physical activity could to improve positive body image and its associated health outcomes in pregnant women.

98.

## PEER SUPPORT IN COPD: A SCOPING REVIEW

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**Background:** Individuals living with chronic obstructive pulmonary disease (COPD) report a desire for supportive interactions with peers. However, there is little research on the outcomes of these interactions. The purpose of this study was to identify the outcomes discussed in peer support interactions in individuals with COPD through a scoping review methodology. **Methods:** Literature searches from six databases produced 4,999 possible articles. Twenty-three studies, including four clinical trials, were included in the analysis. **Results:** The majority of the articles were written after 2006 (n=17) and included 11 qualitative, nine quantitative, and three mixed-methods studies. The published articles were broken down into two categories: those that evaluated a peer support intervention (n=11); and those that reported on informal peer support interactions (n=8). Within the quantitative articles of the peer support interventions (n=6), disease specific and overall health-related quality of life and six-minute walk distance increased pre-post intervention. In the qualitative evaluations of the peer support interventions (n=5) individuals reported gaining a way to: share experiences, build community, accept their disease, and become an advocate for COPD. The informal peer support interaction studies indicated that peers were important for creating meaningful connections and feeling understood. **Conclusion:** Peer support interventions with individuals living with COPD can improve traditional outcomes (e.g., quality of life) but can also help foster positive social outcomes (e.g., advocacy). Yet, there is still a lack of understanding of how peer support can be best integrated into interventions and how peer support can influence individuals' willingness to participate in their community.



127.

## **EXPLORING THE RELATIONSHIP BETWEEN SELF-COMPASSION AND SLEEP**

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Quality sleep can promote mental and physical health, and improve exercise quality. University students get insufficient quality and quantity of sleep. Self-compassion has been associated with increased sleep quality among university students but little is known about the processes that underlie this relationship. Self-compassion may lead to improved sleep through reducing maladaptive and promoting adaptive cognitive emotion regulation strategies. Self-compassion may also promote sleep through its positive association with a proactive health focus. The purpose of this cross-sectional study was to explore the relationship between self-compassion and sleep and to determine if this relationship is mediated by cognitive emotion regulation strategies and a proactive health focus. In this cross-sectional study, undergraduate students (N=193) completed measures of the following constructs through an online survey; self-compassion (independent variable); self-esteem (control variable); the two sleep outcomes (sleep quality; sleep hygiene); and two proposed mediators (cognitive emotion regulation; proactive health focus). Mediation analysis using Hayes PROCESS macro revealed that, after controlling for self-esteem, two cognitive emotion regulation strategies mediated the relationship between self-compassion and sleep outcomes: self-blame mediated the relationship between self-compassion and sleep quality ( $b = 0.55$ , BCa CI [0.075, 1.093]) and rumination mediated the relationship between self-compassion and sleep-hygiene ( $b = -0.07$ , BCa CI [-0.137, -0.002]). Proactive health focus did not mediate the relationship between self-compassion and either sleep outcome. These findings contribute to the literature by highlighting that self-compassion may be associated with positive sleep outcomes through its negative association with maladaptive cognitive emotion regulation strategies.

131.

**OLDER AND MORE EXPERIENCED: EXAMINING MAINLAND CHINESE INTERNATIONAL STUDENTS IN CANADA ON SOCIAL COGNITIVE CORRELATES OF LEISURE TIME PHYSICAL ACTIVITY, ACCULTURATION, AND MENTAL HEALTH**

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<sup>1</sup>University of Alberta

In this study, first year (n = 92), second year (n = 52), and senior (n = 77) Chinese international students were compared on measures of physical activity, self-efficacy, intention, access, stress, acculturative stress, subjective well-being, acculturation, and self-construal. Relationships of these variables to physical activity were also examined. Senior students had lower perceptions of places to do physical activity and higher perceptions of discrimination compared to first and second year students. Senior students also experienced more academic pressure and guilt towards their family compared to second year students. First year students reported more general stress compared to second year students and walked more than seniors. Self-efficacy, intention, and exercise to reduce stress shared relationships with vigorous physical activity. Subjective well-being was related to moderate physical activity, and self-efficacy and independent self-construal were related to walking. Health behavior should be considered in within changing student contexts.

132.

## **INVESTIGATING THE RELATIONSHIPS BETWEEN SELF-COMPASSION, PHYSICAL ACTIVITY AND HAPPINESS WITHIN PHYSICAL ACTIVITY COUNSELLING**

Olivia Pastore<sup>1</sup>, Michelle Fortier<sup>1</sup>, Taylor McFadden<sup>1</sup>

<sup>1</sup>University of Ottawa

Physical activity counselling (PAC) is an evidence-based approach that has been shown to increase physical activity and reduce depressive symptoms in female students over time (McFadden et al., 2017). Moreover a feasibility paper found that PAC led to increases in physical activity and mental health in university students (McFadden, submitted for review). However, levels of self-compassion and happiness within PAC, and their relationships with physical activity have yet to be explored. Thus, the purpose of the study is to investigate levels of self-compassion, physical activity, and happiness during PAC, as well as the relationships between self-compassion and happiness, self-compassion and physical activity, and physical activity and happiness. The study followed an experimental design involving online surveys pre- and post-intervention. Average self-compassion, physical activity, and happiness levels of thirty individuals were  $M = 2.52 \pm 0.54$  (Self-Compassion Scale; total score of 5),  $M = 7.13 \pm 8.76$  (Godin Leisure-Time Exercise Questionnaire; a score  $< 24$  = insufficiently active), and  $M = 16.87 \pm 0.55$  (Subjective Happiness Scale; total score of 28), respectively. Preliminary results revealed a strong correlation between self-compassion and happiness pre-intervention ( $r = 0.536$ ,  $p = 0.002$ ), indicating that individuals entering the program that are more self-compassionate are happier. No significant relationships were found between self-compassion and physical activity and physical activity and happiness. This study will further our understanding of the relationships between key constructs such as self-compassion and happiness within PAC, which will therefore help to refine and guide its future implementation.

134.

## THE IMPORTANCE OF PEERS: ELEMENTARY SCHOOL CHILDREN'S PLAY FOLLOWING A PLAYGROUND PAINTED LINES INTERVENTION

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Children's social and built environment interactions can affect physical activity. This mixed-methods study examined children's levels of and perceived physical activity and social experiences in response to adding painted lines in school playgrounds (e.g., four square). Grade 3-4 children were recruited from four elementary schools: three had received painted lines through a community initiative, and one was a control school. Children's physical activity was recorded through systematic observations and  $n=30$  wore accelerometers. At the schools where lines were painted,  $n=31$  children participated in photo-elicitation-based focus groups, and  $n=5$  teachers completed interviews about their perceptions of the children's experiences with the lines. The control school and two schools that had received painted lines had valid accelerometer data. Contrary to expectations, children at the control school had significantly (Dunnett t-test;  $p < .05$ ) higher weekday minutes of moderate-to-vigorous physical activity ( $M=184.16$ ,  $SD=39.82$ ) compared with those at schools with lines ( $MMVPA=139.19$ ,  $SDMVPA=40.76$  for school A;  $MMVPA=153.23$ ,  $SDMVPA=43.28$  for school B). Steps per day results were similar. Children thought the lines were not extensively used due to school policies, group play preferences, confusion around how to use the lines, and perceived use of the lines by peers. Teachers reported no noticeable increase in physical activity as a result of the painted lines, but also noted their potential for physical activity and education. Children's ideas for increasing play included designs to facilitate group play, interactions with school policies, promoting popularity and uptake among the peer group, and appealing, clear, and durable designs.

143.

## **SUPPORTIVE BEHAVIORS AND RELATIONSHIPS IN GROUP EXERCISE FOR OLDER ADULTS: OBSERVATIONAL RESEARCH**

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Meaningful relationships and physical activity are important contributors to older adults' physical and psychological well-being. Structured group exercise programs delivered in a supportive environment can lead to the development of relationships, but the behaviors facilitating a supportive environment within these programs are not well understood. The purpose of this research was to examine interpersonal interactions amongst older adults in group exercise classes and identify supportive behaviors that may contribute to the development of relationships within group exercise classes. Four observations of adults age 55 and older, who were engaged in group physical activity programs were completed at four sites (i.e., 16 observation) in Calgary. Field notes were thematically analyzed in light of successful aging and social support theory. Instructors created a supportive environment by engaging in conversations with the exercisers, providing advice, and offering assistance when needed to ensure all the exercisers felt included. Instructors provided support by offering inclusive positive feedback, and demonstrated genuine care by addressing exercisers' concerns. By ensuring there were no potential hazards on the floor when exercisers walked around, and by correcting them when they were in an incorrect position to avoid injuries, instructors helped create a safe environment facilitating trusting relationships. During the exercise class, exercisers provided each other with support by smiling, making jokes, and laughing. Many exercisers got together before or after their exercise classes to have coffee and discuss among each other. Results highlight behaviors both instructors and exercisers can adopt to facilitate a supportive environment within structured group exercise programs.

149.

## **ADJUSTING EXERCISE IDENTITY WHEN TIMES CHANGE: SELF-COMPASSION AND REACTIONS TO THE EXERCISE IDENTITY CHALLENGE OF NEW MOTHERHOOD**

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New mothers often show a reduction in exercise that can challenge their pre-motherhood exercise identity, an established exercise correlate. If they can adapt their exercise identity, they may accept their changed behavior and maintain some exercise; a healthy alternative to relentless pursuit or abandonment of their old identity. Identity theory lacks information about what predicts identity adaptation. Self-compassion, treating oneself kindly in the face of challenges, may promote identity adaptation; to our knowledge no research has examined this. This cross-sectional study examined the relationship between self-compassion and identity adaptation in a sample of 279 mothers of young children ( $M_{age} = 32.95$ ,  $SD = 5.00$ ) who identified with exercise and reported a reduction in exercise following motherhood (identity challenge). Participants completed online measures of self-compassion, positive reactions (acceptance, well-being, self-determined motivation), and negative reactions (guilt, shame, rumination, role conflict) in relation to their current relative to their pre-motherhood exercise. Regression analyses revealed that self-compassion related negatively to shame ( $\beta = -.259$ ,  $p < .001$ ), rumination ( $\beta = -.212$ ,  $p < .001$ ), and role conflict ( $\beta = -.188$ ,  $p = .002$ ); and positively to acceptance ( $\beta = .199$ ,  $p = .001$ ), well-being ( $\beta = .426$ ,  $p < .001$ ), and self-determined exercise motivation ( $\beta = .202$ ,  $p = .001$ ). Semi-partial correlations, controlling for self-esteem, found that self-compassion uniquely related to shame ( $r = -.259$ ,  $p = .048$ ), rumination ( $r = -.212$ ,  $p = .013$ ), and well-being ( $r = .426$ ,  $p < .001$ ). Self-compassion may help new mothers cope positively with exercise-related identity challenges.

186.

## **BODY IMAGE CONCERNS AMONG PERSONAL TRAINERS**

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<sup>1</sup>Brock University

Body image refers to an individual's thoughts, feelings, perceptions, and behaviours towards his or her own body, including both its appearance and functioning. Given that negative body image is associated with poor health outcomes such as depression, anxiety, disordered eating, and steroid use, it is important to determine who is at risk of body image concerns. Individuals working in the fitness industry, such as personal trainers, may be at risk as this environment emphasizes the body's appearance and function. On the one hand, they may feel increased pressure to meet the ideal; however, since they are exercisers they may experience fewer body image concerns. The present study investigated differences in body image concerns in personal trainers compared to regular exercisers. Forty-one personal trainers and 84 exercisers (n = 50 men; n = 75 women) between the ages of 18 and 52 years self-reported body-comparisons, social physique anxiety, body appreciation, investment in appearance, and drive for muscularity. A MANOVA examining differences in body image between trainers and exercisers, controlling for gender, was non-significant  $F(7,116) = 1.71, p > 0.05$ , indicating no differences in body image between groups. Results from this study provide evidence on that personal trainers may not be at risk for negative body image concerns. It is likely they engage in high levels of physical activity, which may serve as a protective mechanism. They may also place more emphasis on health and function of the body, and thus be good role models to their clients.

188.

## **SHAME ON YOU, OR SHAME ON ME?: AN EXAMINATION OF BODY-RELATED SELF-CONSCIOUS EMOTIONS ACROSS THE LIFESPAN**

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Body-related self-conscious emotions include guilt, shame, and pride (authentic and hubristic) and are experienced in relation to a person's body. Body-related guilt and shame are associated with negative health-related outcomes including disordered eating and depression, whereas authentic pride is associated with positive outcomes such as increased self-esteem. Previous studies suggest that body-related self-conscious emotions vary across gender, age and weight-status; however, most research has focused on young adult populations. In one study that examined a larger age range, only those up to age 65 were included. Therefore, the present study aimed to examine body-related shame, guilt, and pride across age, gender, and BMI in a sample of men and women throughout the lifespan. Participants (N = 298) aged 18-85 completed questionnaires to assess body-related self-conscious emotions and physical activity, and self-reported demographic characteristics including height, weight, and age. The overall MANCOVA was significant ( $F(4, 278) = 635.16, p < .05$ ) and univariate and post-hoc analyses revealed significant main effects for age, gender, and BMI when controlling for physical activity (all  $p$ 's  $< .05$ ), indicating that older and middle-aged adults reported higher shame and guilt than young adults, females reported higher shame and guilt than males, and obese and overweight individuals reported higher shame and guilt than individuals classified as normal-weight. Findings from the present study suggest that body-related self-conscious emotions, specifically shame and guilt, fluctuate across gender, age and weight-status; giving insight to populations who may benefit from future studies aimed at decreasing negative outcomes related to body image.



195.

## **SELF-COMPASSION AND EXERCISE: MEN AND WOMEN'S REACTIONS TO A RECALLED EXERCISE FAILURE**

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Exercise improves health and wellbeing, yet people experience setbacks when trying to adhere to exercise. Self-compassion (i.e., treating oneself kindly when facing challenges) can help people cope with exercise setbacks. Most exercise and self-compassion research has been conducted with women but self-compassion should help with exercise failures regardless of gender. The purpose of this study was to establish whether gender moderates the association between self-compassion and responses to an exercise setback. Using an online survey, undergraduate exercisers (N = 117, Mage = 20.97) recalled an exercise setback and how they responded regarding motivation, goal re-engagement, rumination, and affect. Using PROCESS, moderation analysis revealed gender (binary) did not moderate the relationships between self-compassion and responses to the exercise setback. Some moderated effects were found when gender was treated as a continuous variable; self-compassion had a stronger negative relationship with two forms of motivation (amotivation:  $b = -0.59$ , 95% CI [-0.98, -0.20],  $t = -3.02$ ,  $p = .003$ ; and identified regulation:  $b = 0.40$ , 95% CI [0.06, 0.74],  $t = 2.33$ ,  $p = .021$ ) at high levels of masculinity, while a stronger negative relationship between self-compassion and state rumination was established at high levels of femininity,  $b = -0.58$ , 95% CI [-0.92, -0.25],  $t = -3.50$ ,  $p < .001$ . Findings for most outcomes suggest that self-compassion is associated with adaptive responses to setbacks regardless of gender. Researchers should study effects of self-compassion in exercise contexts across genders and the gender continuum, and continue exploring whether gender influences self-compassion's effects in exercise contexts. Key words: self-compassion, physical activity, exercise failure, gender

212.

## **EFFECT OF DYNAMIC NORMS ON STUDENT INTEREST IN EXERCISING DURING EXAMS**

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<sup>2</sup>Nipissing University

A growing body of evidence supports a positive relationship between descriptive norms and physical activity using both correlational (Carpenter & Amaravadi, 2019) and experimental designs (Crozier, 2019). Although the findings align with conceptual models (Cialdini et al., 1990), this relationship becomes problematic if the desired behavior is not the norm. Consider physical activity, where only 18% of Canadian adults are active enough for health benefits. What can be done if the intended behavior (i.e., being physically active) counters the prevailing norm (i.e., physical inactivity)? One possibility concerns the use of dynamic norms (Sparkman & Walton, 2017), which provide information that a behavior is changing. This study examined whether dynamic norms would increase interest in exercising more during final examinations in students who were regular exercisers but indicated they reduced exercise during the exams. Students were assigned randomly to one of four conditions: Dynamic norm (n=28), dynamic norm/high outcome expectation (n=34), minority descriptive norm (n=34), or attention control (n=34). Interest in increasing exercise during the exams was the main dependent variable. ANCOVA results revealed a significant condition effect ( $p=0.007$ ,  $\eta^2=0.09$ ). Post hoc tests revealed interest in increasing exercise during exams was higher in both dynamic norm conditions ( $ps < .03$ ) versus attention control. No difference emerged between the minority descriptive norm and attention control ( $p=0.84$ ). The current findings provide initial evidence that exposure to dynamic norms may provide students with the impetus to increase exercise during an examination period even though the prevailing norm may serve as a barrier to change

220.

## USING DYNAMIC SYSTEMS METHODS TO UNDERSTAND PEER-MENTORSHIP CONVERSATIONS BETWEEN PEOPLE WITH SPINAL CORD INJURY

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Background: Peer-mentorship is a promising approach to support people with spinal cord injury (SCI), however, little research has examined how peer-mentorship is provided in terms of the frequency, duration, and sequence of topics and techniques used in real-time. Objective: Use a dynamic systems approach called state space grids (SSGs) to understand how topics and techniques used in peer-mentorship conversations unfold in real-time. Methods: Transcripts of peer-mentorship conversations (n=5; Average duration=42±20 minutes) were transcribed and coded for topics and techniques used by mentors and mentees. Noldus Observer XT was used to create a continuous stream of time-series data. Gridware was used to create a SSG for each peer-mentorship conversation. The top topics and techniques used by mentors and mentees based on frequency and duration were determined for each conversation. Results: In total, 1453 statements were coded across the five transcripts (kappa=0.85; PABAK=0.96). Five SSGs were produced. Grid pattern analyses demonstrate variability in techniques used in peer-mentorship conversations. Commonly discussed topics by the mentor and mentee based on duration were personal information (10 minutes 55 seconds ± 6 minutes 30 seconds), chronic health care services (5 minutes 34 seconds ± 4 minutes 31 seconds), and emotional outcomes of injury (4 minutes 54 seconds ± 4 minutes 10 seconds). Conclusions: Findings provide an initial understanding of the patterns of topics and techniques used within peer-mentorship conversations between people with SCI. These findings will provide a foundation for future research to create and implement recommendations to support quality peer-mentorship.

228.

## **HOW DOES SOCIAL SUPPORT IMPACT BODY IMAGE EXPERIENCES OF OLDER WOMEN IN PHYSICAL ACTIVITY PROGRAMS?**

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As we age, we experience physical changes that may impact body image. Older women in particular may find these changes difficult due to cultural ideals of youthfulness directed at women. This study examined social interactions and support in group physical activity and how older adult women perceive them to impact body image. Fourteen women aged 65 and older, who participated in physical activity classes at a city recreation centre, participated in a semi-structured interview. The study was guided by interpretive description methodology. Interviews and analysis were informed by social support and positive body image theories. Women reported that being in a context with a diversity of abilities and body types helped them feel comfortable with their own body. They often compared themselves to others in relation to function that helped to reframe negative thoughts and recognize their own ability. However, comparisons contributed to negative perceptions at times. Engaging in discussions about body function and health with peers often promoted positive perceptions and facilitated coping with functional or health difficulties. It was noted that the absence of discussion of appearance in these groups indirectly communicated body acceptance. Other participants communicated comfort, understanding, and acceptance through humour, demonstrating that support was available if needed, and providing empathy for common experiences. Instructors promoted positive body image by providing physical challenges, celebrating successes, and providing modifications or feedback. Findings suggest the social experiences in group exercise may support forming positive body perceptions, and reframing negative thoughts about the body among older adult women.

253.

## **A THEMATIC ANALYSIS OF THE EXPERIENCES OF FAMILY SUPPORT PROVIDERS OF PEOPLE WITH SPINAL CORD INJURY: A GUIDE FOR FUTURE INTERVENTIONS**

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**Introduction:** Spinal cord injury (SCI) has a profound impact on the family and friends of those who are injured, and in particular, on family support providers. These impacts have been shown to result in psychological distress, burden, and lack of participation in health-promoting behaviours such as physical activity. However, few interventions exist to support this population. **Objective:** To gain a better understanding of the areas of family support providers' lives most impacted by their role and how interventions could help to improve their experiences. **Methods:** Semi-structured interviews were conducted with family support providers and people with SCI. The interview questions targeted the areas of family support providers' lives that are impacted by SCI and how interventions may support them. All interviews were transcribed verbatim, and a thematic analysis was conducted. **Results:** Seven interviews (mean duration: 58±22 minutes) were conducted with four support providers (four partners, 50% women, mean age: 38±7 years) and three people with SCI (two partners, one child, 67% women, mean age: 39±13 years). The area of support providers' lives most impacted by SCI was social participation (e.g., sport, employment, socializing). Five themes were identified that appeared to influence social participation, including access to resources, asking for help, guilt, relationship changes, and needing someone who "gets it". **Conclusion:** These findings highlight the need for support and resources for family support providers to promote social participation. By gaining an in-depth understanding of the experiences of family support providers, such resources may be tailored to the needs of this population.

# **SPORT PSYCHOLOGY ABSTRACTS**

# **Sport Psychology**

## **Verbal Session I**

155.

## COMPARING THE QUALITY OF EXPERIENCES OF ATHLETES WITH A DISABILITY AT TWO HIGH-PERFORMANCE TALENT IDENTIFICATION EVENTS

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<sup>2</sup>Canadian Paralympic Committee

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Two approaches to high-performance talent identification events for athletes with a disability (AWAD) are for participants to: 1) perform physically demanding tests, or 2) try different sports. Athletes' quality of experience at these events may influence their pursuit of Para sport; however, the impact of these differing event formats on experience quality is unknown. Objective: To compare the experiences of AWAD between high-performance talent identification events. Participants: Twenty individuals with physical and/or visual impairments (Mean=30.39, SD=13.755; 45% Female) who attended one of two four-hour talent identification events were recruited. Methods: Pre-post measures of quality experience assessed participants' feeling states, event enjoyment, and intentions to pursue Para sport. Data were analyzed using repeated measures analysis of variance and independent t-tests. Results: Feelings of autonomy, belonging, and engagement increased following the events,  $p < .05$ . Physical test participants reported greater feelings of challenge and meaning than try-it event participants,  $F(1,18) = 5.521$ ,  $p < .05$ ;  $F(1,18) = 4.689$ ,  $p < .05$ . No time by event interactions were observed except for feeling state,  $F(1,18) = 4.355$ ,  $p < .05$ . Positive feelings increased over time among try-it style event participants,  $p < .05$ . T-tests revealed no difference in intentions to participate in, or seek information on, Para sport; or to pursue opportunities if identified as having Paralympic potential ( $p < .05$ ). Physical test participants reported higher intentions to pursue new Para sport opportunities offered than try-it event participants,  $t(2.76) = .016$ ,  $p < .05$ . Conclusion: Participation in a high-performance talent identification event for AWAD fosters elements of quality participation; however, event structure influences some elements, including challenge, meaning, and feelings.



247.

## RECREATIONAL ATHLETES' EXPERIENCES OF ADVERSITY

Kelsey Wright<sup>1</sup>, Tara-Leigh McHugh<sup>1</sup>, Amber Mosewich<sup>1</sup>

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Kelsey S. Wright, Tara-Leigh F. McHugh, Amber D. Mosewich Faculty of Kinesiology, Sport, and Recreation; University of Alberta Sport involvement can be a both a stressor and a protective factor for elite athletes' well-being (Arnold & Fletcher, 2012; Sarkar & Fletcher, 2014; Secades et al., 2016), but the relationship between adversity and recreational sport participation is unknown. As a means of understanding the potential coping strategies associated with recreational sport participation, this study addressed how recreational athletes experience adversity. Ten recreational athletes (Mage = 24.2 years, SD = 2.71) participated in one-on-one semi-structured interviews. Data were analysed using an interpretive phenomenological analysis (Smith, 2004; Reid, Flowers, & Larkin, 2005). Participants were asked to describe their definitions of "recreational athletes" as a basis for interpreting their experiences. Through interpreting the findings, it appears that recreational athletes use their sport participation as a means of coping with adverse life events. Through social support, distraction, reaffirmation of their athletic identity, and goal setting, the recreational athletes of this study found coping strategies within sport. Notably, participants described that their coping efforts were more successful when their personal goals matched the goals of others around them in sport. Social support within and outside of sport provided athletes with opportunities to resolve their emotions, while at other times sport distracted from negative emotions. Greater investment in their athletic identities provided more sport coping opportunities, bettering recreational athletes' responses to adversity. Further exploring successful coping strategies within sport could help to inform future sport policy involving recreational athletes.

180.

## **INTERPERSONAL SPORTING RELATIONSHIPS AS EXPERIENCED BY LGBTQ+ ATHLETES**

Shannon Herrick<sup>1</sup>, Alexandra Moisan<sup>1</sup>, Lindsay Duncan<sup>1</sup>  
<sup>1</sup>McGill University

Despite concerted efforts, inclusivity is not equally distributed across all sporting contexts. The perceived ex/inclusivity of sporting environments is often influenced by interpersonal relationships, this is especially true for LGBTQ+ athletes. Using an online cross-sectional survey, LGBTQ+ adults (N = 741) were asked the following open-ended response question, “how would you describe your past and/or current relationships with teammates, coaches, and other sports-related support staff?” The resulting texts were independently coded by two researchers using thematic analysis and compared. All discrepancies were discussed with and rectified by a third researcher who acted as a critical peer. LGBTQ+ athletes described how their interpersonal relationships created perceived sporting environments that existed on a continuum ranging from exclusive to inclusive. Exclusive sporting environments were characterized by experiences of discrimination fuelled by conceptions of ability, aesthetics, and homo/transphobia. Formal or neutral sporting environments were maintained through self-distancing techniques and inclusive sporting environments were defined by strong positive relationships with coaches and teammates that were primarily based on acceptance. Both higher athletic ability and identity concealment strategies created increased opportunity for mobility along the sporting environment continuum. This study demonstrates that despite strides towards inclusivity within sport, there are still pervasive vestiges of intolerance that need to be engaged with and deconstructed.

229.

## **AN EXPLORATION OF INDIGENOUS PEOPLES' PERSPECTIVES OF PHYSICAL LITERACY**

Autumn Nesdoly<sup>1</sup>, Douglas Gleddie<sup>2</sup>, Tara-Leigh McHugh<sup>1</sup>

<sup>1</sup>Faculty of Kinesiology, Sport, and Recreation, University of Alberta

<sup>2</sup>Department of Elementary Education, University of Alberta

Over recent years the concept of physical literacy has gained popularity within physical education, sport policy, practice, and research settings. Although researchers have suggested that physical literacy is beneficial to the general population, the cultural relevance of physical literacy is not well understood. The purpose of this research was to explore Indigenous peoples' perspectives of physical literacy. Eleven Indigenous educators, coaches, and youth mentors participated in this community-based participatory research. Data was generated through one-on-one and sharing circle interviews, and transcripts were analyzed using a content analysis. Findings are represented by five themes: (a) wisdom sharing (b) being mindful in teachings, (c) youth-centered approaches, (d) culture and spirituality as part of being active for life, and (e) supporting factors. Findings from this research may support future physical education and sport initiatives that are inclusive of, and meaningful to, Indigenous youth.

# **Sport Psychology**

## **Verbal Session II**

24.

## **USING NOVEL METHODS TO EXPLORE THE SOCIAL IDENTITY AND MORAL BEHAVIOUR RELATIONS IN YOUTH SPORT**

Mark W. Bruner<sup>1</sup>, Luc J. Martin<sup>2</sup>, Jordan D. Herbison<sup>2</sup>, Richard Slatcher<sup>3</sup>, Ian Boardley<sup>4</sup>, Alex Benson<sup>5</sup>, Colin McLaren<sup>1</sup>, Jordan Sutcliffe<sup>1</sup>, Justin Carré<sup>1</sup>, Shawn Geniole<sup>6</sup>, Jean Côté<sup>2</sup>

<sup>1</sup>Nipissing University

<sup>2</sup>Queen's University

<sup>3</sup>University of Georgia

<sup>4</sup>University of Birmingham

<sup>5</sup>Western University

<sup>6</sup>University of Fraser-Valley

During adolescence, youth increasingly interact with peers as their social realm expands beyond the family and they struggle to establish their identity (Wagner, 1996). Throughout this formative period, adolescents rely on the identities they form through memberships in different social groups (i.e., their social identities). Seminal research in social psychology notes that even with arbitrary grouping criteria (e.g., color preference), youth behaviours differ between group members (ingroup) and others (outgroup; Tajfel et al., 1971). Youth sport teams constitute an influential peer group and a promising context to examine how social identity influences moral behaviour. This symposium will explore the use of novel research methods within a large naturalistic data collection effort seeking to further our understanding of the social identity and moral behaviour relationship in youth sport. First, we introduce the Electronically Activated Recorder (EAR), a novel observational ambulatory monitoring method and the Audio Coding System for Social Environments in Sport (ACSSES), which was developed specifically to assess communication and interactions related to social identity with youth athletes. Second, we investigate athlete engagement and reception of social identity enhancing behaviours using EAR methodology and the ACSSES. Third, we test social identity strength as a mechanism through which friendship networks at the individual and team levels relate to athlete moral behaviour. Finally, we examine social identity perceptions as a moderator of game outcome and hormone response. The findings from this research can inform theory and the practical strategies used by coaches to foster desirable teammate behaviours through social identity development.

25.

## **THE ELECTRONICALLY ACTIVATED RECORDER (EAR): A NOVEL APPROACH FOR EXAMINING SOCIAL ENVIRONMENTS IN YOUTH SPORT**

Jordan D. Herbison<sup>1</sup>, Luc J. Martin<sup>1</sup>, Richard Slatcher<sup>2</sup>, Ian Boardley<sup>3</sup>, Alex Benson<sup>4</sup>, Jordan Sutcliffe<sup>5</sup>, Colin McLaren<sup>5</sup>, Justin Carré<sup>5</sup>, Jean Côté<sup>1</sup>, Mark W. Bruner<sup>5</sup>

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<sup>5</sup>Nipissing University

Sport is a context in which youth are afforded the opportunity to develop meaningful connections with peers and adults (e.g., Holt, 2016). Based on recent evidence, the interactions that athletes have outside immediate training and competition environments can shape their overall sport experiences (Tamminen et al., 2017). Accordingly, researchers have been challenged to explore innovative approaches that can contribute rich data and subsequently inform a more comprehensive understanding of what constitutes enriched sport experiences. Technological innovation combined with careful consideration of ethical concerns have led to the development of novel research approaches that can assess participants' conversations in their natural sport and social environments. This presentation will introduce the Electronically Activated Recorder (EAR; Mehl et al., 2001) as a novel ambulatory ecological assessment tool. Established originally in social psychology, the EAR can provide access to the daily social processes involving athletes and coaches within and beyond immediate sport activities (e.g., commute to/from training/competition, locker rooms, hotels). The EAR software is embedded within a portable recording device (e.g., iPod Touch) that is programmed to record brief segments of audio from participants' daily lives. In addition to discussing the utility of this approach for sport contexts, we introduce the Audio Coding System for Social Environments in Sport (ACSSES), which was developed specifically to assess communication and interactions related to youth athlete social identity. Evidence for the reliability and validity of the ACSSES, the associated coder training protocol, and proposed implications for research will be discussed.

26.

## **THE REINFORCING NATURE OF SOCIAL IDENTITY-DRIVEN PROCESSES: EVIDENCE USING THE EAR METHODOLOGY AND A MULTILEVEL APPROACH**

Alex Benson<sup>1</sup>, Luc J. Martin<sup>2</sup>, Jordan Herbison<sup>2</sup>, Richard Slatcher<sup>3</sup>, Ian Boardley<sup>4</sup>, Jordan Sutcliffe<sup>5</sup>, Colin McLaren<sup>5</sup>, Justin Carré<sup>5</sup>, Jean Côté<sup>2</sup>, Mark Bruner<sup>5</sup>

<sup>1</sup>Western University

<sup>2</sup>Queen's University

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<sup>5</sup>Nipissing University

The ways in which teammates interact with one another meaningfully shapes their sport experiences. In the current research, we leveraged an ambulatory ecological assessment tool known as the Electronically Activated Recorder (EAR) to non-obtrusively document the acoustic nature of athletes' social environments. Guided by a social identity approach, we generated and tested the novel hypothesis that when athletes receive signals from teammates suggesting that they are a valued and accepted team member, they will be more likely to engage in social identity enhancing behaviours. Data were collected from 45 youth athletes over the course of a three-day hockey tournament. We used the Audio Coding System for Social Environments in Sport to index the number of instances athletes experienced and engaged in three forms of social identity enhancing behaviours (i.e., ingroup affect, ingroup ties, cognitive centrality). Applying linear mixed-level modelling, we examined how experiencing social identity enhancing behaviours at both the within-person (i.e., daily events) and between-person (i.e., aggregated over the duration of the tournament) levels predicted engagement in social identity enhancing behaviours. Athletes engaged in more ingroup affect enhancing behaviours on days that they were the recipient of ingroup affect enhancing behaviours ( $p = .002$ ). A similar pattern emerged in relation to cognitive centrality enhancing behaviours ( $p < .001$ ). Our results highlight the utility of the EAR for studying teammate interaction processes and provide insight into the reinforcing nature of social identity processes in youth sport teams.

27.

## **SOCIAL NETWORK STRUCTURE AND MORAL BEHAVIOUR: THE MEDIATING EFFECT OF SOCIAL IDENTITY**

Colin McLaren<sup>1</sup>, Ian Boardley<sup>2</sup>, Luc J. Martin<sup>3</sup>, Jordan D. Herbison<sup>3</sup>, Richard Slatcher<sup>4</sup>, Alex Benson<sup>5</sup>, Jordan Sutcliffe<sup>1</sup>, Justin Carré<sup>1</sup>, Jean Côté<sup>3</sup>, Mark W. Bruner<sup>1</sup>

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<sup>5</sup>Western University

Relationships with significant others are important to the regulation of moral behaviour (e.g., Bandura, 1991). Using the social cognitive theory of moral thought and action as a foundation, the purpose of the current study was to test social identity strength as a mechanism through which teammate friendship networks at the individual and team levels relates to adaptive moral behavior in youth sport. Using social network analyses derived from reports of friendship strength among teammates, three metrics were computed: outdegree centrality (i.e., self-reported friendship with teammates), indegree centrality (i.e., nominations of friendship from others), and team density (i.e., overall friendship network strength). Athletes also completed self-report measures of social identity (SIQS; Bruner & Benson, 2018) and moral behaviour with teammates adapted for social situations (Kavussanu & Boardley, 2009). In total, six mediation models were tested using PROCESS (Hayes, 2013). Overall, the indirect effect of network structure on moral behaviour was significant, Sobel's test  $ps < .05$ , with the mediation accounting for 1.8 to 8.3% of the variance. The results highlighted a pattern whereby friendship network strength at the individual and team level were positively associated with sport team social identity, which in turn was (a) positively associated with athletes engaging in prosocial behaviours with teammates in social situations and (b) negatively associated with antisocial behaviours. These findings provide initial support for social identity to serve as an important pathway through which social ties among teammates may translate to moral behaviour outside of the immediate sport setting.



28.

## **SOCIAL IDENTITY AND CORTISOL RESPONSES TO COMPETITION IN MALE COMPETITIVE YOUTH HOCKEY PLAYERS**

Justin Carré<sup>1</sup>, Shawn Geniole<sup>2</sup>, Luc J. Martin<sup>3</sup>, Jordan D. Herbison<sup>3</sup>, Richard Slatcher<sup>4</sup>, Ian Boardley<sup>5</sup>, Alex Benson<sup>6</sup>, Colin McLaren<sup>1</sup>, Jordan Sutcliffe<sup>1</sup>, Jean Côté<sup>3</sup>, Mark W. Bruner<sup>1</sup>

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<sup>6</sup>Western University

Cortisol is a steroid hormone synthesized and secreted by the adrenal glands during experiences of physical and psycho-social stress. Cortisol levels have been found to rise sharply within the context of competitive interactions, yet with noticeable variability among athletes (Casto & Edwards, 2016). Here, we examined whether the degree to which one identifies with one's teammates (known as social identity) and competition outcome explain some of the variability in neuroendocrine reactivity patterns. One hundred and thirty-four male hockey players (Mage = 12.39, range = 10-14 years) from 9 hockey teams completed a sport specific social identity questionnaire (Bruner & Benson, 2018) and provided saliva samples before and after each of their 3 competitive ice hockey tournament games. Cortisol concentrations were assayed using commercially-available enzyme immunoassay kits. Multi-level analyses were performed to examine the extent to which variability in social identity (and its individual dimensions: ingroup ties, ingroup affect, cognitive centrality) and/or competition outcome predicted variability in cortisol reactivity patterns. Preliminary analyses revealed that competition outcome modulated cortisol responses, whereby cortisol levels were higher after defeats relative to victories. Moreover, athletes who felt increased positive emotions toward their teams (i.e., ingroup affect) demonstrated a more robust increase in cortisol levels relative to athletes who reported less positive feelings associated with team membership. The extent to which stronger cortisol responses to competitive interactions play a role in modulating athletic performance and/or important group related emergent states (e.g., cohesion) after competitive interactions will be discussed.

# **Sport Psychology**

## **Verbal Session III**

82.

## **DO WE AGREE THAT I TAKE THE BALL? DEVELOPING A VIDEO-BASED MEASUREMENT METHOD FOR SHARED MENTAL MODELS IN TENNIS DOUBLES**

Charlotte Raue<sup>1</sup>, Dennis Dreiskämper<sup>1</sup>, Bernd Strauß<sup>1</sup>

<sup>1</sup>University of Muenster, Germany

Shared Mental Models (SMM) are defined as knowledge structures held by each team member, enabling them to form accurate explanations and expectations of each other and adapt their own behavior (Cannon-Bowers et al., 1993). So far, measurements captured SMM using statical questionnaires (e.g. Filho et al., 2014). However, measurements should incorporate the dynamic sport-context. The aim of the study is to develop an ecological valid, video-based measurement for SMM in tennis doubles. In total, 35 tennis doubles clips and two conditions were selected. In Condition Self participants respond for themselves. In Condition Partner they indicate their partners response. Measured was ball taking response, expertise, time played together and perceived trustworthiness (9 items). In total, 29 male tennis teams were analyzed, being 34.57 Mean years old (SD=12.25) and had 22.79 Mean years (SD=10.49) tennis experience. Inter-player agreement -Self/Partner- was analyzed for each partner and averaged per team (SMM). The results show that SMM depend on the difficulty level of the videos,  $F(2,15)=8.77, p<.01, \eta^2=.24$ . Post hoc analysis show that SMM are higher on easy than on medium ( $d=0.58$ ) and hard videos ( $d=0.94$ ). The average agreement of Partner 1 and Partner 2 show a significant correlation ( $r=.63, p<.001$ ). However, no significant correlations to expertise, time played together or trustworthiness were found. The results indicate that measuring SMM using video-based measurement is possible, due to the diverse video difficulty. Furthermore, a relationship between SMMs of partners can be found. The results underline that developing an ecological measurement of SMM using dynamic sport-related material is promising.

184.

## EXPLORING LIFE SKILL DEVELOPMENT THROUGH COACHING IN EMERGING ADULTS

Nathania Ofori<sup>1</sup>, Marika Warner<sup>2</sup>, Jessica Fraser-Thomas<sup>3</sup>

<sup>1</sup>\*School of Kinesiology & Health Science, York University \*\* MLSE Launchpad, Toronto

<sup>2</sup>MLSE Launchpad, Toronto

<sup>3</sup>School of Kinesiology & Health Science, York University

Sport offers a context for youth to develop life skills (LS) such as initiative, leadership, and teamwork, which can be transferred to non-sport settings (Camiré et al., 2012; Holt et al., 2017). Coaching offers a natural extension of youth's sport involvement, as a first employment/volunteer opportunity as youth transition into young adulthood. Given many challenges (e.g., instability, identity) that often accompany emerging adulthood (Arnett, 2000), there is value in better understanding young coaches' experiences. While extensive research has examined youths' LS development through sport programming, emerging adults' experiences coaching have yet to be explored. The purpose of this study was to gain an understanding of emerging adults' coaching experiences, with a specific focus on LS development through coaching. Semi-structured interviews were conducted with 8 emerging adult coaches affiliated with a large sport for development facility in Toronto; transcribed interviews were explored through thematic analysis (Braun & Clarke, 2006). Coaches perceived they were developing life skills in their positions and described various means by which this was occurring. Specifically, they discussed LS they had learned as athletes (i.e., perseverance, respect, leadership, time management, communication) and how they were continuing to build/enhance these skills in different ways as coaches. Additionally, they discussed the challenges of their positions, and their desire for additional training (e.g., TED talks, staff check-ins, feedback/focus groups) to help better foster their LS development. Preliminary findings suggest LS development through sport can continue into emerging adulthood, but that LS development is not automatic, supporting past work in youth sport contexts.

148.

# **AN EXPLORATION OF WOMEN ATHLETES' SELF-COMPASSION, SPORT PERFORMANCE PERCEPTIONS, AND WELL-BEING AROUND AN ATHLETE-IDENTIFIED IMPORTANT COMPETITIVE EVENT.**

Margo E. K. Adam<sup>1</sup>, Abimbola O. Eke<sup>1</sup>, Leah J. Ferguson<sup>1</sup>

<sup>1</sup>College of Kinesiology, University of Saskatchewan

Women athletes have expressed hesitation regarding adopting self-compassion in sport, stating that self-compassion may lead to complacency while self-criticism helps them achieve their goals in sport (Ferguson et al., 2014; Sutherland et al., 2014). However, quantitative research has identified that self-compassion is, and self-criticism is not, related to women athletes' sport performance perceptions (Killham et al., 2018). The contrasting findings suggest that the relationship between self-compassion and sport performance perceptions is complex. Moreover, perceived importance of competitive events might further impact how athletes perceive and relate to their sport performance experiences. The current study adopted a qualitative collective case study approach to explore and describe women athletes' self-compassion, sport performance perceptions around an athlete-identified important competitive event. Nine competitive women athletes between 19 and 27 years participated in one-on-one interviews before and after their self-identified event. Data were analyzed and are represented by a holistic case description, one overarching theme Continuing to Excel in Sport, and two sub-themes: (i) Re-framing Criticism and (ii) A Determined Approach. The generated themes indicate that the athletes benefit from a self-compassionate perspective during the preparing, competing, and reflecting stages of their important competitive events. Overall, the results highlight that women athletes utilize self-compassion to promote their sport performance perceptions when at different times and for a variety of reasons around their important competitive events to excel in sport. This research was funded by the Social Sciences and Humanities Research Council of Canada (SSHRC).

64.

## **WHEN WORDS FAIL, PICTURES SPEAK: A VISUAL AUTOETHNOGRAPHY OF A FEMALE UNIVERSITY STUDENT-ATHLETE WITH POST-CONCUSSION SYNDROME**

Melissa Paré<sup>1</sup>, Jill Tracey<sup>1</sup>

<sup>1</sup>Department of Kinesiology and Physical Education, Wilfrid Laurier University

Sport-related concussions (SRC) are an epidemic among all levels of sport (Noble & Hesdorffer, 2013) and an increasing number of athletes are experiencing prolonged symptoms, known as post-concussion syndrome (PCS). This study used a combination of autoethnography and art-based methods to demonstrate the experiences of a female university student-athlete with PCS. Data collected through retrospective personal reflection, personal journals, medical records, and art-work created during the recovery period was analyzed through a 3 step qualitative content analysis (preparation, organization, and reporting) using manifested and latent content (Elo & Kyngäs, 2008). The manifested content revealed how I was feeling in the specific context when the art was created. For example, communicating where exactly I felt my headache, or feeling trapped in a dark hole. However, when looking deeper into the latent content, more complex psychological constructs revealed the dissociation between injury and athlete, the loss of identity, and the lack of control in the recovery process. This novel integration of art-based methods in the research of the psychology of sport injury and rehabilitation provides a new perspective on the experiences of athletes with SRC and/or PCS. Sharing my experience with PCS can normalize the negative psychosocial responses to injury and rehabilitation of other athletes, as well as educate rehabilitative professionals about these responses.

10.

## **PRIVATE INSTANT MESSAGE GROUPS, COHESION AND PERFORMANCE IN SPORT: A MIXED-METHODS CASE STUDY**

Tina DeRoo<sup>1</sup>, Lori Dithurbide<sup>1</sup>

<sup>1</sup>School of Health and Human Performance, Dalhousie University

Online communication is a relatively new phenomenon that has yet to be addressed in the cohesion and performance literature. Online communication has been related to both positive and negative outcomes for users outside of sport, but there is little, if any, work looking at the effects of online communication in team-based sports. The purpose of this mixed methods case study was to explore how online communication impacted a team's cohesion and performance over a season. Using an explanatory sequential mixed methods design, an initial quantitative phase measured cohesion via the GEQ (Carron, Widmeyer & Brawley, 1985) and online networks among teammates to examine the potential relationship between high cohesion and a high frequency of online communication. A qualitative phase of coach and athlete interviews followed, integrating findings from the quantitative phase. Abductive analysis included both deductive and inductive phases to first compare the findings from interviews to other research in the field and second, to generate themes unique to the experience of the participating team. Quantitative analysis revealed no significant relationship between cohesion and frequency of online communication. Deductive analysis revealed support in the interviews for some theories and not for others. Inductive analysis generated themes of organized communication, inclusion and a general lack of tension among teammates. Actionable findings for coaches, athletes, mental performance consultants and researchers will be discussed. Online communication through instant messaging is growing and pervasive, therefore we should continue to explore any potential effects of instant messaging groups (full team or subgroups) on team performance.

**Sport Psychology**  
**Verbal Session IV**  
**(Symposium)**



## **Collaborating with Indigenous communities in sport and exercise research**

### **Overview**

The Canadian Sport Policy and the Framework for Recreation in Canada share a vision of increasing access and inclusion to meaningful sport, physical activity, and recreation opportunities for underrepresented populations. Researchers serve a critical role in supporting the development of evidence-based programming and policy, and the purpose of this symposium is to facilitate the flow and exchange of knowledge regarding respectful processes for engaging in sport, physical activity, and recreation research with Indigenous peoples in Canada. Drawing upon research projects conducted in partnership with Indigenous communities, the specific objectives of this symposium are to: (1) enhance critical understandings of the historical role of sport, physical activity, recreation, and research in the lives of Indigenous peoples in Canada; and (2) increase awareness of guiding principles and resources for engaging in respectful research with Indigenous peoples.

### **Speakers**

Leah Ferguson, Métis assistant professor in the College of Kinesiology at the University of Saskatchewan, will share an Indigenous sport research project focused on exploring Indigenous women athletes' sport meanings and experiences. She will describe and present examples of decolonizing research philosophies and processes, particularly through relationship-building and embracing athlete- or community-identified methods of gathering knowledge (i.e., data generation). She will also discuss creating respectful partnerships with Indigenous sport advisors and engaging in meaningful knowledge translation to share research results.

Heather Foulds is an assistant professor in the College of Kinesiology at the University of Saskatchewan and the Heart & Stroke/CIHR Early Career Indigenous Women's Heart and Brain Health Chair. She will share her experiences partnering with Indigenous communities to develop and implement research collaborations evaluating community-based physical activity interventions. Her examples include a community-initiated walking and running training program, and a collaboration to evaluate physical fitness and exercise potential of Indigenous cultural activities. Specifically, Métis Red River Jigging will highlight the importance of community voice and the shared journey of community and researcher.

Tara-Leigh McHugh, professor in the Faculty of Kinesiology, Sport, and Recreation at the University of Alberta, will describe a community-based participatory research project that is focused on enhancing the sport experiences of Indigenous youth through participation in northern games. She will outline the essential role of a cross-sector partnership in facilitating collaborative processes of data generation. As well, she will describe her commitment to ensuring that research findings are relevant to community members, researchers, and decision makers.

Moss Norman is an assistant professor in the School of Kinesiology at the University of British Columbia. Based on experiences gained from a six-year research collaboration with Fisher River Cree Nation (Manitoba, Canada), Moss will share thoughts about the role place and relationality occupy in Indigenous sport and physical activity research protocols. As a white settler scholar, he will argue that considerations of place and relationships, both of which are significant aspects of a Cree research paradigm, have been critical to fostering a ethical, relevant and reciprocal inter-cultural research collaboration with Fisher River Cree Nation.

# **Sport Psychology**

## **Verbal Session V**

150.

## **TODDLER AND PRESCHOOLER SPORT PARTICIPATION: TAKE-UP, PATHWAYS, AND PATTERNS OF ENGAGEMENT**

Meghan Harlow<sup>1</sup>, Jessica Fraser-Thomas<sup>1</sup>

<sup>1</sup>York University

While prominent life-span sport participation and development models suggest children enter organized sport at approximately six years of age (i.e., Developmental Model of Sport Participation [DMSP], Côté & Fraser-Thomas, 2016; Long-Term Athlete Development Model [LTAD], CS4L, 2016), current trends indicate active free play is being replaced by organized sport at markedly younger ages (AAP, 2019; ParticipACTION, 2018). As limited research captures children's sport experiences during the early years (i.e., ages 0-6), this study aimed to advance understanding of toddler and preschooler sport participation, by exploring patterns of sport take-up, pathways, and general patterns of engagement. Data were collected through external program observations of five early-years sport programs (i.e., multi-sport, soccer, hockey, rugby, and gymnastics), as well as 10 semi-structured parent interviews (Mage = 36.4; six female, four male), who each had a child between 3-5 years of age enrolled in one of the aforementioned programs. Results offer novel insight into toddler and preschooler children's sport, organized physical activity, active-play, and unstructured sport habits, while also highlighting common features and engagement patterns within early-years sport programs (e.g., structure, movement/sport skill focus, play-based activities). Findings suggest existing models (i.e., DMSP, Côté & Fraser-Thomas, 2016; LTAD, CS4L, 2016) do not reflect or align with the delivery of or experiences within early-years sport programming. Future research is needed to determine what engagement patterns/program activities are optimal for toddler and preschooler development, to in turn contribute to refined versions of models, while acknowledging that sport participation is occurring prior to six years of age.

178.

## **A MOTIVATIONAL PERSPECTIVE OF STRESS AND COPING IN PHYSICAL EDUCATION FOR CHILDREN AT RISK FOR DEVELOPMENTAL COORDINATION DISORDER**

Chantelle Zimmer<sup>1</sup>, Janice Causgrove Dunn<sup>1</sup>

<sup>1</sup>University of Alberta

Developmental Coordination Disorder (DCD) affects 1 to 2 children in every elementary classroom and results in significant difficulties learning and performing motor skills. Many children with DCD seem to experience stress in physical education due to emphasis on their motor skills and their motor difficulties being visible to others. According to Skinner and Wellborn (1994), children may perceive physical education as stressful because it challenges or threatens their basic psychological needs for relatedness, competence, and autonomy. No researchers to date, however, have examined these experiences from the perspectives of children through a stress and coping lens. The purpose of this study was to explore how children who demonstrated characteristics associated with a diagnosis of DCD, and were referred to as at risk for DCD, experienced and coped with stress in physical education. Method: Six children in Grades 4 to 6 were interviewed two times to learn about their experiences, with Skinner and Wellborn's theory informing the interpretation of the findings. Results: Three themes were identified: (1) They hurt me – psychological and physical harm sustained from peers, (2) It's hard for me – difficulties encountered in activities, and (3) I have to – pressure to meet the teacher's demands. Children coped in more adaptive ways in response to the first two stressors compared to the third stressor. Conclusion: These findings indicate that children at risk for DCD are confronted with stressors in physical education that impinge on all three of their basic psychological needs, but largely cope well when social support is provided.

267.

## **USING THE RE-AIM FRAMEWORK TO EVALUATE THE IMPACT OF A SPORT FOR DEVELOPMENT PROGRAM SERVING MARGINALIZED YOUTH**

MICHAEL JONATHAN HOOD<sup>1</sup>, KELLY ARBOUR-NICITOPOULOS<sup>1</sup>

<sup>1</sup>Faculty of Kinesiology and Physical Education, University of Toronto

Sport for development (SFD) interventions can act as a catalyst for positive youth development. This case study used the RE-AIM framework to evaluate the individual and community level impact of Ahead of the Game (AOTG), a 12-week school-based program that empowers marginalized youth through sport and mentorship in the Peel District School Board (PDSB) (Ontario, Canada). Each of the five RE-AIM dimensions were assessed using surveys and school administrative records. Overall, 1,551 Peel district students (85% male; age 14-19) have participated in AOTG (Reach). Participants attended an average of 87% of sessions. Main reasons for participation included: the supportive environment (30%), the opportunity to build positive relationships (25%), mentorship (23%), and learning life skills (22%). Participants reported increased conflict resolution (89%) and anger management skills (90%) (Efficacy). 19/42 schools within PDSB have run AOTG, 8 of which are the highest priority schools in the Board. Two AOTG facilitators have collaborated with at least one school staff at each site. (Adoption). The majority (79%) of sites have implemented the AOTG program curriculum in its entirety, with 16% also administering AOTG's evaluation component (Implementation). School records show a decrease in participants' negative incidents with teachers and school administration at one-month follow-up. 14/19 schools have repeated the program the following school year (Maintenance). AOTG is an effective mentorship-based SFD program that demonstrates the potential for building positive relationships, increasing life skills, and decreasing juvenile delinquency. Application of the RE-AIM framework to this program provides a blueprint for its translation to other SFD programs.

152.

## **IDENTIFYING AFFECTIVE PROTECTIVE AND RISK FACTORS ASSOCIATED WITH SPORT DISENGAGEMENT: A FOUR-YEAR RETROSPECTIVE FOLLOW-UP**

Anna Zheng<sup>1</sup>Jenna GilchristCatherine M. SabistonEva Pila

<sup>1</sup>Kinesiology, Western University

Participation in organized sport is associated with enhanced psychological, social, and health outcomes, yet considerable dropout rates are observed in adolescence, particularly among girls. Affective factors are associated with sport experiences and may impact dropout in adolescent athletes, however, there is a dearth of longitudinal research examining sport dropout. The purpose of this longitudinal study was to identify affective factors (i.e., enjoyment, positive affect, negative affect, competitive anxiety) that may protect against or present risk for dropout from sport. Adolescent girls (Mage = 14.02 ± 1.38 years old) participating in organized sport were sampled at baseline (n = 518) and self-reported a range of affective indices, and were followed up 4 years later (n = 166) to track sport disengagement or dropout from sport altogether. At follow-up, 55% of respondents reported disengagement from at least one sport (81%), or completely withdrew from sport (19%). Controlling for age, the binary logistic regression model was significant,  $\chi^2(5) = 12.41$ ,  $p < .05$ , and explained 11% (Nagelkerke  $R^2$ ) of the variance in sport dropout. Girls with higher baseline competitive anxiety were 2.04 times more likely to dropout or sport over the next four years ( $p < 0.05$ ). These findings suggest that competitive anxiety is an affective risk factor that may predict future sport disengagement. Developing strategies to target and reduce competitive anxiety among female athletes may contribute towards reduced sport disengagement, and allow girls to further realize the psychosocial and health benefits associated with sport participation.

96.

## **COMMUNITY STAKEHOLDERS' INVOLVEMENT IN A TRAIN-THE-TRAINER MODEL TO INTEGRATE TRAUMA-INFORMED SPORT PROGRAMMING IN A NATIONAL YOUTH ORGANIZATION**

Majidullah Shaikh<sup>1</sup>, Corliss Bean<sup>2</sup>, Tanya Forneris<sup>2</sup>

<sup>1</sup>University of Ottawa

<sup>2</sup>The University of British Columbia

Trauma-informed sport programs are an emerging means to support youth who have experienced psychological trauma. Using a train-the-trainer model, which involves building the capacities of peer facilitators to train youth workers, may be a promising approach for integrating and sustaining trauma-informed sport programs in multiple community settings. In this study, community stakeholders' experiences are explored with regards to participating in a train-the-trainer model focused on disseminating trauma-informed sport programming throughout a national community youth organization. Peer facilitators with previous experience in delivering trauma-informed sport programming ( $n = 6$ ; 4 female;  $M_{age} = 47.50 \pm 10.35$ ; Range = 32-62) attended a two-day intensive training workshop hosted by two expert consultants; here, peer facilitators learned and practiced how to train others to deliver trauma-informed sport programming. The peer facilitators then hosted training workshops for youth workers at their respective sites, which were monitored and assessed by the expert consultants. Data were collected through workshop observations and interviews with consultants and peer facilitators, and then analysed using deductive-inductive thematic analysis. The interview guides and deductive analysis were informed by the theoretical domains framework. Results spanned across seven themes: (a) Identity as champions of trauma-informed sport approaches; (b) Anxiety in taking on new leadership roles; (c) Improved confidence through leadership practice; (d) Enhanced communication and instructional skills; (e) Value of feedback in peer facilitators' development; (f) Importance of maintaining clear expectations; and (g) Positive intentions to continue and expand training. Implications are discussed regarding how community organizations can improve the dissemination of trauma-informed sport programming.



# **Sport Psychology**

## **Verbal Session VI**

15.

## EMERGING TOPICS IN ATHLETE DEVELOPMENT RESEARCH

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<sup>1</sup>Faculty of Health Sciences, Ontario Tech University

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Despite a large body of multidisciplinary research and several models, successful athlete development remains fraught with inefficiencies, and negative outcomes. The aim of this symposium is to highlight new approaches, as well as critical perspectives, on how to manage athlete development. The first two presentations discuss findings from a unique high performance student-athlete development program, the Academy for Student Athlete Development (ASAD). Knibbe et al describe the sport-school model of ASAD, and how qualitative data have been used to adapt the program over the first few years of its existence. Mosher and colleagues present quantitative data describing the impact of the ASAD on athlete-level education, social and athletic outcomes using pre and post-test data. The third and fourth presentations focus on the challenges of identifying and developing talent in sport. Using data from 46 targeted sports across three developmental levels in British Columbia, Hill et al quantify the probability of conversion across levels of sport for talented athletes, and critically discusses the utility of targeted pathways, and current notions of when athletes should be targeted for talent pathways. Schorer eschews predominant multivariate ‘formula’ approaches to talent identification in favour of a bounded rationality approach using simple heuristics, based on decision-making research. The symposium appropriately concludes with results of a systematic review from Lemez on end of athletic career transitions, which emphasizes the role of psychosocial and environmental factors that influence successful transitions. All presentations stress the need to challenge conventional approaches, for rigorous and critical research, to optimize athlete development.

17.

## **THE ACADEMY FOR STUDENT ATHLETE DEVELOPMENT: THE EVOLUTION OF A SPORT SCHOOL MODEL IN ONTARIO**

Tara Joy Knibbe<sup>1</sup>, Nick Wattie<sup>2</sup>, Joseph Baker<sup>3</sup>, Jessica Fraser-Thomas<sup>3</sup>, Alexandra Mosher<sup>3</sup>, Jennifer Leo<sup>4</sup>

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<sup>4</sup>The Steadward Centre, University of Alberta

Most Canadian provinces have experienced a dearth of economically and geographically feasible sport school models. As a result, student-athletes often make compromises that lead to failings in academics, social isolation, or diminished athletic pursuits. This research examined the experience of elite student-athletes participating in the Academy for Student Athlete Development (ASAD), and the evolution of this sport school model over two years. This program focuses on athletic, academic, and psychosocial development. A qualitative design employed semi-structured interviews with student-athletes participating in the ASAD program stream (n=9). Interpretive thematic analysis was used to analyze the data using the four domains of development framework: physical, intellectual, psychological/emotional, and social (NRCIM, 2002). Results are presented in these four areas: Physical (Performance-related benefits such as skill development, fitness, and overall health); Intellectual (Prioritization, time-management, and self-discipline were attributed to program structure and the cooperation of community and partners); Psychological/emotional (Sense of purpose, accomplishment, and belonging reported alongside intense pressure and threats to self-esteem); and Social (Flexible and enhanced social network responsive to student-athletes needs and schedules, but desire for increased personal connections). Results highlight the need for a flexible environment with dynamic supports to thrive athletically, academically, and psychosocially. Mapping results to the ASAD model, tangible areas for improvement in the subsequent year include changes to classroom structure, enhanced coaching to increase alignment between stakeholders, additional mental training, and dedicated time in student-athlete schedules for community engagement and relationship building. Further implications will be discussed in relation to the evolving ASAD model.

18.

## **EVALUATING PSYCHOSOCIAL OUTCOMES OF STUDENTS PARTICIPATING IN A SPORT-SCHOOL MODEL**

Alexandra Mosher<sup>1</sup>, Tara Joy Knibbe<sup>2</sup>, Nick Wattie<sup>3</sup>, Joseph Baker<sup>1</sup>, Jessica Fraser-Thomas<sup>1</sup>, Jennifer Leo<sup>4</sup>

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Athlete development is a continuous process, yet there has been very little focus on understanding the factors related to optimizing psychosocial outcomes in a sport-school model during adolescence. The Academy of Student Athlete Development (ASAD) is a high performance athletic and academic sport-school model offered to student athletes in grade 9-12 in a large urban center in Southern Ontario. Research is a fundamental component of the ASAD model as it is used to guide continual improvement of the sport-school model. The current study examined the psychosocial outcomes of students participating in the ASAD sport-school model. More specifically, 31 current students (58% male) completed a survey package containing the Student Athletes' Motivation Toward Sports and Academics Questionnaire (SAMSAQ; Gaston-Gayles, 2005), Cohen Perceived Stress Scale (PSS; Cohen, Kamarck & Mermelstein, 1994), Developmental Assets Profile (DAP; Search Institute, 2016) and the Training Self-Efficacy Scale (TSS) early in the school year (November) and late in the school year (May). As a whole, scores on subscales remained consistent across both time points. Further Time-1 and Time-2 comparisons trended towards gender differences, with females dropping in almost all scores while males remained relatively stable or increased scores. Correlation analyses indicated all subscales of the DAP were positively correlated to each other. Interestingly, the TSS was positively correlated with all DAP subscales ( $p < .05$ ) and the PSS was negatively correlated to the DAP subscale of support ( $p < .05$ ). Results will be discussed in regard to implications for the future of the sport-school model and needed next steps.

19.

## **CONVERTING IN THE HIGH PERFORMANCE PATHWAY: AN INITIAL STUDY OF THREE YEAR CONVERSIONS**

David Hill<sup>1</sup>, Drew Todd<sup>1</sup>, Ming-Chang Tsai<sup>1</sup>, Nicola J Hodges<sup>2</sup>

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One of the issues in talent development concerns the reliability of “talent identification” at young ages in terms of future success (conversion) as a national team athlete. In Canadian sport, the Long Term Athlete Development (LTAD) model (Balyi & Hamilton, 2004) has provided guidance concerning transition stages for youth athletes. Over the past ten years, the Canadian Sport Institute Pacific has been compiling lists of athletes who have been “targeted” (i.e., identified as future National team potential). Data from PSOs (Provincial Sport Organizations) were collected across three athlete levels (Provincial Development Levels 1 and 2 and Canadian Development) from 2008-2013. Data was analyzed over a three-year window to determine successful conversion to the next level within this time band. Over 7000 athletes had been targeted across 46 sports (M years targeted = 2.43 yr). Conversion rates ranged between 20-27%, with more successful conversions at younger ages (vs 18 yrs). Although these data only provide information relating to rate (and indirectly, probability) of conversion, they provide a starting point to look at factors which led to successful conversion (such as the environments, competition success, other markers of athlete ability, age of identification) and to determine whether targeted pathways are most conducive to success. They also warrant discussion about the length of time that athletes can develop under high quality practice conditions and whether athletes are afforded a sufficient amount of quality practice in order to achieve expertise in their given sport.

20.

## **TALENT PROGNOSIS IS SIMPLE – WHAT CAN WE LEARN FROM DECISION-MAKING RESEARCH?**

Jörg Schorer<sup>1</sup>

<sup>1</sup>Institute of Sport Science, Carl von Ossietzky University of Oldenburg

One of the most difficult things in sport seems to be the prediction of future success in young athletes. Sport science has tried to identify predictors for this task in a large variety of areas. Starting with anthropometric data or psychological measures, to technical and tactical skill test, and many more approaches. The idea behind these attempts is to find a formula that might be able to explain most of the variance of later success in young athletes. While the rationale for this approach is understandable, and at first sight logical, decision-making research in the last decades suggests an alternative approach may be more appropriate. Gigerenzer and colleagues have argued for a bounded rationality in decision making and forecasting (Gigerenzer, Todd, & Group, 1999). They suggest that simple heuristics might make us smart, and might be as, or probably more accurate, than all the “talent formulas” that exist. This presentation will discuss both approaches, and present first findings of two studies that seem to support the bounded rationality approach, while not really testing it (Schorer, Rienhoff, Fischer, & Baker, 2017).

21.

## **WHO AM I? A MULTIDIMENSIONAL APPROACH TO UNDERSTANDING CAREER TRANSITION QUALITY IN FORMER COMPETITORS**

Srdjan Lemez<sup>1</sup>

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Participation in sport in early childhood plays an important role in identity formation of children; however, those who go on to compete in more specialized and elite-sport systems may be prone to conflating their self-identity with sport-identity. In turn, a unidimensional construction of identity may act as one barrier of many for former athletes that are trying to navigate the post-sport transition. The purpose of this study was to build on Park, Lavallee, and Tod's (2012) review on athletes' career transition out of sport by conducting an updated systematic analysis on factors predicting successful and 'crisis' transitions of former competitive athletes. Articles were searched through the PubMed, SPORTDiscus, and Web of Science databases using specified keywords and inclusion criteria. Preliminary findings suggest the emergence of similar themes to Park et al.'s (2012) review as important considerations in the career transition process for athletes, such as the role of athletic identity, voluntariness of retirement decision, perceived control of life, pre-retirement planning, and physical health. In addition, more recent findings have illuminated the importance of sociocultural environments and the need for athletes to adopt new narratives and expand the functionality of current narratives as it relates to their lived experiences in post-retirement (e.g., Cavallerio, Wadey, & Wagstaff, 2017). Results will be discussed in the context of facilitating effective athlete 'identity' development from an early age to promote positive psychosocial outcomes, such as sport and life satisfaction throughout the lifespan, with a focus on strategies to ensure successful end-of-athletic-career transition in particular.

# **Sport Psychology**

## **Verbal Session VII**



242.

## **CATCHING THE FEELING OF FLYING: CULTIVATING OLYMPIC TRAMPOLINE CHAMPIONS**

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<sup>1</sup>Human Studies, Laurentian University

<sup>2</sup>School of Human Kinetics, Laurentian University

Olympic podium performances represent peak accomplishments for an athlete and his/her team. As such, researchers seek to understand the pathway to the Olympic podium and produce athlete development models capable of helping athletes reach these achievements. The Environmental Success Factors model (ESF; Henriksen et al., 2010), an emergent athlete development framework, shifts focus away from the importance of social agents in isolation (e.g., coaches, teammates) to the importance of a holistic environmental development context. The ESF model demonstrates how contextual inputs (i.e., preconditions, processes) shape the sport environment's culture and athletes' subsequent performance outcomes. Using this framework, we conducted an intrinsic case study to explore the athlete development program at Skyriders Training Environment (STE), a Canadian trampoline training facility sporting consistent Olympic medal performances across five previous Olympic cycles. Participants led a researcher on guided walks (a mobile method of conversational interviews), contextualizing the sport environment and discussing environmental factors (e.g., coaching, facility) that interdependently contribute to their consistent success, prompted by relevant cues throughout the facility. Consequently, we constructed an ESF model of STE's athlete development program. An interpretive thematic analysis identified three main themes discussing (a) creating lift (i.e., creating an environment of success), (b) providing a tailwind (i.e., establishing partnerships), and (c) soaring onto the Olympic podium (i.e., training for excellence). Unearthing the idiosyncrasies of this unique training environment provides insight into the "how to" of elite athlete development. These findings can be translated into other sport contexts and aid practitioners in building a holistic development program.

139.

## **THE MORE, THE MERRIER: A CONDITIONAL INDIRECT EFFECT APPROACH TO NARCISSISM AND TEAM FUNCTIONING**

Matt W. Boulter<sup>1</sup>, James Hardy<sup>1</sup>, Ross Roberts<sup>1</sup>

<sup>1</sup>Institute for Psychology of Elite Performance, Bangor University

Those high versus low in narcissism tend to perform better in individual performance settings. However, less is known about narcissists influence in team environments. Narcissists self-centred and entitled disposition may contribute to conflicts within a team, leading to decreased team functioning. Therefore, we investigated how narcissism in teams contributes to team functioning via intragroup conflicts. Couched within Trait Activation Theory (Tett & Burnett, 2003), we explored the interplay between individual and team-level narcissism on cohesion. Across two studies we examined cross-sectional (Study 1, N = 306 from 24 teams) and longitudinal (Study 2, N = 400 from 44 teams) perspectives of the influence of narcissism in sport teams. Participants completed measures of narcissism, perceived narcissistic team composition, intragroup conflict, and cohesion. Multilevel Bayesian conditional indirect effect hybrid modelling allowed us to test the effect of individual narcissism on cohesion via intragroup conflict moderated by perceived narcissistic team composition. Results indicated a conditional negative indirect effect through process conflict (only) on task cohesion in Study 1, and on task and social cohesion in Study 2. Specifically, a negative indirect effect was only present when teammates perceived few narcissists to be on the team. Findings suggest that narcissists undermine team functioning when they are in teams comprising of few similar individuals, this effect was mitigated when they perceive more narcissists in their team. Seemingly, the disruptive effects of narcissism can be attributed to the disagreements regarding roles and responsibilities only when few likeminded individuals are in their team.

84.

## **SYNCING TO PERFORM: A LONGITUDINAL CASE STUDY OF EMOTIONAL AND PHYSIOLOGICAL SYNCHRONY IN A TEAM OF MALE VOLLEYBALL ATHLETES**

Katherine Tamminen<sup>1</sup>, Chad Danyluck<sup>2</sup>, Ruochen Chen<sup>3</sup>

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<sup>3</sup>University of Toronto

Participation in group activities predicts feelings of connection with other group members that can enhance performance coordination. However, there is limited research exploring whether team routines predict perceptions of emotional synchrony, physiological synchrony, and performance outcomes in sport. The purpose of this study was to examine emotional and physiological synchrony among a team of 16 male university volleyball athletes over two months using a case study approach (Stake, 2005). Athletes participated in a pre-practice group visualization routine while wearing bioharnesses to continuously measure heart rate (HR) and heart rate variability (HRV). Athletes completed post-practice measures of emotional synchrony and individual and team performance. The coach also rated athlete and team performance. Multilevel modeling revealed time and emotional synchrony predicted higher coach ratings of team performance and higher athlete ratings of both team and athlete performance. However, emotional synchrony drove both coach and athlete performance ratings, especially early in the season. Indeed, performance ratings in the early season were lower than ratings made later in the season unless players perceived high emotional synchrony. On those days, coach and athlete's performance ratings were comparable to the higher performance ratings made later on. Visual examination of the physiological data depicted synchronization between athletes' physiological states during their pre-practice routines. This research represents a novel case study examining the association between emotional and physiological processes and performance within a team of athletes. Overall, emotional synchrony seems particularly beneficial for team performance early in the season.

102.

## **AN INCH AWAY FROM BEING MENTALLY TOUGH: PERFORMANCE BIAS IN RATINGS OF MENTAL TOUGHNESS**

Benjamin Schellenberg<sup>1</sup>, Patrick Gaudreau<sup>2</sup>

<sup>1</sup>Faculty of Kinesiology and Recreation Management, University of Manitoba

<sup>2</sup>School of Psychology, University of Ottawa

Are assessments of an athlete's mental toughness influenced by how that athlete performs in a single moment in a game? We conducted three experimental studies to address this question and conclude that the answer is yes. In each study, sports fans (total N = 1,097) read scenarios that depicted a mentally tough basketball player, either by describing the player as having many mentally tough qualities (Study 1), or by stating that the player had been identified as being mentally tough by an expert sport psychologist (Studies 2 and 3). Participants then read that the player was about to take a championship-winning shot and were randomly assigned to learn that the shot had been either successful or unsuccessful. Moreover, in Studies 1 and 2 participants learned that the outcome had been either decisive (i.e., a "perfect swish" or an "air ball") or indecisive (i.e., the ball hitting the backboard, then the rim and, eventually, either going or not going into the basket). In each study, despite learning that the athlete was very mentally tough, participants' mental toughness ratings depended on whether or not the shot was successful. Ratings were also sensitive to the way in which an outcome was attained: ratings decreased in a linear pattern with the highest ratings following a decisive success, and the lowest ratings following a decisive failure. Overall, this research supports the criticism that assessments of mental toughness are distorted by how an athlete performs in a single moment.

94.

## GRIT AND PERFECTIONISM IN INTERCOLLEGIATE ATHLETES

Danielle L. Cormier<sup>1</sup>, John G. H. Dunn<sup>1</sup>, Janice Causgrove Dunn<sup>1</sup>, James L. Rumbold<sup>2</sup>

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Understanding personality characteristics that help and/or hinder competitive success in sport is of great interest to many sport psychology researchers. Two such personality characteristics that have been linked to the achievement-striving process in competitive sport are grit and perfectionism. While grit—as conceptualized by Duckworth, Peterson, Matthews, and Kelly (2007)—is largely associated with adaptive characteristics and outcomes in sport, perfectionism has been labeled as a ‘dual effect’ characteristic (MacNamara & Collins, 2015) that has been linked to both adaptive and maladaptive outcomes/processes in sport. The purpose of this study was to examine previously unexplored relationships between facets of multidimensional grit and multidimensional perfectionism in sport. A sample of 251 intercollegiate student-athletes (M age = 20.34 years, SD = 2.0) completed measures of domain-specific grit and domain-specific perfectionism in sport. Hierarchical regression analyses revealed that (a) separate facets of perfectionistic concerns negatively predicted grit, and (b) separate facets of perfectionistic strivings positively predicted grit in sport. Canonical correlation analysis produced an adaptive profile of perfectionism (i.e., a canonical variate comprising low perfectionistic concerns and high perfectionistic strivings) that was positively correlated ( $RC = .61$ ,  $p < .001$ ) with a grit variate comprising moderate consistency of interests and high perseverance of effort. The results not only reinforce the importance of conceptualizing/measuring grit and perfectionism as multidimensional constructs, but also indicate that the combination of high grit, low perfectionistic concerns, and high perfectionistic strivings may form part of a ‘positive personality profile’ that might assist athletes in the achievement-striving process in sport.

50.

## **NO PROFESSIONAL ATHLETE IS AN ISLAND: A CASE STUDY EXPLORING PERSONAL AND FAMILY EXPERIENCES OF TRANSITIONS THROUGH AN EARLY NHL CAREER**

Leisha Strachan<sup>1</sup>

<sup>1</sup>University of Manitoba

The careers of professional athletes are both exciting and tenuous. Normative and non-normative transition experiences (Stambulova, 2000) are both in play and how an individual is able to cope with these transitions is a key element to persistence and health (Stambulova et al., 2009). Throughout the course of an athletic career, several transitions will occur that affect the individual as well as significant others (Debois et al., 2012; Wylleman & Lavallee, 2004). In early work related to transitions, Schlossberg and colleagues (1981; 1995) point to four factors that could influence a person's ability to transition: 1) the situation, 2) the self, 3) support, and 4) strategies. Wylleman and Lavallee have also suggested a developmental approach to studying transitions through sport and highlight the roles of the individual and context throughout development to adulthood. The purpose of the current case study was to gain further understanding of transition experiences as they are currently happening throughout the early stages of a professional hockey career. Using a constructivist approach, a current NHL athlete as well as his parents and sibling were interviewed yearly over the past three seasons. Using previous frameworks, data collected were deductively analyzed to highlight or critique various components of the current models. Results point to the importance of continued family support throughout the early stages of a professional career and suggestions for individual and family preparation as an athlete enters the professional ranks.

# **Sport Psychology**

## **Poster Session I**

1.

## **SO YOU'RE A TOUGH GUY, EH?: CONSTRUCTIONS OF IDENTITIES BY COMPETITIVE MALE ICE HOCKEY PLAYERS**

Kirsten G. Morrison<sup>1</sup>

<sup>1</sup>School of Rural and Northern Health, Laurentian University

Throughout sport psychology literature, the relationship between identity and sport has been explored; however, research on how athletes come to develop certain identities has been lacking, particularly in aggressive sports, such as hockey. The proposed study will explore how competitive male ice hockey players construct their identities through sport participation. Framed within a social constructionist paradigm, and guided by narrative theory, this study addresses the intersectionality of multiple identities such as masculinity, race, and social class. Participants will include six to eight players from three competitive hockey teams in Sudbury, Ontario, Canada. Unstructured, conversational interviews will take place with each participant, asking them questions pertaining to their experiences in sport, with injury, and as a hockey player. Interpretative thematic analysis will be completed to identify common themes, as well as differences between the narratives. In line with narrative theory, keeping the integrity of the participants' stories will be the focus of data analysis. Based on previous literature, anticipated findings include identities of athletes being shaped by their early sporting experiences, the culture of sport, and idealized masculine values. The goal of the proposed study is to provide insight into the way sociocultural processes are used for forming identities, while also leading a path of new research into identity formation and the impact of sport culture. The results of this study will be important for facilitating a better understanding of how athlete identities are shaped both negatively and positively and their implications for individuals both in and out of sport.



5.

## **MARKERS OF EARLY SPECIALIZATION AND THEIR RELATIONSHIPS WITH BURNOUT AND DROPOUT IN SWIMMING**

Heather K. Larson<sup>1</sup>, Bradley W. Young<sup>2</sup>, Tara-Leigh F. McHugh<sup>1</sup>, Wendy M. Rodgers<sup>1</sup>

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Empirical evidence directly associating early sport specialization with burnout and dropout is lacking, although a relationship is theorized. Research in this area relies on time-intensive retrospective interviews or questionnaires that generate large amounts of data. The optimal use of these data for assessing early specialization (ES) and its relationship with key criterion variables is unclear. The purpose of this study was to add empirical evidence to the literature regarding ES, burnout, and dropout. This involved examining a large number of hypothesized markers of ES and reducing them to a smaller set useful for predicting burnout and dropout. Survey data were collected from 137 swimmers, age 12–13 years, and their parents, including descriptions of swimmers' sport backgrounds from age 6 until present. Contrary to what was expected, the ES items were not positively related to burnout and dropout. The authors present several possible explanations, including key motivational considerations.

7.

## **THE ANTECEDENTS AND OUTCOMES OF INFORMAL ROLES IN INTERDEPENDENT SPORT TEAMS**

Jeemin Kim<sup>1</sup>

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Informal roles (e.g., team comedians, informal leaders, distracters) can emerge in sport teams and influence overall team functioning. Thus, more research is warranted to investigate the factors/processes involved in the emergence and influence of these types of roles in sport. The current study examined the link between athletes' personality characteristics and their informal role occupancy assessed via teammate-nominations, and whether teammates' informal role occupancies predicted athletes' perceptions of group cohesion, satisfaction, and intentions to return. Data were collected from 286 athletes from 16 teams over three time points. The results indicated that extraversion positively predicted the occupancy of team comedian, verbal leader, social convener, cancer, and distracter roles. Conscientiousness negatively predicted distracter role occupancy, and neuroticism (positively) and agreeableness (negatively) predicted cancer role occupancy. Bivariate correlations indicated that debilitating roles (team cancers, distracters, malingerers) generally had negative associations with valued outcome perceptions. Multiple regressions indicated that the presence of comedians and enforcers positively predicted task cohesion, whereas distracters negatively influenced athlete satisfaction. The presence of verbal leaders had an inverse-U type relationship with athlete satisfaction, indicating that a few informal verbal leaders may benefit—but too many may harm—the group. The current findings supporting the link between athlete personality and informal role occupancy align with organizational psychology scholars' emphasis on the importance of role-occupant related factors in role emergence within groups. The findings pertaining to the outcomes support the proposition that the presence of informal roles can influence athletes' experiences and overall team functioning.

37.

## **THE EFFECT OF DISTANCE TO ELITE SPORT TEAMS ON TALENT DEVELOPMENT IN GERMAN HANDBALL PLAYERS**

Lojain Farah<sup>1</sup>, Nick Wattie<sup>2</sup>, Joseph Baker<sup>1</sup>, Dirk Büsch<sup>3</sup>, Jörg Schorer<sup>3</sup>

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The proximity of youth athletes to elite sport teams has been shown to have positive developmental effects in Canadian, Irish and Danish athletes (Farah et al., 2018; Finnegan et al., 2016; Rossing et al., 2018). However, this effect has not been explored in Germany; a country that is much different in its geospatial and sport-systematic nature. The purpose of this study was twofold: a- to explore the influence of distance from birthplace and first club to elite sport teams on selection into the youth national handball team, and b- to examine the long-term effects of distance on the league-level reached years later. Birthplace and first club data were collected for 60 female and 36 male athlete selected into the national youth program, as well as 59 female and 34 male athletes whom were not. Results showed that selected male athletes were closer to elite teams than their non-selected counterparts; however, only distance from birthplace to sex-specific second-division teams reached significance ( $p = .04$ ,  $d = .52$ ). As for female athletes, there were no differences in distance between the two groups. In regards to our second objective, distances from birthplace and first clubs to first-division teams significantly varied across league levels but in no particular pattern ( $p < 0.01$  and  $p = 0.02$ , respectively), while no differences were observed in the female group. These findings suggest that distance to elite teams have a positive influence on the development of male German handball players, yet has no effect on female athletes in this population.

38.

## **THE IMPLEMENTATION OF AN ATHLETE LEADERSHIP DEVELOPMENT PROGRAM WITH YOUTH ICE HOCKEY PLAYERS**

Matthieu Boisvert<sup>1</sup>, Todd Loughhead<sup>1</sup>, Krista Munroe-Chandler<sup>1</sup>

<sup>1</sup>University of Windsor

Leadership in sport is considered a crucial factor for any team to achieve success. Researchers have found a positive relationship between athlete leadership and a variety of group dynamic outcomes. The present study focused on two of these outcomes: cohesion and collective efficacy. In particular, the purpose of the current study was to examine the effects of a season-long athlete leadership development program on perceptions of athlete leadership behaviours, cohesion, and collective efficacy. The participants were 14 elite youth hockey players ( $M = 16.46$ ,  $SD = 0.78$ ) from one competitive team. Players participated in six athlete leadership development workshops over the course of the season. Each workshop lasted approximately 45 to 60 minutes. Using a mixed-method approach, quantitative data were collected prior to the athlete leadership development program and following the program. Specifically, the players completed measures assessing athlete leadership behaviours (Leadership Scale for Sports, Chelladurai & Saleh, 1980; Differentiated Transformational Leadership Inventory, Callow et al., 2009), cohesion (Youth Sport Environment Questionnaire; Eys et al., 2009), and collective efficacy (Collective Efficacy Questionnaire for Sports, Short et al., 2005). In addition, in-depth qualitative interviews with the players were conducted following the athlete leadership development program. Taken together, the leadership development program was beneficial in fostering the players' leadership behaviours, and helped maintain their levels of cohesion and collective efficacy. Implications for developing leadership behaviours with the objective of enhancing cohesion and collective efficacy will be discussed.

39.

## **EXAMINING THE ANTECEDENTS AND OUTCOMES OF ATHLETE LEADER FAIRNESS**

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Fairness is defined as an individualized perception of an action or statement as appropriate and just according to group rules and standards (Blanchard, 1986; Mallard, Lamont, & Guetzkow, 2009). The purpose of the study was to examine athlete leader fairness in relation to athlete leadership behaviours, cohesion, and athlete satisfaction. Participants were 203 (male  $n = 113$ ; female  $n = 90$ ; Mage = 19.85 years,  $SD = 1.51$ ) intercollegiate team sport athletes. Participants completed the Leadership Scale for Sports (Chelladurai & Saleh, 1980), Differentiated Transformational Leadership Inventory (Callow, Smith, Hardy, Arthur, & Hardy, 2009), Group Environment Questionnaire (Eys, Carron, Bray, & Brawley, 2007), Athlete Satisfaction Questionnaire (Riemer & Chelladurai, 1998), and a leader fairness inventory (Colquitt, 2001). Data were analyzed using path analysis to examine relationships among the variables. Task-oriented leadership predicted procedural fairness ( $B = .48$ ) and distributive fairness ( $B = .46$ ), transformational leadership predicted distributive fairness ( $B = .31$ ), interpersonal fairness ( $B = .39$ ), and informational fairness ( $B = .39$ ), and transactional leadership predicted procedural fairness ( $B = .23$ ), interpersonal fairness ( $B = .21$ ), and informational fairness ( $B = .13$ ). In turn, procedural and distributive fairness predicted task cohesion ( $B = 1.52$  and  $1.54$ , respectively), which then predicted satisfaction with performance ( $B = .40$ ) and the team ( $B = 1.19$ ). Findings from the present study provide support for athlete leaders as a source of leader fairness perceptions in team sport. Additionally, perceptions of athlete leader fairness are identified as an antecedent of cohesion and athlete satisfaction.

40.

## **AN INVESTIGATION OF THE ASSOCIATIONS BETWEEN PERSONALITY AND ATHLETE LEADERSHIP BEHAVIOURS**

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Athlete leadership is defined as “an athlete occupying a formal or informal leadership role within a team and influences team members to achieve a common objective” (Loughhead, 2017, p. 58). The study of athlete leadership is guided by numerous theoretical models such as the multidimensional model of leadership (Chelladurai, 2007). According to these models, personality will influence the behaviour of the leader. Very little research in sport has examined the relationship between personality and leader behaviour. This is unfortunate because personality traits are a precondition for leadership, providing the potential for leadership (Andersen, 2006). To better understand athlete leader behaviours, this study examined the relationship between personality and leadership behaviours of athlete leaders. Athlete leaders (N = 101) rated their agreement on the Big Five Inventory (John & Srivastava, 1999), and rated the frequency of their own leadership behaviours assessed by the Differentiated Transformational Leadership Inventory (Callow et al., 2009) and Leadership Scale for Sports (Chelladurai & Saleh, 1980). Model fit indices from the path analysis support our model ( $\chi^2/df = 1.10$ , CFI = .99, NFI = .92, RMSEA = .03). Further, the results showed the personality dimensions of openness to experience, extraversion, and conscientiousness predicted most of the leadership behaviours, while the other two personality dimensions (i.e., neuroticism, agreeableness) predicted at least one leadership behaviour. These findings provide evidence that personality is positively related to athlete leadership behaviours. The results indicate that athlete leader’s personality should be taken into account when delivering any type of athlete leadership development program.

46.

## **PERFECTIONISM IN ATHLETES AND NON-ATHLETES: EFFECTS ON SOCIAL PHYSIQUE ANXIETY AND BODY SATISFACTION**

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<sup>1</sup>Laurentian University

In today's culture, the body appears to have become a main focus. Increased use of image based social media sites appear to reinforce a focus on body ideals and related body image concerns. Nonetheless, individuals appear to differ with regard to vulnerability to such influences. The purpose of the present study was to examine how perfectionism [self-oriented (SOP) or socially-prescribed (SPP)] and athletic status (athlete vs non-athlete) might interact to influence body satisfaction, appearance investment and social physique anxiety in individuals. Athletic status was assessed using both a perceived athlete and an objective athlete definition based on responses to related questions. Participants included a post-secondary sample of 208 men and women aged 17-24 years. They agreed to participate in an online study of how personality and athletic status influence feelings towards oneself and related behaviours. Findings revealed both significant interaction and main effects on the outcome variables of interest, with the pattern of results differing based on athletic status definition and the specific perfectionism facet. Implications of these findings are discussed. Additionally, these results provide evidence for more closely examining the role of one's perceived athletic status as a unique risk factor in appearance and body related concerns. The findings of this study may assist in better identifying individuals at risk for negative self-body perceptions and their related compensatory behaviours, such as the use of appearance and performance enhancing drugs.

48.

## **IDENTIFYING COMPONENTS OF ATHLETES' SUBGROUP PERCEPTIONS: A CONCEPTUAL AND QUALITATIVE APPROACH**

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Recent advances in team dynamics research suggest subgroups to be an inevitability in sport, and that their presence can have facilitative and debilitating implications at both athlete and team levels (Wagstaff & Martin, 2018). Interestingly, the relative impact that subgroups have within a team appears to revolve less around their objective presence, and more so around athletes' subjective experiences (Martin et al., 2015). As such, the purpose of this study was to advance a series of components expected to be indicative of the way that athletes perceive subgroups in sport. Using a critical realist approach, a theory-driven literature review informed a preliminary list of perceptual components that were then assessed in detail through face-to-face or virtual focus-group interviews with 28 athletes (61% female; Mage = 22.2) from a range of sports (e.g., basketball, hockey, rowing). Audio recordings were transcribed verbatim, coded to identify demi-regularities, and analyzed through abduction and retroduction. The resulting proposed subgroup components include: Observability (e.g., distinctiveness), structural (e.g., variability, exclusivity), organizational orientation (e.g., citizenship behavioural tendencies), organizational representativeness (e.g., team level prototypicality of subgroup members), and affective (e.g., feelings associated with particular subgroups). These components uncover numerous ways that subgroups may be observed by athletes and could further inform our understanding of athletic experiences in sport. Indeed, whereas the traditional discourse pertaining to subgroups has involved trepidation and avoidance, the proposed components can provide a foundation for a more nuanced approach to their investigation.



49.

## **TRUST IN GOLF DISTANCE MEASURING DEVICES IN USERS**

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Whether to improve training or performance, the use of technology is increasing in sport and golf is no exception. A common piece of technology used in both competitive and recreational golfers is the Distance Measuring Device (DMD). Trust in technology can affect the choice to use technology and the performance of the human-technology team. The purpose of this research was to examine a golfer's confidence in their own abilities to determine yardage and trust in a DMD after a series of golf rounds both with and without the DMD. Thirty-three golfers with a handicap of 20 or less, and who typically used a DMD, participated in a repeated measures design study where measures were taken at baseline and following each of five rounds of golf. Trust in automation and confidence to estimate yardage without technology were assessed using a modified validated questionnaire on trust in automation (Jian et al., 2000). Results showed that trust in the DMD remained high throughout the study and did not change after golfers stopped using the device. Golfers' confidence in estimating yardage (without technology) did change over the course of the study where confidence decreased immediately after they played their first round without the DMD. However, their confidence increased again after playing another round without the device. There was no significant change in golfers' performance over the course of the five rounds. Future research should consider actual estimate accuracy and its relationship to self-confidence in one's own estimates without technology and trust in technology.

55.

## **AMPING UP ATHLETES: DESIGN AND IMPLEMENTATION OF A MENTAL SKILLS PROGRAM FOR VARSITY ATHLETES**

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Mental skills programs have been shown to provide numerous benefits to athletes of many sports, in a variety of facets including training, practice, competition, and injury recovery (Behncke, 2004; Hamson-Utley, Martin, & Walters, 2008). The Athlete Mental Performance (AMP) program was developed to provide athletes with psychological skills designed to enhance their performance in and out of competition. The program consisted of sessions that explained the theory behind psychological skill and allowed in the moment practice. Imagery, self-talk, goal-setting, anxiety management, pre-performance routines, and athletic identity sessions provided athletes with the building blocks they needed to improve their performance. The AMP team consisted of 3 graduate students, and a faculty supervisor. Through collaboration with coaches and athletic therapists at their University, the AMP team worked directly with members of men's football, women's lacrosse, and men's and women's curling. The team also facilitated drop-in sessions which attracted athletes from swimming, golf, women's basketball, and track and field. Sessions were 45 minutes in length and were divided into explanation and practice portions. Through the AMP program, athletes received in-group and one-on-one support to help them develop a greater understanding of their athletic abilities and were supported through their psychological skills development to enhance their overall athletic performance. Through feedback from the athletes and athletic therapists, and collaboration within the AMP team, the program has seen exponential growth in its first year, creating community partnerships to further expand the program and to support athletes and outside of the university athletics community.

56.

**ATHLETE LEADERSHIP DEVELOPMENT IN YOUTH HOCKEY PLAYERS**Kyle Bezaire<sup>1</sup>, Todd M Loughhead<sup>1</sup>, Krista J Munroe-Chandler<sup>1</sup><sup>1</sup>Department of Kinesiology, University of Windsor

Athlete leadership has been found to be critical for achieving effective team functioning and performance (Bucci et al., 2012; Gould et al., 2002). Further, researchers have highlighted the importance of including all team members in leadership development training since all athletes can provide leadership to their team (Crozier et al., 2013). However, theoretically and empirically tested athlete leadership development programs are not common in the literature. Using Duguay et al.'s (2017) athlete leadership development program, the purpose of the present study was to implement an athlete leadership development program targeting the enhancement of leadership behaviours for youth hockey players. Participants were 15 male Peewee Minor hockey players from one competitive team. The leadership development program consisted of six, one-hour long sessions that occurred twice monthly. Each session comprised an introduction to the leadership behaviours, small group and/or independent activities, and a debrief led by the coaching staff. The data were derived from continuous observations of the players, and a diary based on observations from the principal researcher during the hockey season that included perspectives from both the players and coaches. An improvement in communication and social cohesion amongst the players was found over the course of the intervention. Further, the leadership development program was beneficial for the coaches by allowing them to practice and reflect on the same leadership behaviours as those addressed to the players (Nelson et al., 2006).

60.

## THE RELATIONSHIP BETWEEN ATHLETIC IDENTITY AND MOTIVATION IN MASTERS ATHLETES

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Athletic identity (AI) is associated with increased motivation across a broad age range of exercisers. The study of AI and Masters athletes (MAs) has received less attention. The relationship between AI and motivation was tested with a large sample of MAs ( $n = 455$ ;  $M_{age} = 51.97$ ,  $SD = 11.51$ ). MAs completed the Athletic Identity Questionnaire (AIQ) and Behavioral Regulation in Sport Questionnaire (BRSQ). Confirmatory factor analyses supported the four-factor (i.e., appearance, importance, competence, encouragement) structure of the AIQ ( $\chi^2(183) = 384.02$ ,  $p < .005$ ,  $CFI = .944$ ,  $RMSEA = .049$ ) and the six-factor (i.e., intrinsic, integrated, identified, introjected, external and amotivation) structure of the BRSQ ( $\chi^2(237) = 646.26$ ,  $p < .005$ ,  $CFI = .872$ ,  $RMSEA = .062$ ). The structural model ( $\chi^2(900) = 1682.28$ ,  $p < .005$ ,  $CFI = .901$ ,  $RMSEA = .044$ ) showed significant relationships between the importance of sport and MAs' intrinsic ( $B = .167$ ), integrated ( $B = .227$ ), identified ( $B = .249$ ), and external ( $B = -.239$ ) motives. MAs' competence was related to intrinsic ( $B = .171$ ), identified ( $B = .173$ ), introjected ( $B = -.312$ ) motives, and amotivation ( $B = -.229$ ). MAs' perceived encouragement was related to integrated ( $B = .127$ ), identified ( $B = .169$ ), and introjected ( $B = .124$ ) motives, and amotivation ( $B = -.137$ ). Generally, when MAs identify strongly with their athletic role, they are also likely to have high levels of self-determined and low levels of non-self-determined motives for sport. The results are encouraging considering the established link between self-determined motives and sport commitment.

61.

## **NEXT ONE UP! EXPLORING HOW COACHES MANAGE TEAM DYNAMICS FOLLOWING INJURY**

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<sup>1</sup>Nipissing University

<sup>2</sup>Western University

Injuries are commonplace in high-intensity sport and a growing literature has explored how athletes are psychologically affected by such events. Given that injuries carry implications for the group environment in sport teams (Surya et al., 2015), the purpose of this study was to explore what occurs within a team during a time period of injury from a coach perspective, and how high-performance coaches manage a group at this time. Semi-structured interviews were conducted with ten U Sport (Canadian university) basketball head coaches (Mexperience = 14 years; SD = 9.05), and were thematically analyzed. Themes were identified in relation to (1) the perceived changes in group dynamics (i.e., role adjustments and strategic shifts), (2) factors that moderated a team's reaction to the injury (i.e., severity of injury, reaction of player injured, status of player injured, maturity of team, reaction of management), and (3) the coach management strategies used following an athlete's injury (e.g., provision of support, maintain alignment with team culture, communication). Our findings identify a range of group interaction processes and coach management strategies that unfold following injury. Coaches' descriptive accounts of how they attempt to manage group dynamics from the moment of the injury event to an athlete's reintegration into the lineup carries both theoretical and practical implications.

66.

## **CREATING CULTURALLY SAFE YOUTH SPORT ENVIRONMENTS SUPPORTING CANADIAN NEWCOMERS' WELLBEING**

Camille Sabourin<sup>1</sup>, Sara Kramers<sup>1</sup>, Laura Martin<sup>1</sup>, Jacob Dupuis-Latour<sup>1</sup>, Martin Camiré<sup>1</sup>  
<sup>1</sup>University of Ottawa

Higher levels of physical activity have been associated with physical, psychosocial, and cognitive indicators of wellbeing (e.g., Kettunen, 2015; Richards et al., 2015). Accordingly, sport programs are offered across Canada to ensure persons from all segments of society are involved in quality sport experiences that promote physical activity and wellbeing (Sport Canada, 2011). However, research has indicated that newcomers to Canada have lessened access to sport when compared to permanent residents and Canadian citizens, due to a multitude of interrelated factors (Aizlewood et al., 2005; Bryan et al., 2006). Thus, further research is needed to understand how access to culturally safe sport programs can be facilitated amongst newcomers to Canada. The purpose of the study was to qualitatively examine the lived experiences of the founder and active leader of a newcomers youth sport program deliberately designed to promote the physical activity and wellbeing of its participants. Two interviews were conducted with the program leader over a 2-month timespan, the transcripts of which were combined with program documents for analysis. Interpretative phenomenological analysis (Smith, 2016) was used as a preferred analytical approach to situate the program leader's lived experiences delivering the sport program. Findings provide an intricate picture of the complex contextual factors to be accounted for when running a newcomers youth sport program and ensuring its interconnectedness to other contexts (e.g., school) in youth's lives. Practical implications will be discussed during the presentation, focusing on the importance of intentionally facilitating culturally safe environments that support newcomers' adjustment to Canadian life.

72.

## **DYNAMIC VISUAL ATTENTION OF ELITE TABLE TENNIS PLAYERS AND BOXERS**

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<sup>2</sup>International Integrated Systems, Inc.

**Introduction:** The ability to distribute the resources of attention is a crucial component for elite athletes' performance. Due to the specificity of the sport, certain abilities may be different between sports. Therefore, the purpose of this investigation was to analyze the dynamic visual attention among elite male collegiate table tennis (TT) players and boxers through multiple objects tracking task (MOT). **Methods:** We recruited 44 collegiate men including 11 TT players and 18 boxers in the national levels and 15 non-athlete men enrolled as the control group. All participants completed a series of MOT. We manipulated the velocities (0.6, 0.9, 1.2 r/s), target numbers (1 or 2), and the visual fields (unilateral or bilateral) of MOT. Four-way mixed ANOVA was used to analyze the correct rate of conditions between groups. **Results:** The result revealed that the main effects of target number ( $F(1,41)=125.48$ ,  $p<0.05$ ), visual field ( $F(1,41)=18.63$ ,  $p<0.05$ ) and velocity ( $F(1.71,69.92)=90.37$ ,  $p<0.05$ ) were significantly different. There was no significant difference between groups in most conditions. However, the trend showed that correct rates of TT and boxers were slightly higher than non-athletes. **Conclusion:** According to the hemisphere-specific resource theory, this study found that elite athletes have better dynamic visual attention performance than the control group. Although there is no disparity between TT players and boxers, the future study may try to manipulate the difficulty of conditions to discriminate the ability of athletes in different sports.

75.

## **PSYCHOLOGICAL AND SOCIAL BENEFITS OF BEING A MASTERS ATHLETE**

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<sup>1</sup>Western University

The benefits of physical activity for older adults are well known. These include improved cardiovascular function, a decrease in cardiovascular disease and risk factors, increased skeletal muscle mass and size, improved balance, postural stability and flexibility, and psychological health. These benefits contribute to prolonging the age of mortality (Salem et al., 2009; Vogel et al., 2009). Some limited evidence suggests that participation by older adults in competitive sport may have additional benefits to those obtained from being physically active. These include more prosocial behaviour, passion and involvement, meaning to life, and successful aging (e.g., Geard, Reaburn, Rebar, & Dionigi, 2017). To investigate these additional benefits, forty-five Masters athletes were interviewed (age 50 to 85). Athletes were asked about their history and nature of involvement in sport, and particular perceived benefits from their participation as a Masters athlete. Based on the interviews, both psychological (i.e., improved self-confidence and sense of achievement) and social factors (i.e., larger friend groups and being closer with family) were important benefits that athletes believe they obtain over and above the physical benefits of participation in sport. These findings suggest that promotion of participating in competitive sport to older adults should emphasize these benefits.



81.

## **THE PRACTICE OF IMAGERY: A REVIEW OF 25 YEARS OF APPLIED SPORT IMAGERY RECOMMENDATIONS**

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<sup>2</sup>Cal State East Bay

Over time, researchers have advanced our understanding of sport imagery by providing theoretical, methodological, and practical recommendations (e.g., Munroe-Chandler & Hall, 2017). These practical recommendations often consist of a summary of the research findings, with the intent of enhancing applied practice. What is seldom discussed, however, is the use of these recommendations by those participating in, or facilitating, sport experiences (Gould, 2016). If sport imagery researchers are to infer that their recommendations will be effectively implemented, they are assuming practitioners have adequate knowledge of, and training in, imagery. Therefore, it is important to further examine these applied imagery recommendations and to evaluate their practicality. The purpose of the current study was to identify the most common practical imagery recommendations over the past 25 years. Imagery studies were identified from an electronic search and were included in the analysis if they examined imagery, used original data, and provided practical recommendations (n = 94). A content analysis was used to identify the number of studies that provided practical recommendations (e.g., Cope et al., 2011). Further, a reflexive thematic analysis was conducted to develop, construct, and generate commonalities in the data (Braun & Clarke, 2019). The most common recommendations included: (a) the role of the coach to facilitate imagery use, (b) the use of motivational imagery to increase confidence, and (c) the matching of the imagery function(s) to the desired outcome(s). Interestingly, similar recommendations appeared across multiple decades, suggesting that these recommendations are rarely followed in applied practice.

88.

## **MUSCLE UP: EXAMINING PSYCHOLOGICAL RESPONSES TO SOCIAL-EVALUATIVE BODY IMAGE THREAT IN MALE ATHLETES AND NON-ATHLETES**

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Social self-preservation theory (SSPT) holds that humans have an innate need to protect their social-self, which is comprised of their social status, standing, and esteem. Humans respond to negative social-evaluative threats, in which the potential for loss of social status is present, with increased feelings of shame. Body dissatisfaction and shame often occur as a result of negative social evaluation of the physique. Athletes generally report less body dissatisfaction and shame compared to non-athletes, however, no studies have examined these body image responses to acute social-evaluative body image threat conditions. Therefore, the present study looked to examine psychological responses to social-evaluative body image threats in 49 male varsity athletes and 63 non-athletes between the ages of 18 and 28 years. Participants were randomized into a high or low body image threat condition, stratified by athletic status, and measures of body dissatisfaction and shame were taken across the session. Results revealed significant time-by-condition interactions, such that both athletes and non-athletes had significant increases in body shame ( $F[2.43, 321] = 4.56, p = .007$ ) and dissatisfaction ( $F[2.22, 318] = 3.21, p = .038$ ), controlling for percent body fat and trait body image, following the high threat condition. Participants in the low threat condition experienced significant decreases in body shame and no changes in body dissatisfaction, regardless of athletic status. Consistent with SSPT but contrary to previous body image research involving male athletes, these findings suggest that acute social-evaluative body threat affects men equally, regardless of athletic status.

95.

## **EXPLORING THE RELATIONSHIP BETWEEN PARENTAL SPORT EXPERIENCE AND THE ACCUMULATION OF PRACTICE IN ATHLETES**

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<sup>1</sup>University of Ottawa

<sup>2</sup>Paralympics New Zealand

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Sport expertise is strongly associated with practice patterns throughout development, but early sport participation is shaped by parents as instigators, facilitators, and supporters of their child's sport engagement (Harwood, 2017). Further, parental experience and expertise in sport positively predicts athletes' peak levels of expertise (Wilson et al., 2019). This study explored the relationship between previous parental sport experience/expertise and the athletic trajectories of their children using a secondary analysis of athlete responses to the Developmental History of Athletes Questionnaire (Hopwood, 2013;  $n = 259$ ;  $Mage = 22.9$ , 18-35). ANOVAs compared the age of the athlete at nine developmental milestones (e.g., first participated in practice with a coach) and the volume of sport-related practice accumulated each year prior to turning 18, according to indicators of parental sport participation. Parental participation in competitive sport, but not parental skill, was significantly associated with earlier engagement by the athlete in supervised ( $p = .011$ ,  $\eta^2 = .025$ ), unsupervised ( $p = .035$ ,  $\eta^2 = .021$ ), and physical training ( $p = .031$ ,  $\eta^2 = .018$ ), as well as the earlier emergence of the idea of becoming an elite athlete ( $p = .013$ ,  $\eta^2 = .025$ ). Significantly ( $p < .05$ ) more sport-specific practice was accumulated each year between ages 5-12 by children of parents who participated in regular competitive sport, and competed at a non-elite level. Athletes' developmental trajectories appear to be significantly affected by their parents' sport experiences, a potentially potent antecedent of sport expertise in need of much greater depth and breadth of investigation.

97.

## **MOVING TOWARDS RECONCILIATION THROUGH SPORT: SHARING OUR PROCESS OF EXPLORING TEAM SASKATCHEWAN EXPERIENCES AT THE NORTH AMERICAN INDIGENOUS GAMES**

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<sup>3</sup>North American Indigenous Games

<sup>4</sup>Sask Sport Inc.

Unanticipated benefits emerge when Indigenous partners and academics come together to share project authority and knowledge. Drawing on examples from our research into Team Saskatchewan's experiences at the North American Indigenous Games, we highlight the impact that engaged methodologies can have on the research process and product. Working with and guiding the faculty researchers and student trainees on this project is a steering committee consisting of sport Knowledge Keepers and other Indigenous sport leaders. Provincial sport organization delegates and funders are also active contributors. The steering committee, along with project participants, sets research priorities, provides direction and assistance with methodology, and identifies integrated and end-of-project knowledge mobilization goals. Beyond one-on-one interviews gathering oral stories and lived experiences from Team Saskatchewan leaders and builders, our wholistically-informed methodology has organically led to conversational group interviews (Kovach, 2009) with Team Saskatchewan athletes, coaches, and organizers. The committee has also helped identify, collect, and examine manuscripts, documents, video archival sources, and sport equipment/memorabilia. Prior to contact, sport played an integral role in Indigenous peoples' culture and wholistic wellness (Heine, 2013), and today it continues to provide opportunities to share culture (Downey, 2018). We highlight ways that academics can respectfully share in reconciliation through sport by embracing the role of trustful allies who take their lead from Indigenous partners who are willing to share authority in a symbiotic relationship. Such relationships actualize research objectives by identifying novel and meaningful directions for project growth, and build both academic and Indigenous capacity through reciprocal knowledge transfer.

101.

## **HOW DO PASSIONATE ATHLETES “COPE” WITH POSITIVE EVENTS? RELATIONSHIPS BETWEEN PASSION, SAVOURING, AND DAMPENING**

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Good things happen in sport; athletes win games, earn awards, reach milestones, and experience many other types of positive events. Sometimes athletes respond to these positive events by engaging in savouring and attempt to maintain, enhance, or prolong their positive emotions. But athletes can also respond to positive events by engaging in dampening and attempt to stifle and decrease their positive feelings. Our aim in this research was to build on recent findings with students and sports fans (Schellenberg & Gaudreau, in press), and test if responses to positive events were predicted by the extent to which athletes' passion for sport was harmonious and obsessive (Vallerand, 2015). Athletes (N = 420) recruited from a crowdsourcing website (Prolific Academic) completed an online survey in which they reported their levels of harmonious and obsessive passion for their sport and the extent to which they would engage in savouring and dampening in response to a positive event in their sport. Using partial correlations that controlled for both the positivity of the event and the other passion type, we found that savouring was positively predicted by both harmonious and obsessive passion, but that dampening was negatively predicted by harmonious passion and positively predicted by obsessive passion. These findings replicate past research with other populations by showing that the ways in which athletes “cope” with positive events is predicted by the extent to which their passion for sport is harmonious and obsessive.

113.

## **COACHING ATHLETES ON THE PATH TO EXPERTISE: STRATEGIES TO FOSTER CONSCIENTIOUSNESS, GRIT, AND SELF-CONTROL**

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Conscientiousness, grit, and self-control are athlete personality characteristics that have been shown to differentially predict criteria of expertise development, including deliberate practice and higher skill levels (Tedesqui & Young, 2018; Toering & Jordet, 2015). Little is known about coaches' views on (a) whether these conscientiousness-related traits are more stable/malleable, (b) strategies that can help athletes develop these traits, or (c) whether coaches consider these traits when making talent identification and development (TID) decisions. To fill these gaps, semi-structured interviews were conducted with 11 high-performance coaches (9 male, 2 female), representing individual (5) and team sports (6), at national and international competitive levels. Data were analyzed using inductive thematic analysis (Braun & Clarke, 2006). Although coaches viewed these traits as mostly stable, they also considered them amenable to development. To help athletes develop grit/perseverance, coaches exposed athletes to failures and created challenging training conditions. Other strategies to foster conscientiousness-related traits included building good training habits and having honest one-on-one conversations about athletes' behaviours. Prompted through a hypothetical scenario, coaches generally preferred to work with less talented athletes who displayed high levels of the investigated traits as opposed to talented athletes with lower trait levels; a high level of both trait and talent was identified as ideal. Coaches revealed not measuring but intuitively considering conscientiousness-related traits in their TID decisions, especially in the context of athlete development, but to a lesser extent at the highest competitive levels where winning took primacy. Results have implications for coaching and the development of desirable traits.

177.

## **RECIPROCAL RELATIONS BETWEEN COACH AND ATHLETES IN FEMALE ELITE JUNIOR SWIMMING: A SHARED REALITY PERSPECTIVE**

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**Purpose:** Shared Reality Theory (SRT) stipulates that humans are relationally and epistemologically motivated to create a shared reality about a target referent with others. Furthermore, a shared reality with significant others is argued to be a verification of worthwhile goals and the means to achieve them. It may therefore be argued that SRT holds potential for studying the reciprocity in the coach-athlete relationship and understand what makes the co-operation effective. The purpose of the present study is to investigate how and to which extent the coach and athlete share reality about performance development. **Design:** Six female elite junior swimmers (Mage=14.8 years) and their head coach were interviewed using semi-structured interviews (Mtime=39.9 minutes). A thematic analysis was applied on the transcripts. **Results:** The coach reported a sincere wish of coaching in adherence to the athletes' interests. However, as he coached several athletes, it was difficult to know the different athletes' interests without athletes conveying them. Thus, an important finding was the importance of honesty and directedness from the athletes when communicating with their coach, together with athletes taking initiative to communication. Athletes who reported this behavior achieved to a greater extent a shared reality with their coach about performance development. **Conclusion:** A shared reality in a coach-athlete relationship occurs when the coach and athlete have agreed on which goals to pursue and the means to reach them, and when there is a common understanding on why the goals and means are as they are. To achieve this, honest communication is key.

206.

## **THE CAR RIDE TO AND FROM COMPETITION: EXPLORING PARENT-ATHLETE INTERACTIONS IN COMPETITIVE YOUTH SPORT**

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As part of the physical youth sport environment, athletes are directly exposed to verbal and non-verbal feedback from important social agents, including parents (Fredricks & Eccles, 2005). It is important to note that athlete interactions with parents are not limited to public settings, and often occur in more private contexts such as at home or during transportation to and from sport. The car ride to and from competition represents a salient setting during which parents and athletes socialize and interact in enjoyable and unenjoyable ways (Tamminen et al., 2017). As such, researchers have called for real-time audio in this setting to capture these athlete-parent interactions. To address this, we used an ambulatory ecological assessment tool known as the Electronically Activated Recorder (EAR) to non-obtrusively capture interactions between athletes and their parents over the course of a 3-day competitive hockey tournament. A total of 91 audio files were gathered from the car. Conversations were inductively coded using thematic analysis through a critical realist lens (Braun et al., 2016; Fletcher, 2017). Higher order themes included the opportunity to a) discuss other social agents (e.g., coaches and teammates), b) provide goal-specific information, c) deliver performance-related feedback, and d) provide organizational support to the athlete. While preliminary in nature, these findings present insight into the nature of parent-athlete interactions as they travel before and following a hockey game. Further, the EAR appears to be an effective tool to generate real-time audio that otherwise would be subject to measurement bias.



# **Sport Psychology**

## **Poster Session II**

118.

## EXPLORING RESILIENCY IN YOUNG AND OLD ATHLETES

Shruti Patelia<sup>1</sup>, Amy Gayman<sup>2</sup>, Joseph Baker<sup>1</sup>

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Sport participation has been advocated as an avenue to develop or enhance various positive developmental outcomes. One of these, resiliency, has emerged an important asset for dealing with adversity. For instance, previous research in youth sport has found resiliency to play a role in managing stressors such as burnout, anxiety and depression. Similarly, literature in older adults has explored resiliency as an important factor in managing loneliness, depression and overall health. However, unlike youth research, little is known about this construct within the context of sport for older adults. Given the scarcity of this topic, this study used the General Social Survey 2016 (cycle 30) to compare resiliency among older athletes, older non-athletes (aged 45 and above) and younger athletes (aged 15-34). Preliminary results indicated that both older ( $M=40.62$ ,  $SD=3.67$ ) and younger athletes ( $M=41.76$ ,  $SD=3.87$ ) had significantly higher resiliency than older non-athletes ( $M=37.81$ ,  $SD=4.87$ ). However, there was no significant difference between young and older athletes. While these results are intriguing, future work on the contribution of sport to levels of resilience among athletes over the lifespan is needed to determine whether this is a cause or effect of sport participation in older life. Additionally, comparisons to other forms of leisure activities are needed to determine if sport or any form of active leisure is related to increases in resilience. Moreover, further exploration in this area could have implications for regulating psychological stressors related to well-being in older adults.

121.

## **EXPLORING THE PERTINENCE OF APPLIED SPORT PSYCHOLOGY IN MASTERS SPORT: A CASE STUDY**

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Psychological enhancement strategies are useful and effective practices with younger, high-performance athletes (Weinberg & Gould, 2015). However, applied sport researchers have yet to consider how Masters athletes (MAs) use psychological skills and strategies with respect to multiple facets of their adult sport experience (Makepeace & Young, 2019). This study explored the use of psychological strategies by a serious-minded female Masters dragon boat and canoe racer (Wendy: aged 62; regional, national, and international level competitor). Employing a semi-structured interview methodology, questions explored her use of mental skills relating to performance, the sporting experience, and managing a sporting lifestyle. Data were thematically analyzed (Braun & Clarke, 2006) deductively, using Weinberg and Gould's (2015) traditional mental skills catalogue, and inductively. Deductive results demonstrated use of skills pertaining to "goal-setting", "self-confidence", "concentration", "arousal regulation", and "imagery". Wendy illustrated the importance, resultant outcomes, and various techniques associated with each skill. Inductive results revealed that "past experiences" were important precursors to psychological use in Masters sport, especially when experiences included an enriched sport environment and adequate fitness levels. Wendy noted "actionable psychological strategies" for effectively maintaining a MA lifestyle (i.e., supportive relationships and communication; structuring) and framing sport as an outlet in her life. She also described a "need for psychological supports among MAs", noting their underuse and many barriers. Overall, themes illustrate nuances not typically observed among younger cohorts. Findings show unique properties associated with certain psychological strategies for MAs, while suggesting the importance of integrating psychological support services with MAs' training and competitive regimes.

122.

## **SAMPLING AND ATHLETE DEVELOPMENT IN THE YOUTH SPORT CONTEXT: A SYSTEMATIC REVIEW**

Alex Murata<sup>1</sup>, Goldman Daniel<sup>2</sup>, Jennifer Turnnidge<sup>2</sup>, Luc Martin<sup>2</sup>, Mark Bruner<sup>3</sup>, Jean Côté<sup>2</sup>

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Sport specialization has been linked to a variety of negative outcomes in young athletes including an increased risk of injury, burnout, and attrition. In an effort to combat these issues, researchers and health practitioners recommend young athletes avoid year-round, intensive participation in a single sport and instead sample a breadth of sport programs at varying intensities. Due to the recent spotlight that sampling has enjoyed in both the academic and public realm, the purpose of this review was to systematically investigate the youth literature and synthesize findings involving outcomes of interest in relation to sampling in sport—namely: improved sport performance, increased likelihood of sport participation, and enhanced personal development (the 3Ps; Côté et al., 2014). Six electronic databases were searched yielding 9,257 articles. Captured articles were read at the abstract level and retained for analysis if they described the impact of sampling on any of the 3Ps. In total, 42 articles met the inclusion criteria and were coded for outcomes of sampling. Findings indicated that youth sampling research has: (a) primarily used quantitative approaches, (b) almost exclusively implemented retrospective methodologies of inquiry, (c) predominantly included male participants, and (d) prioritized findings related to athlete performance, rather than sport participation and personal development. It is hoped that these findings might guide researchers interested in sampling to explore more diverse methodologies and to include underrepresented athlete populations in future studies. Exploring these avenues could prove important in painting a more complete picture of the contemporary young athlete experience.

123.

## **PRELIMINARY CRITERION VALIDITY FOR THE ADULT-ORIENTED SPORT COACHING SURVEY: ASSOCIATIONS WITH KEY PSYCHOSOCIAL VARIABLES**

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<sup>3</sup>Sport and Physical Activity Leadership, Cape Breton University

Qualitative studies highlight the use of adult-oriented coaching as an alternative to traditional pedagogical practices when coaching Masters athletes (MAs; Callary et al., 2017). Studies have yet to quantitatively assess associations between various adult-oriented coaching practices and MAs' psychosocial outcomes. Four-hundred-and-two MAs (Mage = 55.91, SD = 10.41) completed an online questionnaire comprising the Adult-Oriented Sport Coaching Survey (AOSCS; Rathwell et al., 2019), Basic Needs Satisfaction in Sports and Psychological Needs Thwarting scales, Coach-Athlete Relationship Questionnaire (CARQ), and items for liking, commitment, and investment. Cross-sectional relationships were analyzed using structural equation modeling. "Considering MAs' individuality" associated with autonomy satisfaction (Blocus causality = .42; Bvolition = .43), as did "respecting MAs' preferences for effort, accountability and feedback" (Bchoice = .43); these same practices related to autonomy frustration (Bs > -.40). "Respecting preferences" associated with competence frustration (B = -.37) as did "framing learning situations" (.38). "Creating personalized programming" related to CARQ commitment (B = .40). "Considering individuality" (B = .31) and "respecting preferences" (.36) each associated with CARQ closeness, with the latter also relating to CARQ complementarity (.37). MAs' liked to go to practice because of their coach when they reported having coaches who were "respecting their preferences" (B = .46), and they wanted to invest in sport more because of their coach when their coach "created personalized programming" (.27). Results support criterion validity for the AOSCS by demonstrating relations between discrete factors representing adult-oriented coaching and key outcomes for psychological needs, and indicators of a quality coach-athlete relationship.

126.

## **DEFINING CONTRIBUTION THROUGH SPORT USING A SCOPING REVIEW METHOD**

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Contribution is the ultimate outcome of Lerner's (2005) 5Cs model of positive youth development (PYD). However, contribution has yet to be clearly defined. Therefore, the purpose of this study was to identify properties of contribution and establish a theoretical definition of contribution through sport. Using a systematic six-stage scoping review method (Levac et al., 2010), a total of 1138 manuscripts were identified, and 75 were selected for inclusion. Descriptions and definitions of contribution and other prosocial terms (e.g., civic engagement) were extracted and synthesized to create a definition. Contribution was defined as: acting on beliefs and the behaviors that an individual performs purposefully with the intent of positively influencing other individuals, groups, or broader society to bring about a positive outcome for the beneficiaries. These actions involve moving beyond an exclusive self-interest or focus on oneself in order to benefit others or the common good. Additionally, an individual making a contribution to others may benefit directly or indirectly themselves. The specific behaviors that constitute contribution vary across contexts and reflect the values and social norms of each context. Twenty researchers (M=38.1 years old, SD=9.87; 5-30 years researching PYD) rated the content-validity of definition and each property on a six-point scale. Mean ratings of the definition and properties ranged from 5.05 to 5.70 and Aiken's V was used to assess the validity of the definition and properties (V range: 0.81-0.94,  $p < 0.01$ ). This theoretical definition of contribution will facilitate future PYD research by moving beyond individual PYD outcomes to include communal outcomes.

133.

## **MULTICOLLINEARITY BETWEEN TEAM ASSESSMENT DIAGNOSTIC MEASURE AND YOUTH SPORT ENVIRONMENT QUESTIONNAIRE**

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<sup>1</sup>University of Calgary

Team mental model (TMM) has been introduced from organizational and industrial psychology to sport psychology. Team mental models are defined as a “team members’ shared, organized, understanding and mental representation of knowledge about key elements of the team’s relevant environment” (Mohammed & Dumville, 2001, p. 90). One of the currently used TMM measurement questionnaires is the Team Assessment Diagnostic Measure (TADM). However, items seem similar to the construct of cohesion. Therefore, the purpose of this study was to analyze multicollinearity between the TADM and the Youth Sport Environment Questionnaire. Method Participants 89 male youth soccer players in Calgary Minor Soccer Association, Calgary, Alberta, Canada for age between 13 and 17 years old. Measures Team mental model: Team Assessment Diagnostic Measure (TADM) Cohesion: Youth Sport Environment Questionnaire (YSEQ) Data analysis Pearson correlation analysis was conducted. Results All subscales and total mean scores of YSEQ and TADM were significantly moderately and highly correlated positively ( $r = 0.44 - 0.81$ ,  $p < 0.01$ ). Specifically, the mean of task cohesion was highly correlated to mean of team mental models ( $r = 0.81$ ). Discussion As the correlation coefficient did not reach 0.90, we could not conclude that YSEQ and TADM exhibited multicollinearity. However, task cohesion of YSEQ and mean of TADM was still highly correlated ( $r = 0.81$ ). If there are operational overlaps between TMM and task cohesion, it becomes questionable what, in fact, is being measured. Therefore, the TADM should be used carefully, and another methodology such as Pathfinder is recommended.

135.

## **UNEXPECTED, BUT NOT A SURPRISE: HOW WOMEN VARSITY ATHLETES HIGH IN SELF-COMPASSION MANAGE UNEXPECTED STRESSORS SURROUNDING COMPETITION**

Benjamin J. Sereda<sup>1</sup>, Nicholas L. Holt<sup>1</sup>, Amber D. Mosewich<sup>1</sup>

<sup>1</sup>Faculty of Kinesiology, Sport, and Recreation, University of Alberta

Athletes appraise unexpected stressors as more threatening than expected stressors (Dugdale et al., 2002) and women varsity athletes have reported experiencing a high proportion of unexpected competition-related stressors (Holt et al., 2007). Self-compassion may promote adaptive appraisals and coping in women athletes (Mosewich et al., 2018), and a self-compassionate perspective may aid athletes in navigating the experience of unexpected stressors. Therefore, the purpose of this study was to explore how women varsity athletes high in self-compassion manage unexpected stressors surrounding competition. Based on Self-Compassion Scale scores (Neff, 2003), seven women varsity athletes (Mage = 19.43 years, SD = 1.40 years) high in self-compassion (M = 3.83, SD = 0.48) were purposefully sampled to participate in one-on-one semi-structured interviews. Through an interpretive description framework (Thorne, 2016), four themes were developed that illustrate coping efforts: Emotion regulation (effectively controlling emotional responses to the stressor), adaptive perspective (taking a balanced, objective approach to the situation), active re-engagement (approaching and engaging with the task at hand), and learning from experience (drawing on, and learning from, past experiences). It appears that varsity women athletes with high self-compassion possess resources that enabled them to effectively cope with unexpected stressors. To support athletes in managing unexpected stressors, coaches and practitioners can encourage athletes to reflect on past experiences, support emotion regulation strategies, and foster adaptive perspectives to aid athletes in effectively engaging with and managing unexpected stressors surrounding competition.



136.

# **WHAT A DIFFERENCE A GRADE MAKES? THE RELATIONSHIP BETWEEN THE ACADEMIC AND NON-ACADEMIC SELF-CONCEPT, SELF-ESTEEM, AND GRADES IN SECONDARY SCHOOL CHILDREN**

Lena Henning<sup>1</sup>, Dennis Dreiskämper<sup>1</sup>, Bernd Strauss<sup>1</sup>

<sup>1</sup>University of Muenster

The self-concept is closely associated with various cognitive, emotional, and behavioral outcomes (e.g., physical activity; Craven & Marsh, 2008). One of the most salient and influencing sources of self-concept in childhood are school grades as they are directly communicated and easy to compare (Arens et al., 2017). Several studies have supported reciprocal relationships between academic self-concept and academic achievement (Huang, 2011). However, the relationship between different self-concept domains (e.g., physical and native language self-concept) and self-esteem considering the grades in the associated areas (e.g., physical education and native language) is still unclear. Therefore, the aim of this study was to examine the meaning of grades for a) the level of associated self-concepts and b) the relationship of self-concept domains with self-esteem. 236 students from class 6 to 8 (range: 11-14 ys.) participated in the study (class 6: n = 86, class 7: n = 73, class 8: n = 82). Physical self-concept was assessed using the PSK (Stiller et al., 2004), native language self-concept was measured with a questionnaire by Arens and Jansen, 2016). Student's self-esteem was assessed by a German version of the SDQ I (Arens et al., 2011). Results show a main effect of grades on the level of both self-concept domains, physical and native language. Besides, the self-esteem is stronger related to physical self-concept than to native self-concept, especially in children who are better in physical education. As other relations are still found as inconsistent, the role of grades for self-concept development in early adolescence is discussed.

140.

## **INFLUENCE OF IMPAIRMENT TYPE ON THE DEVELOPMENT OF COMPETITIVE ATHLETES WITH A PHYSICAL DISABILITY**

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The developmental trajectories of athletes with physical disabilities are complex — and when it comes to understanding the factors that influence their development in sport, existing research has only scratched the surface. To deepen our understanding, this study examined the influence of impairment type on (a) how athletes were introduced to sport, (b) the age at which nine sport-related developmental milestones (e.g., first participated in offseason training) were achieved, and (c) the time it took to reach each milestone. An international sample of competitive athletes with physical impairments ( $N = 187$ ; 68% male;  $M_{age} = 33$ ) provided training histories using the Developmental History of Athletes Questionnaire. Participants were divided into four groups: spinal cord injuries (SCI;  $n = 67$ ), amputations and/or limb deficiencies (A/LD;  $n = 48$ ), cerebral palsy and/or spina bifida (CP/SB;  $n = 32$ ), and other physical impairments (OPI;  $n = 40$ ). Participants with SCI were most frequently introduced to sport through healthcare professionals (54%), A/LD through friends or relatives (26%), and CP/SB through talent search programs (22%). Separate one-way ANOVAs revealed that the SCI group was significantly older than the other three groups at eight of the nine milestones ( $p < .05$ ). However, significant differences persisted for only three milestones in terms of time. Specifically, participants with SCI took significantly less time than participants with OPI to reach these three milestones ( $p < .01$ ). Thus, despite differences in age and how they got involved, athletes with distinct physical impairments appear to progress through sport at a similar rate.

144.

## **MENTAL SKILLS DEVELOPMENT AMONG NATIONAL HOCKEY LEAGUE PLAYERS.**

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<sup>2</sup>Athabasca University

The purpose of this research was to explore how National Hockey League (NHL) players developed mental skills over the course of their careers. Retrospective semi-structured interviews were conducted with six current or former NHL players. Participants had 1-13 seasons of NHL experience ( $M$  years of NHL experience = 9,  $SD$  = 4). Interview transcripts were analyzed using a thematic analysis. We identified three stages of mental skills development. The first stage was characterized by the development of personal characteristics and life skills (rather than mental skills per se) during participants' early involvement in hockey. Personal characteristics and life skills included interpersonal skills (e.g., respect, building relationships), and commitment and effort (e.g., work ethic, deliberate practice). The second stage, performance characteristics development, involved the development of focus (e.g., self-awareness and being 'present') and confidence (e.g., positive mindset and perseverance), most often beginning during the participants' junior hockey career. The third stage was performance skills development, which reflected the development of performance-specific mental skills. This typically occurred during our participants' professional careers. At this point in their careers, participants appeared to possess discreet mental skills (e.g., visualization, goal setting, self-talk, and self-reflection) and were able to strategically use these skills in pre-, during-, and post-game routines. Overall, this study suggests that the development of personal characteristics, life skills, and performance characteristics set a foundation for the later development of performance-specific mental skills. From a practical perspective, these findings may be useful for informing mental training approaches for young hockey players.

158.

## **FITNESS-RELATED SELF-CONSCIOUS EMOTIONS AND SPORT MOTIVATION IN ADOLESCENT FEMALES: DOES PERCEIVED ATHLETIC COMPETENCE MODERATE THE EFFECT**

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Sport participation can provide many benefits to adolescent athletes; however, female sport participation tends to decrease significantly during adolescence (Eime et al., 2016; Sabiston et al., 2012). A commonly cited reason for this dropout is issues surrounding body image, such as fitness-related body self-conscious emotions (FSCE; pride, shame, guilt, envy and embarrassment; Castonguay et al., 2016). Researchers have suggested that perceived athletic competence (PAC) may buffer the negative relationship between SCE and sport outcomes (Sabiston & Pila, 2016). Thus, this study examined the relationship between FSCE, PAC, and sport motivation among adolescent female athletes. A sample of female athletes (13 to 17 years old) completed measures of FSCE, PAC, and sport motivation. Linear correlations indicated that fitness-related embarrassment ( $r = -.47$ ), envy ( $r = -.46$ ), shame ( $r = -.50$ ), guilt ( $r = -.35$ ), authentic pride ( $r = .47$ ) and hubristic pride ( $r = .35$ ), as well as PAC ( $r = .34$ ), were all correlated with sport motivation (Sport Motivation Scale II: RAI composite score). All FSCE scales were moderately to highly inter-correlated. Due to multicollinearity, only shame and PAC were entered as individual predictors. Regression analysis showed that shame ( $B = -.45$ ), but not PAC ( $B = .10$ ) was a significant predictor of RAI ( $R^2 = .29$ ). There was also no evidence for PAC acting as a buffer as the moderated regression analysis indicated that a PAC x Shame interaction term did not make a significant additional contribution beyond main effects ( $R^2 \Delta = .001$ ). This research provides further evidence of the important contribution of body self-conscious emotions in predicting sport motivation.

161.

## **EVALUATING THE ACUTE INFLUENCE OF UNREPRESENTATIVE PRACTICE TASKS ON THE GAZE BEHAVIOUR OF ELITE BASEBALL HITTERS**

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The preservation of perception-action coupling in the practice environment may increase skill transfer to competition and quality of learning, in part because relevant perceptual (e.g., visual) information is preserved. Although baseball batters rely on advanced gaze behaviours to achieve success in a challenging perceptual-cognitive-motor task, development of these skills may be constrained by traditional de-coupled practice drills. This study's purpose was to explore the influence of de-coupled batting drills on the gaze behaviour of 28 elite baseball players. Participants completed one of four warm-up tasks common in baseball practice (i.e., stationary tee, pitching machine batting practice, coach-thrown batting practice, and a control) varying in representativeness, prior to participating in a temporal occlusion simulation. No statistically significant evidence of an acute warm-up effect was noted. However, descriptively the more de-coupled tasks influenced participants' quickness and ability to locate the pitcher's release point and to less desirable observations of task-relevant areas. Main effects of occlusion time ( $F(2, 26) = 3.87, p = .03$ ), and playing level ( $F(1, 27) = 16.81, p < .01$ ), were also observed. Accordingly, players of advanced skill fixated more quickly on the release point, and participants increased their sum of task-relevant fixations across trials. Additionally, release point fixation before release of the ball was positively related to correct pitch type predictions ( $\chi^2(1) = 78.67, p < .01$ ). The absence of a conclusive warm-up condition effect may be explained by the athletes' familiarity with unrepresentative tasks, and potential skill in recalibration.

165.

## **MORE THAN JUST ANOTHER BIB: GROUP DYNAMICS IN AN ELITE NORDIC SKI TEAM**

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<sup>3</sup>The Australian National University, Australia

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The social environment within individual sport teams may have a significant influence on the success, development, and well-being of athletes. The purpose of this study was to explore elite individual sport athletes' group experiences through the lens of a social identity approach. Participants included six members of an elite nordic ski team. At two times points in the competitive season, a novel online Social Identity Mapping tool (oSIM; Cruwys et al., 2016) was used in combination with semi-structured interviews to garner insights into athletes' social identities and group experiences as a member of the ski team. This study is the first of its kind applying oSIM to a sports setting, allowing individuals to gain a visual representation of the importance and compatibility of social groups in their lives. Interview data were thematically analyzed to explicate participants' perceptions of social identity, and team cohesion, and their significance to success and development in elite individual sport. Major themes included the roles of social identity, cohesion, subgroups, and conflict within the team, as well as the influence of an individual on the collective group. The results provide insight for coaches and individual sport athletes into the various roles which teammates can play in their development and performance. Additionally, findings highlight the benefits of having a cohesive team, even in a sport where athletes compete as individuals. The results of this study also indicate the significance of the coach's role in fostering strong team dynamics, and the benefits which this can have on performance.

166.

## **A NATURALISTIC CASE STUDY OF CO-REGULATORY SCAFFOLDING WITH A MATURE COACH-ATHLETE DYAD IN FIGURE SKATING**

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Self-regulated learning (SRL) processes are used frequently by elite athletes and are important for optimizing practice efforts during talent development (McCardle et al., 2017). Before someone becomes self-regulated, they are co-regulated by a more experienced other, e.g., a coach (Glaser, 1996). Scaffolding, a form of co-regulation, has three conceptual characteristics: contingency control; fading; transfer of responsibility (van de Pol & Elbers, 2010). While popular in education, no studies have assessed scaffolding in sport. We explored scaffolding in a naturalistic, instrumental case study with an experienced female coach (aged 53, national level) and her competitive male figure skater (aged 15, provincial level) using a) participant observation, field notes, and recording and analysis of dialogue at 16 practices, and b) three separate interviews with the coach and skater at early-, mid-, and late-season. Data were thematically analyzed (Braun & Clarke, 2006). Deductive interpretations, guided by scaffolding characteristics, proved difficult due to overlap of conceptual constructs. Inductive analysis revealed complex, sport-specific nuances. Co-regulation occurred at both micro- and macro-levels. Micro-level co-regulation was illustrated by a “co-regulatory interface” – a pivotal interaction zone described by contributing roles and expectations for each actor, shared roles, and embodied transitory process related to the skater’s SRL. A mature, enriched interface was predicated on prerequisite conditions for coach and athlete. Fading differed from education because of non-linear aspects when the coach would return to refine an element if it was incorrect. Findings suggest scaffolding manifests in sport, with self-regulation married to co-regulation, and more specifically, the interface.

174.

## **RECIPROCAL RELATIONS BETWEEN COACH AND ATHLETES IN FEMALE ELITE JUNIOR SOCCER: A SHARED REALITY PERSPECTIVE**

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<sup>1</sup>Norwegian School of Sport and Science

**ABSTRACT** Purpose: The context in talent development is complex where a collaboration between coach and athlete is necessary for optimal performance development. But it is cramped, where only a few athletes are identified as talents. Hence, it is important to have quality in the coach-athlete relationship, thereby making it more likely to have a shared reality about future development. Shared Reality Theory (SRT) contains: the motivation to connect with others and to create something meaningful. Indeed, SRT holds significant potential for studying the reciprocity in the coach-athlete relationship (Echterhoff & Higgins, 2018). Therefore, the purpose of the study is to investigate the reciprocity in the coach-athlete relationship and whether both parties share the same understanding of talent development. Design: Four female elite junior soccer players (Mage = 15.6 years) and their head coach were interviewed using a semi-structured interview (Mtime = 29.9 minutes). The players trained five days every week (Mduration = 1.5 hours) and played normally one match each week. Two out of four athletes play on the junior national team. Results: The coach is concerned with the players' individual needs, clear feedback, and building confidence. Verbal communication appeared to be an important finding among the coach's attitudes, values, and goals in meeting with talent development. The athletes respond somewhat differently where findings indicate that the process of how to work toward their goals are unclear. Conclusion: According to SRT, there is a distance between what the various parties have of understanding in the process of developing future talents.



179.

## **UNDERSTANDING THE ENGAGEMENT OF CHILDREN WITH IMPAIRMENTS IN PHYSICAL EDUCATION: A REVIEW OF RESEARCH USING SELF-DETERMINATION THEORY**

Chantelle Zimmer<sup>1</sup>, Janice Causgrove Dunn<sup>1</sup>

<sup>1</sup>University of Alberta

Self-Determination Theory (SDT) is commonly used in research to understand children's motivation in physical education because the major components of one of its mini-theories – Basic Psychological Needs Theory (BPNT) – are highly relevant in this context. SDT has been extensively applied in physical education research with children without impairments; however, this does not seem to be the case for children with impairments. Given BPNT's underlying assumption that all people feel an innate commitment to satisfy their needs for relatedness, competence, and autonomy, it has potential to advance research in this area. The purpose of this review was to summarize the adapted physical education literature from 2007 to 2018 concerning at least one of the major components of BPNT to determine the nature and extent of research. Method: Scholarly literature was searched for in relevant databases and journals, with data of interest extracted from 15 eligible studies. Results: The majority of studies examined different facets of physical education that supported or thwarted children's need for autonomy, followed by competence and relatedness respectively. A mix of qualitative and quantitative methods was used to gather data from elementary and middle school aged children with a variety of impairments. Conclusion: The results indicate that teachers and paraprofessionals primarily thwart the basic psychological needs of children with impairments in physical education. Greater research is needed with respect to all of the components of BPNT, particularly relatedness though, as positive student-professional relationships can contribute to the fulfillment of all children's needs.

189.

## **HOW DO PARENTS AND FAMILIES BENEFIT WHEN THEIR CHILD(REN) WITH AUTISM PARTICIPATE IN AN EARLY MOTOR SKILL INTERVENTION?**

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**Background:** Motor skill interventions have been shown to improve the motor skill proficiency of children with autism, however the secondary effects associated with them are not well understood- both for the children and their family members. The purpose of this study was to examine parents' perspectives on the secondary effects of an early motor skill intervention for their children with autism. **Methods:** Parents of four year-olds with autism who completed a 12-week fundamental motor skill intervention- where motor skill proficiency was measured pre- and post-test using the Test of Gross Motor Development-2 -, were invited to participate in a one-time-only interview session (N=8). A semi-structured interviewing technique was employed and data analysis was grounded in interpretive phenomenology. **Results:** The mean Gross Motor Quotient among the children (n=9) was 78.67 + 17.13 pre-test and 94.67 + 14.45 post-test; showing a 20% increase in motor skill proficiency on average. Parents identified several secondary effects of the intervention during their interviews. **Theme 1:** Awareness and Engagement (parents developed an understanding/appreciation for the importance of motor skills for child development and began engaging their families in more active play). **Theme 2:** Increased Outings and Decreased Feelings of Isolation (a combination of secondary effects allowed parents to feel more comfortable going places with their children). **Theme 3:** Witnessing Success and Changing Perspectives (witnessing their children succeed during the intervention, positively influenced parents' perceptions of their children, and their future). **Conclusions:** These findings suggest that parents and families can also benefit from the experience of an early motor skill intervention for their child(ren) with autism.

191.

## **EXPLORING THEORIZED ASSOCIATIONS IN TWO DIFFERENT COMPETITIVE SWIMMING CONTEXTS**

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<sup>2</sup>School of Human Kinetics, University of Ottawa

There are hypothesized associations between high training volume in youth sport and negative psychological and behavioural outcomes such as decreased enjoyment, burnout, and attrition. Autonomy support, however, is associated with positive motivational and behavioural outcomes. The purpose of this study was to concurrently explore the relationships of training volume and perceived coach autonomy support with enjoyment, commitment, burnout, and intentions to continue swimming in two very different competitive swimming contexts: summer club, with a brief season and time for sampling other sports, and winter club, requiring substantial near year-round investments of time and effort in swimming. Survey data were collected from 265 Canadian swimmers ( $M_{age} = 13.78$ ), 40% from summer clubs, and 60% from winter clubs. Their parents provided training volume data. Correlations and path analyses revealed differences in the relationships between certain variables for summer versus winter swimmers. For example, autonomy support was not significantly related to obligatory commitment in the summer sample, but for winter swimmers, there was a medium negative association. Training volume was positively associated with functional commitment and intentions to continue swimming in winter swimmers, but not in summer swimmers. Differences between the two groups will be discussed in relation to their unique competitive contexts. Our findings suggest that some theories and models of motivation, sport commitment, and youth sport participation may not be generalizable across all youth sport contexts. Researchers should take care to fully describe the sport context under study when discussing any potential theoretical implications stemming from their findings.

199.

## **SELF-COMPASSION AND MOTIVATIONAL CLIMATE AS PROMOTIVE FACTORS OF RESILIENCE IN YOUTH ATHLETES**

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<sup>2</sup>Department of Psychology; Carleton University

Resilience has been identified as a key psychological characteristic of successful and well-adapted athletes and is a critical component in athlete development (Rees et al., 2016). Promotive factors of resilience include assets, or skills within an individual, and resources, which is support outside the individual. The purpose of this study was to examine self-compassion and motivational climate as potential promotive factors of resilience in youth athletes. Athletes (N = 117; 87 female; M age = 14.73 years, SD = 1.89) completed the Self-Compassion Scale, Motivational Climate Scale for Youth, Connor-Davidson Resilience Scale, Flourishing Scale, and Short Warwick-Edinburgh Mental Well-being Scale. Self-compassion ( $r = .57$ ,  $p < .01$ ) and a mastery motivational climate ( $r = .21$ ,  $p < .05$ ) were related to resilience. Self-compassion was also related to flourishing ( $r = .66$ ) and mental well-being ( $r = .64$ ; both  $p < .01$ ). Mastery climate was related to mental well-being ( $r = .19$ ,  $p < .05$ ). While the present data are cross-sectional in nature and cannot imply causation, past research suggests these promotive factors are modifiable and can be targeted through intervention and promotion efforts (Mosewich et al., 2013; Smith et al., 2007). Motivational climate has been explored in previous research as a resource for promoting resilience (e.g., Vitali et al., 2015); however, self-compassion represents a potential asset that has been overlooked in the sport context in terms of resilience development. Further consideration of the role of self-compassion in fostering resilience among athletes may support management of sport demands and the development and maintenance of well-being.

203.

## **EXPLORING THE RELATIONS BETWEEN COMPETITIVE YOUTH SPORT PARENTS' IDENTITY AND MORAL INTENTIONS TOWARDS ANTISOCIAL PARENT BEHAVIOUR**

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<sup>1</sup>Nipissing University

<sup>2</sup>Western University

<sup>3</sup>Queen's University

<sup>4</sup>Acadia University

There is emerging evidence that parents may experience cognitive, affective, and behavioural outcomes as a result of their involvement in their child's sport participation (Dorsch et al., 2009). Grounded in identity theory, we explored parents' personal and social identities and moral intentions towards other parents engaging in antisocial behaviour. Competitive youth hockey parents (N = 437) were randomly assigned to one of six conditions involving vignettes that either described a parent from their child's team (i.e., ingroup parent) or opposing team (i.e., outgroup parent) acting antisocially towards either an athlete on their child's team (i.e., ingroup athlete), opposing team (i.e., outgroup athlete), or their own child. Parents reported their response to the antisocial behaviour in the form of direct criticism, indirect criticism, or suggestions to report the behaviour to the coach, or to the league. Results revealed a significant main effect for parents' intentions to directly criticize ingroup parents,  $p = .03$ ,  $\eta^2p = 0.012$ , and indirectly criticize outgroup parents,  $p < .001$ ,  $\eta^2p = 0.034$ . Further, the strength of social identity to their child's sport team moderated the effect. Parents with stronger social identities were more likely to report higher intentions to indirectly criticize an outgroup parent. There were no significant main effects for reporting behaviour (to coach or league), and personal identity did not moderate relationships with moral intentions towards antisocial behaviour. We discuss the theoretical and practical implications of the findings to better understand antisocial parent behaviour in competitive youth sport.

210.

## **COOPERATIVE COMMUNICATION AND INDIVIDUAL ATTRACTION TO THE GROUP: EXAMINING THE MODERATING EFFECT OF PSYCHOLOGICAL CLIMATE**

Colin D. McLaren<sup>1</sup>, Kevin S. Spink<sup>2</sup>

<sup>1</sup>Nipissing University

<sup>2</sup>University of Saskatchewan

Emerging evidence suggests that a positive relationship exists between the cooperative communication of sport team members and perceptions of task cohesiveness (e.g., McLaren & Spink, 2018a; 2018b; 2019). Extending this relationship, the purpose of this study was to examine whether psychological safety would moderate this relation, including an extension to social cohesion. Psychological safety is the support and freedom individuals feel to express themselves without fear of negative consequences in a group setting (Brown & Leigh, 1996). If individuals fear expressing themselves (lower psychological safety), then the relationship between communication and cohesion should be stronger as communication might be expected to be more judicious leading to higher cohesion perceptions. To test for this possible moderating effect, team sport athletes (N = 136) completed an online survey containing measures of cooperative communication (Lee, 1997), psychological safety (Brown & Leigh, 1996), and group cohesion (ATG-T, ATG-S; Carron et al., 1985). Regression results for ATG-T ( $R^2 = .42$ ) revealed that the communication-cohesion relationship was significant at lower (-1SD;  $\beta = 1.59$ ) and mean values of psychological safety ( $\beta = 0.93$ ), but not at higher values. Similarly, moderation also was found for ATG-S ( $R^2 = .19$ ). The communication-cohesion relationship was significant only at lower (-1SD;  $\beta = 1.05$ ) and mean values of psychological safety ( $\beta = 0.61$ ). These results provide preliminary evidence that the relationship between team member communication and perceptions of cohesion in sport teams might be qualified by the member's perception of other aspects of the team's social environment (i.e., psychological climate).

221.

## **INITIAL STEPS IN THE VALIDATION OF THE ATHLETE DEVELOPMENT FORMULATION SURVEY**

Eleanor Langham-Walsh<sup>1</sup>, Dior Anderson<sup>1</sup>, Emily Dunn<sup>1</sup>, Vicky Gottwald<sup>1</sup>, James Hardy<sup>1</sup>, Lew Hardy<sup>1</sup>, Gavin Lawrence<sup>1</sup>, Megan Lowery<sup>1</sup>, Samuel Oliver<sup>1</sup>, Ross Roberts<sup>1</sup>, Tim Woodman<sup>1</sup>  
<sup>1</sup>Bangor University

Traditionally, athletes are selected for talent development programmes based on anthropometric factors, performance in competition, and motor-performance tests (Gullich & Cobley, 2017); psycho-social factors that influence athlete development have been largely ignored (Hardy et al., 2017). This research project seeks to develop the Athlete Development Formulation Survey (ADFS), a brief profiling tool gauging athletes' scores on psycho-social factors influencing elite performance. Following item generation, instrument construction, and establishing content validity, the present study reports on pilot work assessing the ADFS' concurrent validity. Two studies utilised a cross-sectional study design (Study 1; N = 361, M hours training per week = 5.89, SD = 5.05; M years participating in sport = 7.35, SD = 6.47. Study 2; N = 66, Males = 30, Females = 36 (M hours training per week = 7.00, SD = 3.37; M years participating in sport = 7.34, SD = 2.84). Participants completed the ADFS alongside corresponding "full" measures with previously established psychometric properties. The ADFS is designed to assess 33 constructs. Across both studies, bi-variate correlations revealed significant and theoretically relevant associations between the ADFS constructs and their respective "full" measures. The present study adds support to the ADFS as a multi-faceted tool enabling identification of a combination of psycho-social factors that influence elite development. The ADFS has practical value within talent identification systems as it can be used to measure multiple factors without placing burden on athletes and coaches.

33.

## **THE RELATIONSHIP BETWEEN PASSION AND IMAGERY USE IN YOUTH COMPETITIVE GYMNASTICS**

Jessica D. M. Simpson<sup>1</sup>, Krista J. Munroe-Chandler<sup>1</sup>, Kyle F. Paradis<sup>1</sup>

<sup>1</sup>Department of Kinesiology, The University of Windsor

The purpose of the present study was to examine the relationship between passion and imagery use in competitive youth gymnastics. The participants included 245 male ( $n = 10$ ) and female ( $n = 235$ ) gymnasts between the ages of 7-16 years participating in women's artistic gymnastics ( $n = 221$ ), men's artistic gymnastics ( $n = 7$ ), as well as trampoline and tumbling ( $n = 17$ ). Athletes completed questionnaires measuring the frequency of imagery use and another measuring their passion towards the sport of competitive gymnastics. A series of multiple regression analyses indicated that both harmonious and obsessive passion were significantly related to all five types of imagery. More specifically obsessive passion was most strongly associated with four of the five types of imagery (CS, CG, MS, and MG-A), with the exception of MG-M imagery where harmonious passion was more strongly associated.



# **Sport Psychology**

## **Poster Session III**

217.

## **THE INNER LIVES OF INDOOR YOUTH SOCCER PARENTS**

Shannon R. Pynn<sup>1</sup>, Helene Jørgensen<sup>1</sup>, Hannah Schulte<sup>1</sup>, Nicholas L. Holt<sup>1</sup>

<sup>1</sup>University of Alberta

The overall purpose of this study was to examine the “inner lives” of indoor youth soccer parents throughout the course of a season. The term inner lives refers to the aspects of being a sport parent that occurred not just at sporting events but also in the family home, in car rides, and during other interactions in the family setting. Data were collected from three parents; Holly, Bellamy, and Steve (2 mothers and 1 father respectively, Mage= 47 years) over a three-month period during the 2018-2019 indoor soccer season. Parents completed audio-diaries in which they discussed their day-to-day responsibilities, conversations they had with their children regarding sport, and challenges they faced as sport parents. They also participated in individual semi-structured interviews at the beginning and end of the season. Data were analyzed using narrative thematic analysis (Riessman, 2008). While common themes were found among all three participants (e.g., time management, emphasizing effort and fun, relationships with coaches, and teaching life skills) each parent experienced a unique journey throughout the season. Conflict between Holly and her husband in terms of behaviours and attitudes toward sport, Bellamy’s challenges as a single parent, and Steve’s performance-oriented approach to parenting are represented with idiographic narrative accounts. Findings from this study provide insight into the different qualities of sport parents and the intricate demands they face in youth sport. In the future, it may be useful to consider the distinctive experiences and challenges parents face when designing sport parent education and support programs.

218.

## **GENERATIONAL DIFFERENCES IN TOP RANKED GOLFERS' DEVELOPMENTAL TRAJECTORIES**

Aaron Koenigsberg<sup>1</sup>, Jarred Pilgrim<sup>2</sup>, Joseph Baker<sup>1</sup>

<sup>1</sup>York University

<sup>2</sup>Golf Australia

The Official World Golf Rankings (OWGR) measure the relative success of professional male golfers' competing around the globe. National Sporting Organizations (NSOs) often view the attainment of a top 100 OWGR as a significant career milestone. While NSOs provide considerable resources to athletes to help achieve this milestone, little objective data exist to support this process. Understanding the ranking trajectories of top 100 ranked athletes is a first step to informing athlete identification and development (AID) programs in men's professional golf. However, ranking data are retrospective in nature, and since sporting systems change over time past data may not be relevant to current and future athletes. In this study, we appraised OWGR data in order to explore developmental trajectories among four age-groups of athletes who reached a top 100 ranking between 1990-2018. Key career ranking milestones (e.g. first turned professional, first top 1000 ranking, etc.), the time taken to transition between milestones, and the overall time to turn professional and obtain a top 100 OWGR were examined across the age groups using multiple One-Way ANOVAs. Results revealed athletes from younger generational cohorts reached key career milestones at earlier ages; moreover, in some cases they spent less time transitioning between milestones and took significantly less time to transition from first turning professional to obtaining their first top 100 ranking. Results suggest NSOs should continue to update and monitor their data in order to be aware of changes in generational trends so policies can be updated.

219.

## **RELATIVE AGE EFFECT? NO "FLIPPING" WAY: EXPLORING THE RELATIVE AGE EFFECT IN ELITE, FEMALE GYMNASTICS**

Eleanor Langham-Walsh<sup>1</sup>, Vicky Gottwald<sup>1</sup>, James Hardy<sup>1</sup>

<sup>1</sup>Bangor University

The relative age effect (RAE) is a biased distribution of athlete birthdates, with an over-representation and greater success rate of those born earlier in the year. Converse to team-sport contexts, where early maturation is often associated with superior physical attributes, delayed maturation has been observed in higher skilled performers within gymnastics. In this instance, we might expect a more atypical RAE and perhaps, bias towards relatively younger athletes within the system. The present research examined the presence of a RAE within a sample of elite, female gymnasts. We acquired archival data from 2015 until present. Date of births of elite, female gymnasts who had competed internationally since 2015 ( $N = 806$ ,  $M_{age} = 20.63$ ,  $N_{countries} = 89$ ), were obtained from an online database using the *rvest* package in R Studio. Birth quartiles were assigned based on the calendar year consistent with the selection year adopted in gymnastics. Chi squared analysis indicated no presence of a RAE,  $\chi^2(3, 806) = 2.91$ ,  $p = 0.41$ ). There are several underlying mechanisms that may account for this null finding. Firstly, gymnastics often acts as a potential donor sport for alternative sports (see Athletic Skills Model). Furthermore, Q1 athletes, who may be succeeding in other sports where RAEs are more pronounced, may move from gymnastics into another sport. A “wash out” effect may also provide explanation for the lack of RAE as the sample contained gymnasts at varying levels of international representation as well as those favoured by different task demands across apparatuses.

227.

## **A COMPARISON OF MALE AND FEMALE SPORT OFFICIALS' DEVELOPMENTAL HISTORIES**

Nick Wattie<sup>1</sup>, Jason Mergler<sup>2</sup>

<sup>1</sup>Faculty of Health Sciences, Ontario Tech University

<sup>2</sup>Faculty of Health Science, Ontario Tech University

Most research on sport officials (e.g., referees) has been comprised of male participants, with some indications that approximately only 13% of studies have included female officials (Pina et al., 2018). The purpose of this study was to explore the differences in male and female developmental milestones related to sport official's participation. The developmental history of athletes questionnaire (Hopwood, 2013) was modified to collect information from 511 Canadian sport officials (19% female) on factors such as officiating age of debut, and highest tier of officiating achieved (recreational, provincial, national/international). Overall, female officials had younger mean start ages (years) than male officials (21.5 vs. 26.7:  $t(509) = 3.59$ ,  $p = .001$ ). This trend was particularly evident among soccer officials (19.8 vs 26.3,  $t(201) = 2.58$ ,  $p = .01$ ). Although not statistically significant, females officiated on average more games per year prior to the age of 25, and thereafter, male officials averaged increasingly more games per year. There were also no statistically significant differences in the distribution of female and male officials across the tiers of officiating, although there was a 7% over-representation of male officials at the national/international level. These results provide some preliminary information on the developmental histories and activities of male and female officials. While most findings were inconclusive, they provide some indications that female and male officials may have unique developmental histories and experiences. Going forward it may be useful to explore female officials' prior athlete participation histories, as well as their accumulated training experience related to officiating.

234.

## **DEVELOPING A SENSE OF BELONGING THROUGH SPORT: A META-SYNTHESIS OF QUALITATIVE RESEARCH CONDUCTED WITH REFUGEE SPORT PARTICIPANTS**

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<sup>2</sup>School of Human Kinetics, Laurentian University

The number of refugees worldwide exceeded 20 million people for the first time in 2018 (UNHCR, 2019). Sport participation has been posited as a cost-effective way to promote integration between forced migrants (i.e., refugees and asylum seekers) and the host culture they are situated within (Government of Canada, 2012). However, simply enrolling forced migrants in sport programs may not convey the benefits inherently attributed to sport participation (Ryba et al., 2017). Qualitative researchers have worked to bring a deeper understanding to the intricacies of employing sport participation to foster positive integration and a sense of belonging for forced migrants (e.g., Schinke et al., 2019). Seeking to bring together the diverse and varying findings from these researchers we conducted an interpretive meta-synthesis. Through a systematic search, we included 26 articles published from 1990 to 2018 focused on the participation of forced migrants in sport and/or physical activity programs in their host country. The focus of these articles was found to be twofold: (a) barriers/facilitators to participation and (b) approaches to integration through sport and physical activity. Further, based on our own interpretations of the synthesized knowledge, two themes were developed that should be the focus of future research: (1) the impact of the journey to their host country on forced migrants and (2) the role of power in determining forced migrants' sport and physical activity involvement. These findings help to transform our understanding of how sport may or may not promote the integration of those seeking refuge in a host country.

236.

## **THE MESSAGING OF DIVERSIFICATION-SPECIALIZATION WITHIN SPORT-SPECIFIC LONG-TERM ATHLETE DEVELOPMENT MODELS**

Mark S Rice<sup>1</sup>, Joe Baker<sup>2</sup>, LeAnne Petherick<sup>3</sup>, Darren ER Warburton<sup>3</sup>, Shannon SD Bredin<sup>1</sup>

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<sup>2</sup>York University

<sup>3</sup>University of British Columbia

The Canadian Long Term Athlete Development (LTAD) model is a framework for an optimal training, competition and recovery schedule for each stage of athletic development. In line with the LTAD, provincial sporting organizations are mandated to create their own sport-specific model, describing athletes' developmental trajectories. Inherent within LTAD models is the transition from diversification, where there is a focus in a number of different sports, to specialization, where there is year round commitment to a single sport. The purpose of this study was to evaluate the public messaging for specialization and diversification within LTAD models of provincial sporting organizations. A document analysis was conducted of public LTAD frameworks among five different provincial sporting organizations (Ice Hockey, Soccer, Swimming, Alpine, and Gymnastics) in British Columbia, Canada. The documents were analyzed using inductive content analysis. Results showed the emergence of two major themes: (a) the promotion of diversification for youth athletes before the age of 15; and (b) an emphasis on large time commitments to the respective sport by the age of 9. While these findings demonstrate an emphasis in public messaging on the promotion of diversification in early sport development, the frameworks also highlight the need for a large time commitment to a respective sport starting at very young ages. This messaging is conflicting in nature as an emphasis on large sport-specific time demands may serve as a barrier for young children and youth to diversify and participate in multiple sports and/or physical activities.

241.

## **PARALYMPIAN FOR HIRE: DOES THE PARALYMPIAN STEREOTYPE EXTEND TO A JOB SELECTION SCENARIO?**

Amy E. Latimer-Cheung<sup>1</sup>, Kathryn Andrusko<sup>1</sup>, Rac Stone<sup>1</sup>, Alexander Lithopoulos<sup>2</sup>

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Research suggests able-bodied individuals hold an explicit stereotype favouring Paralympians; Paralympians are considered more competent and warmer than individuals with a disability not portrayed as athletes. The purpose of this study was to determine if this Paralympian stereotype translates to an ecologically valid context – job selection. Able-bodied individuals (N=192; Mage= 25.94±7.89; 76.6% female) completed an online survey. Participants were presented a job description, followed by an applicant resume. The resume either highlighted the applicant's experience as a Paralympian or provided no athlete information. Resumes were matched on all other elements. Participants completed stereotype measures (warmth, competence) and judgments of candidate's suitability for the job (Time 1: post-resume). Next, a standardized, seven-minute video of the candidate answering interview questions was presented. Stereotype and judgement measures were repeated. Believability of the applicant's qualifications also was assessed (Time 2: post-video). RM ANOVA revealed the Paralympian and non-athlete were perceived as equally competent and warm at both time-points,  $p > .05$ . A time x athlete status interaction revealed the Paralympian was perceived to be more suitable for the position compared to the non-athlete at Time 1,  $p < .05$ . Judgments of both applicant's job suitability increased after the video interview,  $p < .05$ . Participants were less likely to believe applicants were elite athletes ( $M = 2.99 \pm 1.56$ ) compared to other qualifications (e.g., volunteerism;  $M = 5.32 \pm 1.24$ ),  $p < .05$ . While status of a Paralympian may shape initial perceptions of job suitability, its potential as an impression management strategy may be limited by rigid stereotypes characterizing individuals with a disability as non-athletes.



248.

## **THE RELATIONS BETWEEN NEWCOMER INTEGRATION PROCESSES AND YOUTH ATHLETES' PERCEPTIONS OF THE GROUP ENVIRONMENT IN COMPETITIVE HOCKEY**

Jeffrey J Chamberlain<sup>1</sup>, Alex J Benson<sup>1</sup>, Craig R Hall<sup>1</sup>

<sup>1</sup>Western University

The ways in which new members are integrated into a particular group environment—also known as organizational socialization processes—have been shown to be a powerful predictor of newcomer adjustment in the workplace. Yet, there is a scarcity of research on how sport teams manage the integration of new team members, and the consequences of different tactics. In the current research, we used the recently developed Sport Team Socialization Tactics Questionnaire (STSTQ) to evaluate how socialization processes are systematically related to youth athletes' perceptions of their group environment. The STSTQ assesses information sharing between more experienced members and newcomers (i.e., serial tactics), the provision of tailored role information to athletes (i.e., coach-initiated role communication tactics), and the structuring of group-wide social events (i.e., social inclusionary tactics). Across two time points, 202 competitive adolescent ice hockey players (Mage = 14.47, SD = 1.23, 26.24% female) completed measures of team socialization processes near the beginning of the season, and then measures of group conflict, social identity, and cohesion later in the season. As hypothesized, coach-initiated role communication tactics positively predicted task cohesion ( $p < .001$ ). Also as predicted, social inclusionary tactics positively predicted social identity ( $p < .001$ ). Counter to expectations, however, serial tactics was not significantly related to relationship conflict. Overall, the results point to how the processes surrounding the integration of new members may be a key leverage point for managing the social environment for athletes in youth sport.

255.

## **DO PARASPORT ATHLETES' NORMATIVE PERCEPTIONS OF DOPING MODERATE THE ASSOCIATION OF DOPING MORAL DISENGAGEMENT WITH ANTICIPATED GUILT?**

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Research suggests greater use of doping moral disengagement (DMD; temporary endorsement of a transgressive behavior) is associated with reduced anticipated guilt (Kavussanu & Stanger, 2017). However, DMD occurs within the greater social context of sport. Descriptive norms (perceived doping prevalence) and subjective norms (perceived support from significant others) may influence this relationship, as moral behavior is a product of social circumstances and moral reasoning (Bandura, 1991). The purpose of this study was to examine the potential moderating influence of these normative perceptions on the relationship of DMD with guilt anticipated from doping. A survey was completed by 169 parasport athletes (Mage = 36.5 years, 77.4% male, 53% wheelchair basketball), including three items for descriptive norms (Barkoukis et al., 2014), three for subjective norms (Lazuras et al., 2015), the Doping Moral Disengagement Scale (Boardley et al., 2018), and five anticipated guilt items in a hypothetical doping situation (Boardley et al., 2017). Hierarchical multiple regression revealed a significant increase in variance explained when moderation terms were added to main effects terms ( $R^2$  change = .07). Simple slopes testing showed DMD to negatively predict anticipated guilt when subjective norms are low, but non-significant prediction of anticipated guilt when subjective norms are high. No interaction was found with descriptive norms. Findings suggest the importance of social norms (particularly subjective) to prediction of anticipated doping-related guilt in parasport athletes. Future work should examine how normative influences can strengthen or weaken effectiveness of anti-doping programs.

261.

## **SHEDDING LIGHT ON THE STAGE: THE TRAINING DEMANDS OF COMPETITIVE HIP-HOP DANCERS**

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Despite the growing popularity of hip-hop in Canada, research exploring the unique stressors and coping experiences of competitive dancers is sparse. As a first step in addressing this gap, the purpose of this study was to take an exploratory approach to better understand the types of demands faced by competitive hip-hop dancers and how they attempted to manage these demands. Eleven participants (5 women, 6 men) who have represented Canada at an international hip-hop competition in the past year each participated in a one-on-one semi-structured interview early in their competitive season. An interpretive description framework informed this study (Thorne, 2016). Findings suggest that competitive hip-hop dancers experience a range of demands surrounding their training context (i.e., athleticism, social comparison, pressure of expectations) as well as their ability to participate in competitive hip-hop dance (i.e., financial demands, balancing work, school, and other commitments). Participants reported using a variety of coping approaches to manage such demands, including: coping efforts centered on demands of the self (i.e., self-care, love of dance), coping targeting training session demands (i.e., team accountability, physical training), coping through the dance community (i.e., sense of family and social support, sharing the load), and efforts to manage auxiliary or compounding demands that influence dance training (i.e., time and financial management strategies, schedule flexibility). Understanding the types of demands faced by this unique population can aid dancers, directors, parents, and practitioners in designing tailored programs and support systems to supplement existing coping efforts.

268.

## **SEARCHING FOR POSITIVE YOUTH DEVELOPMENT: A SCOPING REVIEW OF SPORT FOR DEVELOPMENT PROGRAMS SERVING MARGINALIZED YOUT**

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Over the past two decades, the creation and application of sport for development (SFD) programs has permeated communities and groups deemed to lack social resources. The current scoping review examined the literature around SFD programs and marginalized youth. A broad approach was taken to achieve an outline of the literature around the delivery, methodology, and measures involved when exploring the efficacy of SFD interventions applied to marginalized youth. A search of three key terms: “youth”, “sport”, and “at-risk” yielded 14,834 possible studies that were reduced to 359 after a title and abstract search. Studies were then coded by two reviewers for location, year of publication, study design, participants, operationalization of ‘marginalized’, types of sport programs, and associated outcomes. Twenty-three studies were included, predominately published between 2012-2018, using qualitative (43%), quantitative (35%), or mixed (22%) designs. Most participants were males (70%). When defining marginalization, socioeconomic status was primarily used as a descriptor (61%), as well as behaviour status (22%), psychological status (13%), and school enrolment (4%). Most programs were community-based (48%), administered for 12 weeks or more (61%), and aimed to strengthen youth’s psychological well being (26%), or social skills (44%). This review demonstrates a predominantly social approach to the operationalization of marginalized, and the creation, facilitation, and evaluation of SFD programs for marginalized youth. Although 18% of the studies included qualitative methods, an experiential aspect of program evaluation was lacking. Further exploration of marginalized youths’ experiences within SFD programs may prove valuable in understanding participation and development in this population.

272.

## IMAGINING A WAY TO ASSIST PHYSICAL EDUCATORS

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Teacher effectiveness has a positive influence on student achievement and learning (Heck, 2009). Consequently, there is considerable value in better understanding the potential skills that can help make teachers more effective. For physical educators, it has been suggested that strategic use of mental imagery could be associated with teacher effectiveness (Hall, 2012) but minimal research has examined this with the general PE teacher population. This study investigated PE teacher's perceptions and use of imagery as part of teaching. Furthermore, this study sought to establish possible associations between PE teacher characteristics (e.g., grade level taught; years experience; gender; teacher education) and teacher's use of imagery. A total of 150 Canadian PE teachers (76 male, 70 female, 4 undeclared; M years-experience = 12.9) completed the Imagery Use by PE Teachers Survey. The survey focused on PE teacher's perceived frequency of imagery use based around common teaching behaviours (e.g., planning; assessment; skill development). Results demonstrated that the majority of teachers (68.5%) believed imagery was extremely important as an aid for performing various teaching behaviours, with the largest number of teachers (n=125) indicating they use imagery to help teach specific physical skills, and also for personal reflection (n=108). Yet, 78.5% of teachers reported most commonly using imagery prior to delivering a lesson. Teaching experience and education were both found to be significantly associated with imagery use perceptions of PE teachers. These findings suggest that imagery is a skill PE teachers are employing, however not all PE teachers use it equally or for the same purposes.

274.

## **IMAGERY AND MODELING INFLUENCES ON TEAM SPORT ATHLETES' COLLECTIVE EFFICACY**

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Self-efficacy Theory identifies both imagery and modeling as important contributors to efficacy beliefs (Bandura, 1997). Research on use of these mental skills among athletes participating in team sport suggests mastery imagery (i.e., MG-M; Munroe-Chandler & Hall, 2004; Shearer et al., 2007) and use of observation-based interventions (Bruton et al., 2014) contribute to collective efficacy beliefs; however, the relative contribution of these mental skills is unknown. The purpose of this study was to explore whether use of the functions of imagery and modeling contribute to team sport athletes' collective efficacy beliefs. Athletes ( $n = 88$ ; 60% female;  $M = 22.40$  years,  $SD = 7.82$ ) currently competing in team sports self-reported their use of the functions of imagery (SIQ-TS; Curtin et al., 2016) and modeling (FOLQ; Cumming et al., 2005) as well as their individual level perceptions of their team's collective efficacy (CEQS; Short et al., 2005) with respect to their primary sport. Regression analyses were conducted separately for all CEQS subscales (Ability, Effort, Preparation, Persistence, Unity) and total CEQS ( $R^2_{adj} = .13-.35$ ,  $ps < .05$ ). MS imagery alone significantly predicted persistence and unity beliefs, while MG-M imagery was also a significant contributor to ability, effort, preparation, and total collective efficacy beliefs. In addition, the strategy function of modeling significantly predicted both effort and preparation beliefs. The findings provide preliminary support for the relative contributions of imagery and modeling to collective efficacy beliefs. Discussion will focus on the theoretical and practical implications for developing mental skills interventions targeting collective efficacy.

277.

## AN ANALYSIS OF CONCUSSION COMICS

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Comics are an important art form that involve images/drawings, often combined with text. They can deliver both meaningful and enjoyable or provocative content on important topics. Concussion is one such topic – this brain injury can lead to debilitating physiological, psychological, and social consequences, and has become a hot topic in the public eye. In particular, concussions have been highlighted with respect to professional sport. However, this injury occurs in all levels of sport and is also a public health problem in other contexts of life (e.g., in transportation and in the workplace). The aim of this study is to explore the themes related to concussions that are reflected in this form of popular media. Forty-three publicly available comics were identified using the search terms “Concussion + comic” and “Sport concussion + comic” in the Google search engine. A content analysis was used to analyze these comics. The results provide an important look at the types of stereotypes, misinformation, exaggerations, correct information, and emphases that are perpetuated through this creative medium. This information allows us to recognize the messaging that is available for public consumption, and could add to our understanding of this source of knowledge. The most common themes that arose from this analysis include fear (of injury or reinjury), use of fear tactics, minimizing the gravity of the injury, the commodification of athletes, and the culture of sport. A critical discussion provides considerations for the intentional production and consumption of comics on concussions and beyond.

283.

## **NOBODY WANTS LIARS IN SPORTS?! DOPING PERCEPTION AND IDEAS FOR PREVENTION IN A SCHOOL SETTING**

Katharina Poeppel<sup>1</sup>

<sup>1</sup>University of Oldenburg

Doping is one of the major crises in high-performance sports, which emphasizes the necessity of an efficient doping prevention. Ideas how to initiate doping prevention have been complemented by a broader and societal perspective (Petróczi, Norman, & Brueckner, 2017). In order to protect young athletes and to conduct constructive discussions without focusing on moral aspects or sanctions, alternate ideas (e.g., in Germany) aim to integrate doping and prevention in school settings and can be integrated in the concept of physical literacy (e.g., Lundvall, 2015; Ontario Curriculum). An online survey was conducted to gain a deeper understanding of doping-related prerequisites and to deduce recommendations how doping prevention could be integrated in physical education. To the time of submission, the sample ( $n = 51$ ) is characterized by students (63%) who want to become teachers in physical education. In line with elite sport coaches (Pöppel & Büsch, 2019), participants perceive a higher severity of doping and doping prevalence in sports (international elite sports:  $M = 51.7\%$ ) than official data of the World Anti-Doping Agency (1.6%, 2017) indicate. From their point of view, doping(prevention) should be integrated in school subjects like physical education, biology or ethics. According to the ideas of literacy in health and physical education contents should be worked out in discussions, own little research projects, critical analyses, or role plays. The efficacy of transdisciplinary prevention projects needs to be proven in further research. It is planned to conduct further research in Canada as a reference sample.



284.

## **PREVALENCE AND CORRELATES OF ORTHOREXIA NERVOSA IN CANADIAN ELITE ATHLETES**

Georgia Ens<sup>1</sup>, Dr. Dave Paskevich<sup>2</sup>

<sup>1</sup>Western University, Faculty of Kinesiology

<sup>2</sup>University of Calgary, Faculty of Kinesiology

Disordered eating attitudes (DEAs) refer to a continuum of abnormal feeding and eating behaviours. The prevalence of DEAs in elite athletes is greater than that of non-athletes, approximately 9% and 4.78% respectively. This is due in part to sport performance demands placed on the athletes (e.g., outcome importance, aesthetic elements, and judging). Researchers have identified “orthorexia nervosa” as an emerging type of DEA which involves a preoccupation with healthful eating, which may be particularly relevant among elite athletes. At present, there is little information regarding who or how many athletes are struggling with a DEA or ON in Canada. The research aimed to determine the prevalence of DEAs and ON in Canadian elite athlete populations. Sex differences, level of competition, and BMI were also examined. Elite Canadian athletes (n = 72) recruited from Canadian Sport Institutes and National Sport Organizations completed questionnaires on eating attitudes. Findings revealed that orthorexic tendencies were observed in 75% of the sample, while DEAs in only 13.9%. No significant associations in symptomatic status were found between sexes  $X^2(1, 72, 1.858 p=0.173)$  or level of competition  $X^2(1, 72, 0.592, p=0.442)$ . No significant relationship was found between survey scores and BMI ( $F(1,70)=1.180, p=0.281$ )  $r^2=0.017$ . The prevalence of orthorexic tendencies in this sample is considerably high, particularly compared to global DEAs, and warrants further research to determine clinical significance. Developing prevention and treatment protocol for orthorexic tendencies may contribute to the health and performance of Canada’s elite athletes.

45.

## **PARTICIPATION PROFILES OF MASTERS SWIMMERS: WHO ARE THEY, AND HOW DID THEY GET HERE?**

Heather K. Larson<sup>1</sup>, Bradley W. Young<sup>2</sup>, Tara-Leigh F. McHugh<sup>1</sup>, Wendy M. Rodgers<sup>1</sup>

<sup>1</sup>Faculty of Kinesiology, Sport, and Recreation, University of Alberta

<sup>2</sup>School of Human Kinetics, University of Ottawa

Research highlights the heterogeneity of masters swimmers in terms of motives, needs, competitiveness, or sociability (Callary, Rathwell, & Young, 2015), and pathways into masters sport (Larson, McHugh, Young, & Rodgers, 2018). More robust understanding of masters swimmer profiles could enhance programming and coaching tailored to these specific groups and guide our understanding of sport for life. This study aimed to identify profiles of adult swimming participants, and associations these profiles had with demographic variables and factors relating to transitions into masters swimming. Survey data were collected from 205 Canadian swimmers with previous competitive youth swimming experience (M age = 44.4, range = 18-85; 60% women, 40% men). Two-step clustering analysis was conducted using five variables: total sport involvement (number of sports yearly), whether they considered swimming their main sport, season duration (months), swim practices attended weekly, hours of swim practice weekly; swim meets attended yearly. Three distinct profiles emerged: 1) "Specializers," 2) "Competitors," and 3) "Samplers." These profiles differed significantly from one another on all of the variables except season duration. Next, we examined differences on demographic variables by profile. No significant differences emerged on age, gender, number of children, or marital status. "Competitors" had slightly lower educational attainment compared to the other profiles. Finally, we examined their transitions into masters swimming, considering the amount of time off following youth swimming and their age of registering in masters swimming. No significant differences emerged. Further research should look to connect the quality and intensity of youth experiences to masters' current status.

77.

## **SINISTER RIGHT-HANDEDNESS PROVIDES CANADIAN-BORN MAJOR LEAGUE BASEBALL PLAYERS WITH AN OFFENSIVE ADVANTAGE: A FURTHER TEST OF THE HOCKEY INFLUENCE ON BATTING HYPOTHESIS**

Denver M. Brown<sup>1</sup>, Zoe Poucher<sup>1</sup>, Matt Myers<sup>1</sup>, Jeffrey Graham<sup>1</sup>, John Cairney<sup>1</sup>

<sup>1</sup>University of Toronto

Recent research has shown Major League Baseball (MLB) players that bat left-handed and throw right-handed (i.e., sinister right-handers), have a higher batting average (BA) in comparison to players with other combinations of batting and throwing handedness. Possibly owing to early exposure to hockey, Canadian-born MLB players have an increased propensity to be sinister right-handers, however, it has yet to be determined whether this provides a relative offensive performance advantage compared to players born in other countries. Using the largest archival dataset of MLB statistics available, the present study examined whether being Canadian-born influences offensive performance indirectly through handedness. Offensive performance measures included: BA, slugging percentage, on-base plus slugging percentage, on-base plus slugging percentage plus, homeruns, runs batted in and wins above replacement. Findings revealed that since the inception of MLB, left-handed batters (regardless of throwing hand dominance) demonstrate the best offensive performance across each metric. The relative proportion of Canadian-born sinister right-handers is at least two times greater than players from other regions, although being Canadian-born does not provide a direct offensive advantage. Using Iacobucci's (2012) extension for computing mediation involving categorical and continuous variables, results showed evidence of a significant indirect effect in that being Canadian-born increases the odds of being a sinister right-hander and in turn leads to greater performance across each offensive performance metric. Collectively, findings provide further support for Cairney and colleagues (2018) hockey influence on batting hypothesis and suggest this effect extends to offensive performance.

175.

## **RECIPROCAL RELATIONS BETWEEN TEACHER AND STUDENTS IN FEMALE ELITE JUNIOR BALLET: A SHARED REALITY PERSPECTIVE**

Danielle C. S. Fredriksen<sup>1</sup>

<sup>1</sup>Department of Coaching and Psychology, Norwegian School of Sport Sciences

**Purpose:** To perform at the elite level in ballet requires a positive performance development while being a junior ballet dancer. Hence, the teacher-student relationship in ballet is crucial in reaching the desired performance goals. Shared Reality Theory (SRT) holds significant potential for studying the reciprocity in the relationship between human beings (Echterhoff & Higgins, 2018). Indeed, SRT postulates that human beings are relationally and epistemologically motivated to create a shared reality about a target referent (i.e., performance goals). Thus, the purpose of the present study is to investigate the reciprocity in the teacher-student relationship in the Norwegian context of junior ballet, thereby exploring the mechanisms of shared realities in relation to performance development in elite junior ballet. **Design:** Three female elite junior ballet students (Mage=16.7 years) and their main ballet teacher were interviewed using a semi-structured interview (Mtime=35.6 minutes). **Results:** The narrative analysis showed that the teacher emphasized ballet as a professional way of being. Although the teacher highlighted the importance of a continuous dialogue to achieve each student's goals, findings also showed that there was a lack of understanding and reflexivity around each student's performance development. Hence, the students were mainly influenced by the intentions and goals highlighted by their teacher. **Conclusion:** Findings indicate the importance of letting both teacher and students experience a shared reality about the path to achieving the desired goals in order to facilitate effective performance development. Clearly, the teacher found it difficult to let the students have a greater voice in the ballet class.

205.

## **PART OF THE TEAM: MEASURING PARENT SOCIAL IDENTITY IN YOUTH SPORT**

Jordan Sutcliffe<sup>1</sup>, Alex Benson<sup>2</sup>, Colin McLaren<sup>1</sup>, Mark Bruner<sup>1</sup>

<sup>1</sup>Nipissing University

<sup>2</sup>Western University

Parents are active participants in their child's sport participation, as they experience cognitive and behavioural outcomes as a result of sport socialization. As such, parents may develop a social identity that is tied to their child's team membership. Despite this, the conceptualization and measurement of parental social identity in sport has received little attention. The purpose of this study was to assess an adapted measure of social identity in sport that captures the extent to which parents identify with their child's sport team. Based on Cameron's (2004) three-factor model of social identity and the newly developed Social Identity Questionnaire for Sport (SIQS), we assessed competitive youth sport parents' perceptions of ingroup ties, cognitive centrality, and ingroup affect. Using confirmatory factor analysis, this factor structure was assessed in a sample of 788 hockey parents (Mage = 43.27, SD = 6.30; male = 401; female = 387). Confirmatory factor analysis indicated reasonable model fit (RMSEA = 0.087, CFI = 0.960, TLI = 0.934, SRMR = 0.039). Subsequent measurement variance testing for sex (i.e., male, female) and parents' previous experience with youth hockey (i.e., yes or no) evaluated configural, metric, and scalar variance consecutively. Results show strong measurement invariance across sexes and with regard to parents' previous experience in youth hockey. We discuss the implications and future directions of applying the SIQS to parents in youth sport.

207.

## **ASSOCIATIONS BETWEEN ADOLESCENT ORGANIZED SPORT PARTICIPATION AND SELF-REPORTED SYMPTOMS OF ANXIETY AND DEPRESSION: A SYSTEMATIC REVIEW AND META-ANALYSIS**

Michael Panza<sup>1</sup>, Scott Graupensperger<sup>1</sup>, Jennifer Agans<sup>1</sup>, Isabelle Doré<sup>2</sup>, Stewart Vella<sup>3</sup>, Blair Evans<sup>1</sup>

<sup>1</sup>Penn State University

<sup>2</sup>University of Toronto

<sup>3</sup>University of Wollongong

Sport participation may protect against mental health problems that are increasingly prevalent among adolescents. Specifically, sport integrates physical activity behavior and supportive social influences with peers and communities, which are both independently beneficial to mental health. We conducted a systematic review to explore the association between adolescent organized sport participation and self-reported symptoms of anxiety and depression. Upon systematically screening 9,955 records, 29 unique articles were identified and selected; including 61 unique effect sizes and a total of 122,056 participants. Effect sizes were clustered into four categories based on how sport involvement was operationalized: (a) absence or presence of sport involvement, (b) frequency of sport involvement, (c) number of sport teams or the amount of times involved in sport, and (d) duration of sport participation. Results revealed that self-reported symptoms of anxiety and depression were significantly lower among youth who were involved in sport, compared to those who were not involved, although the meta-analytic effect size was relatively small in magnitude. Metaregressions uncovered instances where heterogeneity in effects was partially explained by sample age and sex. Whereas these effects do not uncover a causal effect of sport involvement, they support theorizing that adolescent sport participation can have a protective effect on mental health.?

208.

## **TAKING STOCK OF POSITIVE YOUTH DEVELOPMENT RESEARCH IN SPORT: A CITATION NETWORK ANALYSIS**

Colin D. McLaren<sup>1</sup>, Jordan Sutcliffe<sup>1</sup>, Stewart A. Vella<sup>2</sup>, Mark W. Bruner<sup>1</sup>

<sup>1</sup>Nipissing University

<sup>2</sup>University of Wollongong

Although sport has been established as a vehicle for positive youth development (PYD), an overview of this broad literature base reveals a range of conceptual and theoretical orientations guiding the research. In order to synthesize the sport-based PYD literature, a citation network analysis was conducted to identify the most prominent publications in the area and to evaluate the interconnectedness of the literature based on citations. Peer-reviewed quantitative and qualitative journal articles (N = 197; search finalized June 2018) were included if they (a) used PYD research to establish the conceptual context for the study, (b) included organized and adult-supervised competitive sport, recreational sport, or other settings that included sport activities (e.g., summer camps, school/after-school programs), and (c) reported at least one outcome measure relevant to PYD. Articles within this list then were coded based on whether they cited (1) or did not cite (0) one another, and network metrics were summarized using UCINET software. The network structure was visualized and a modularity algorithm detected four research communities within the PYD literature. These communities, including their total citation network coverage and most cited article were: life skill development (31.9%, 324 total citations; Holt et al., 2008, 29 citations), developmental/sport experiences (27.6%, 246 total citations; Larson et al., 2006; 44 citations), PYD programming (25.5%, 152 total citations; Brunelle et al., 2007; 27 citations), and social environment (15.0%, 110 total citations; Fraser-Thomas & Côté, 2009; 19 citations). Implications of these findings are addressed including the need for common conceptual ground in PYD research.

# **MOTOR CONTROL AND LEARNING ABSTRACTS**



# **Motor Control and Learning**

## **Verbal Session I**

244.

## **EVALUATING AGE-RELATED SENSORIMOTOR TRANSFORMATION DIFFERENCES WHEN PROGRAMMING MOVEMENTS TO SOMATOSENSORY TARGETS**

Rachel Goodman<sup>1</sup>, Luc Tremblay<sup>1</sup>

<sup>1</sup>The University of Toronto

While older adults experience declines in somatosensory acuity, this loss does not appear to increase movement accuracy above that of younger adults (e.g., Helsen et al., 2016). Alternatively, older adults exhibit longer reaction times than younger adults when initiating upper-limb reaches to somatosensory targets (Goodman et al., 2018). One possible explanation for longer reaction time could be the result of increased cortical processing spent performing sensorimotor transformations when planning the movement (e.g., Jeannerod, 1991, Sarlegna & Sainburg, 2007). To determine if somatosensory information about the reaching limb contributes to these transformations, tendon vibration was applied to the effector. Younger and older adults performed reaches to visual, somatosensory and bimodal targets, employed by lights and vibro-tactile sensation to the left fingers. All trials were performed without vision of the limb, and one block of trials was performed with tendon vibration presented between-trials. Both older and younger adults exhibited lower endpoint precision when tendon vibration was applied. Also, only older adults showed significantly lower endpoint precision when making movements to somatosensory targets, versus both visual and bimodal targets. Further, older adults also showed the greatest increases in reaction time when vibration was applied, specifically when they were creating movements to the somatosensory targets. Thus, perturbing the effector limb created significantly greater delays in movement initiation to somatosensory targets in the older versus younger adults. These results provide further evidence that older adults have difficulties programming movements utilizing somatosensory information when reaching to somatosensory targets, including somatosensory cues from the effector.

209.

## **THE HAND LEADS THE EYES WHEN PERFORMING ONLINE MOVEMENT CORRECTIONS**

Anouk J. de Brouwer<sup>1</sup>, Hannah M. Brown<sup>1</sup>, Miriam Spering<sup>1</sup>

<sup>1</sup>Ophthalmology & Visual Sciences, University of British Columbia

During goal-directed reaching, our eye and hand movements are tightly coupled in space and time, with the eye typically leading the hand. It is well known that our eyes and hand quickly correct for errors that occur during movement. However, it is unclear how corrections by the eyes and hand are coordinated, and how they are affected by feedback of the hand position. To study this, we designed a set of tasks in which participants performed online corrections during reaches to a visual target, using a robotic manipulandum. In 60% of trials, a change in movement goal was indicated by a displacement of the target, with or without distractors, or by a visual cue. Reaches were performed with either online or endpoint-only feedback of the hand position, shown as a cursor. We found that the target change evoked a corrective saccade and a rapid correction in the trajectory of the hand in all conditions. The hand always started correcting earlier than the eye. Corrections of both the hand and the eye started earliest in response to a target displacement without distractors, slightly later with distractors, and latest in response to a cue; this increase in latency was larger for the eye than for the hand. Further, the hand but not the eye corrected faster when online feedback of the hand position was available. The differential effects of task and feedback on eye and hand suggest that both effectors might update the movement goal independently.

108.

## **IS IT THE DOMINANT OR IPSILATERAL EYE THAT CONTRIBUTES TO ONLINE VISUOMOTOR CONTROL THE MOST?**

Damian M. Manzone<sup>1</sup>, Tristan Loria<sup>1</sup>, Hui Ting Zhang<sup>1</sup>, Tremblay Luc<sup>1</sup>

<sup>1</sup>Faculty of Kinesiology and Physical Education, University of Toronto

Using the dominant limb (Apker et al., 2015) or gathering visual information from the dominant eye (Manzone et al., 2018) is advantageous for the control of goal-directed action. Further, participants were better able to correct for an imperceptible target jump during right limb trajectories when brief visual samples were provided to the ipsilateral (i.e., right) eye relative to their initial hand position (i.e., rightward home position) compared to contralateral combinations (e.g., left eye, rightward home position; Loria et al., 2019). But, movements were only performed with the dominant right hand and all participants were right eye dominant. Therefore, it is unclear whether the ipsilateral combination of eye, home position and hand or the coupling of the dominant eye and hand contributes to the corrections. In the current study, participants performed left-handed and right-handed reaches toward an imperceptibly jumped target from home positions located to the left and right of the midline. All participants were right hand and eye dominant. After movement onset, only a brief visual sample was provided to the left and/or right eye. This created two ipsilateral conditions: one with the dominant eye and hand (i.e., ipsilateral dominant) and one without (i.e., ipsilateral non-dominant). Significant corrections toward the jumped target position were found in the ipsilateral dominant condition (i.e., right hand, eye, home) but not the ipsilateral non-dominant condition (i.e., left hand, eye, home). This suggests that it is indeed the coupling of only the dominant eye and hand in ipsilateral space that contributes to online visuomotor control.

107.

## **EXPLICIT AND IMPLICIT VISUOMOTOR ADAPTATION DIFFER BASED ON THE METHOD OF ASSESSMENT**

Sarvenaz Heirani Moghaddam<sup>1</sup>, Romeo Chua<sup>2</sup>, Erin K. Cressman<sup>3</sup>

<sup>1</sup>University of Ottawa

<sup>2</sup>University of British Columbia

<sup>3</sup>University of Ottawa

The process dissociation procedure (PDP; action task) and the Verbal report framework (VRF; perceptual task) have been put forth to examine implicit visuomotor adaptation (IA) and explicit visuomotor adaptation (EA). It is unclear if the two methods (PDP vs. VRF) measure similar IA and EA, as the neural processes underlying the control of action versus perception have been shown to be dissociated (Goodale & Milner, 1992). 20 participants were divided into two groups (PDP vs. VRF) and reached in a virtual environment with an aligned cursor (1 block) and a cursor that was rotated 40° CW relative to hand motion (3 blocks). IA and EA were assessed immediately following each of the 4 blocks and following a 5-minute break in which participants sat quietly. The PDP group reached while using any learned strategy (IA+EA), or while not engaging in a strategy (IA). The VRF group verbally reported the number they planned to aim to (EA) before they reached to the target (IA+EA). Both groups adapted to the rotation and showed evidence of IA and EA. However, the groups differed with respect to the stability and extent of IA and EA observed over time. In the PDP group, IA decayed quickly (i.e., following the 5-minute break), while, IA was consistent across blocks and delay interval for the VRF group. The VRF group also had greater EA at all times. Given the different trends in performance between the groups, the PDP and VRF do not assess similar IA and EA.

# **Motor Control and Learning**

## **Verbal Session II**

243.

## **TIME'S UP: WHEN IS IT TOO LATE TO IMPLEMENT ONLINE LIMB-TARGET REGULATION PROCESSES?**

Valentin A Crainic<sup>1</sup>, Goran Perkic<sup>1</sup>, Rachel Goodman<sup>1</sup>, Luc Tremblay<sup>1</sup>

<sup>1</sup>The University of Toronto

Elliott et al.'s (2010) multiple processes model has provided a framework for different stages of online visual feedback utilization. Tremblay and colleagues (2013; 2017) assessed visual feedback utilization processes using a target-jump paradigm, to specifically evaluate limb-target regulation. While results have provided evidence for optimal limb-target regulation early during fast reaching movements (i.e., ~350 ms), they failed to replicate these results for slower movements (i.e., ~700 ms: Crainic et al., 2017). Collectively, these results could indicate that it may be a time to movement end (i.e., approx. 290 ms) that represents a critical criterion to utilize vision for limb-target regulation processes. As such, the current study further investigated limb-target regulation during slower movements (i.e., ~700ms), while a brief window of visual feedback was provided at 0.3 m/s and 0.7 m/s before and after peak velocity. The latter window occurred later than in Crainic et al. (2017) and less than 290 ms before movement end. During the windows, participants either viewed the original target (30 cm) or a target closer to the start position (i.e., 27 cm: target jump). Endpoint accuracy data indicated that participants could use the window of vision to correct for the target jump in all but the last window condition. These results provide further evidence that time from movement end (e.g., Beggs & Howarth, 1972) could better explain visual feedback utilization strategies, than limb velocity (e.g., Tremblay et al., 2013) or other kinematic criteria (e.g., Elliott et al., 2010).

93.

## **"HE CHOSE...POORLY": LACK OF OPTIMAL BEHAVIOUR AND CHOICE PREFERENCE WHEN CHOOSING BETWEEN TARGET-PENALTY CONFIGURATIONS VIA A KEYPRESS**

Joseph Manzone<sup>1</sup>, Saba Taravati<sup>1</sup>, Heather Neyedli<sup>2</sup>, Timothy Welsh<sup>1</sup>

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<sup>2</sup>School of Health and Human Performance, Dalhousie University

When presented with two different target-penalty configurations of similar Maximum Expected Gain (MEG), participants prefer aiming to configurations with more advantageous spatial parameters rather than more advantageous gain parameters (Neyedli & Welsh, 2015) – perhaps due to the motor system's inherent prioritization of spatial information during reaching movements. To test this hypothesis, participants chose between target-penalty configurations via keypress responses to reduce feedback and the importance of spatial parameters. Configurations varied in both spatial (target-penalty region overlap) and gain parameters (negative penalty values) and could be of similar or different MEG. Choices were made without prior aiming experience (Experiment 1), after aiming experience provided information of movement variability (Experiment 2), or after aiming experience provided information of movement variability and outcome feedback (Experiment 3). At the group level, configurations with the advantageous spatial or gain parameters were chosen equally (Similar condition) in all experiments. Interestingly, the larger MEG configuration was not chosen at a level above chance (Different condition) when no prior aiming experience or when variability information was given, but was chosen more often when both variability and outcome information were given prior to the keypress task. Further, participant-by-participant analyses revealed 3 subgroups: those with a value preference, a distance preference, or no preference. These individual differences cannot be explained by MEG differences between prospects or participant's movement variability. Overall, the data indicate that prioritization of spatial information did not emerge when performing keypress responses and optimal behaviour emerged only when information regarding movement variability and outcome feedback were given.



193.

## **THE EFFECT OF LOAD MAGNITUDE ON PATH CHOICE IN A DECISION-MAKING TASK**

Jessica Cappelletto<sup>1</sup>, Jim Lyons<sup>1</sup>

<sup>1</sup>McMaster University

We are constantly faced with decisions about how to choose a path when navigating a complex movement environment. When deciding between movement paths that vary in reach distance and walking distance, previous research shows that the path which minimizes reach distance is more likely to be chosen, as reaching is ~11.2x more costly than walking (Rosenbaum et al., 2011; Rosenbaum, 2012; Cappelletto & Lyons, 2018a, 2018b). Our recent work investigates biomechanical factors (joint loading at the trunk and shoulder) during decision-making tasks and provides evidence that these functional movement costs can influence cognitive decision making when choosing between alternative movement strategies in both a two-choice and four-choice model (Cappelletto & Lyons, 2018a, 2018b). It is still unclear how functional costs are incorporated into the planning and execution of a decision-making task with decision factors in multiple domains (e.g. distance and weight). The purpose of this study is to explore how the perceived costs of multiple task variables are prioritized and integrated into action planning. Sixteen participants performed 80 trials of a bucket transfer task that varied as a function of load start location, load magnitude, and terminal target position. Our biomechanical data revealed that participants prioritized decreased reach distance over bearing an increased load, as reflected in decreased joint loading in chosen vs. unchosen paths, which suggests that bottom-up processes are influencing action planning.

154.

## **VOLUNTARY ACTION DECREASES SPATIAL PERCEPTION IN CENTRAL AND PERIPHERAL VISION**

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<sup>1</sup>University of Toronto

<sup>2</sup>University of Ottawa

The spatial perception of a visual stimulus is optimal at the fovea and diminishes with increasing eccentricity (Brown et al., 2005). As well, visual perception has also been shown to be modulated during a voluntary movement. For example, temporal visual events are less susceptible to accompanying auditory cues during movements (Tremblay and Nguyen, 2010) while spatial cues are more poorly perceived at peak-limb velocity (Hajj et al., 2019). However, visual stimuli in these studies were presented below and at the fovea, respectively, which may explain the discrepant results for temporal vs. spatial perception. The purpose of this study was to investigate how visual spatial processing differs in peripheral vs. central vision at peak-limb velocity. Participants (n=12) performed an inspection time (IT) task whereby they identified the longest side of a briefly presented (25-150 ms) asymmetrical pi figure. In the no-movement condition, the IT task occurred in central (1deg) and peripheral (15deg) vision while participants grasped a manipulandum. In the movement condition, the IT stimulus appeared at and below the foveated target at peak-limb velocity of a rapid 30deg elbow extension to a target. While IT task performance was significantly poorer in the peripheral field, visual spatial processing was further diminished at peak velocity in both peripheral and central vision. These findings indicate that changes in temporal visual event perception during voluntary action (Tremblay and Nguyen, 2010) are accompanied by decreased spatial perception of visual stimuli at peak-limb velocity both at the fovea and at 15deg of visual eccentricity.

# **Motor Control and Learning**

## **Verbal Session III**

237.

## **DEVELOPING SKILLED MOTOR PERFORMANCE: A SYSTEMATIC REVIEW OF PERCEPTUAL SKILL TRAINING IN CHILDREN AND YOUTH**

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Acquiring perceptual motor skill capabilities is an important element of successful sport performance. Perceptual motor skills have shown to be trainable in an adult population; however, less is known about perceptual motor skill training at earlier, developmental stages of long term athlete development. The purpose of this systematic review was to critically evaluate the available evidence for the trainability of perceptual motor skills in children and youth. Original research articles were retrieved systematically through searching electronic databases (PubMed (OVID), PsychInfo (EBSCO), EMBASE (OVID), and SPORTDiscus (EBSCO)) and articles examining perceptual motor training interventions in children and youth were included in the analysis. Twelve articles were identified, including 638 participants with an average age of 11 y. Primary outcome measures varied with an emphasis on the training of anticipatory skills, coincident anticipation time, simple reaction time, and choice reaction time. Findings showed that 10 out of the 12 investigations showed post-intervention improvements in the respective perceptual motor skill when compared to baseline. While there has been a limited number of studies examining perceptual motor skill training in children and youth cohorts to date, this systematic analysis suggests that perceptual motor skill training in childhood/youth may have benefits in sport development. Further research is warranted into examining perceptual motor skill development and training protocols in the context of long term athlete development in children and youth for optimizing sport performance.

65.

## **LONGITUDINAL RELATIONSHIPS AND RECIPROCAL EFFECTS OF MOTOR COMPETENCE, PHYSICAL FITNESS AND EXECUTIVE FUNCTIONS IN PRIMARY SCHOOL-AGED CHILDREN**

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Motor and cognitive development follow similar timetables across childhood (Piaget, 1964). Relationships between both are widely accepted (van der Fels et al., 2015) and partially explained by the demands motor tasks place on executive functions (EF) as well as by neurophysiological changes through exercise (Tompson et al., 2008). However, longitudinal evidence on parallel or reciprocal relationships is lacking. Moreover, the constructs physical fitness (PF) and motor competence (MC) have not been considered separately with regard to EF. Thus, this study examined the cross-lagged relationships between EF and PF as well as between EF and MC in primary-school children. N=198 children (mean age=8.08 ± 1.0, 50% male) 2017 and 12 months later completed two motor tests: the FitnessGram (PACER, broad jump, 20m sprint; FitnessGram, 2016) assessed physical fitness while the TGMD-3 (Ulrich, 2018) assessed MC (locomotion, object control). EF were assessed by the Flanker Task (inhibition) and N-Back Test (working memory). Structural equation modelling (CFI>.95, IFI scaled>.95, SRMR<.05) revealed relative stability for PACER (b = .55), broad jump (b = .75), sprint (b=.58), locomotion (b=.50), and object-control (b=.62, all p<.001). EF showed moderate stability (inhibition: b=.31, p<.01; working memory: b=.31, p<.001). Cross-lagged relationships were found for locomotion (b=.20, p<.05) and object control (b=.21, p<.05) predicting working memory. Results support that PF and MC are more stable across childhood than EF and show that the level of MC predicts working memory performance one year later. The present findings pinpoint the necessity to distinguish between MC and PF in cognitive development during childhood. More longitudinal research to explain differences and underlying mechanisms is needed. Implications for research and physical education will be discussed.

270.

## MANIPULATING THE CHARACTERISTICS OF SELF-CONTROLLED FEEDBACK SCHEDULES

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<sup>1</sup>McMaster University

The “OPTIMAL” theory of motor learning suggests that self-controlled practice conditions—in which participants are asked to make task-relevant (e.g., feedback) or task-irrelevant (e.g., ball colour) choices during practice—enhance learning over no-choice yoked conditions because they support the learner’s need for autonomy. Based on “OPTIMAL” theory, we predicted that participants in self-controlled groups would show enhanced learning relative to their yoked counterparts regardless of the characteristics of their feedback. One self-controlled group exercised choice over an error feedback schedule (e.g., -186 ms) and the other had choice over a graded feedback schedule (e.g., too fast). Corresponding yoked groups were collected. All participants (N=152) practiced an aiming task requiring a rapid 40-degrees extension movement in exactly 225 ms. Measures of intrinsic motivation, perceived competence, and perceived autonomy were collected before, during, and at the end of practice, and before the 24-hr retention and transfer tests. For the spatial and temporal goals, participants performed more accurately in the retention test than in the transfer test. We found a spatial learning advantage for graded feedback. Contrary to previous findings, we did not find a self-controlled learning advantage. Self-reported intrinsic motivation increased over time and participants who received error feedback reported higher perceived competence than those who received graded feedback. Consistent with previous findings, perceived autonomy was similar across groups. These data are not in line with tenets of the “OPTIMAL” theory and add to the growing evidence that self-controlled conditions should not be labelled as autonomy-supportive.

105.

**THE RECOMMENDATION THAT LEARNERS BE PROVIDED CHOICE OVER FEEDBACK SCHEDULING IS CHALLENGED WHEN A PERCEIVED COACH-CONTROLLED GROUP IS ADDED TO THE TYPICAL SELF-CONTROLLED LEARNING PARADIGM**

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<sup>1</sup>University of Ottawa

Researchers have shown that learners who self-control (SC) their knowledge of results (KR) schedule learn the task more effectively than yoked learners. A recommendation that has followed from such results is that learners should be provided choice over their KR schedule, rather than at a coaches' discretion (Wulf & Lewthwaite, 2016). No research to date, however, has compared SC learners to a group that more closely mimics that of receiving KR from a coach, thus challenging whether such recommendations can be made. To this end, three groups learned a golf putting task; a SC group, a traditional yoked group (TY), and a group who were led to believe that their KR schedule was being controlled by a golf coach (perceived coach-controlled yoked group; PCC). Participants (N= 60) completed three phases; pre-test, acquisition, and two 24-hr delayed post-tests (retention/transfer). All groups lowered their mean radial error (MRE) throughout acquisition ( $F(8.26, 470.6) = 4.95, p < .001$ ). As hypothesized, the SC group ( $M = 40.18$ ) had lower MRE compared to the TY group ( $M = 43.10$ ) during the post-tests, yet, the PCC group had the lowest MRE ( $M = 36.54$ ). These differences, however, were not statistically significant. Results from a questionnaire indicated that both yoked groups showed similar moderate ratings for receiving KR when they wanted it, as well as preferring KR on good trials, or good and bad trials equally. Taken together, these results call into question the recommendation for practitioners to give choice to a learner over KR scheduling and further research is warranted.

# **Motor Control and Learning**

## **Verbal Session IV**



245.

## **PHASE-AMPLITUDE-COUPPLING IN THE CORTICO-BASAL GANGLIA NETWORK DURING RESPONSE INHIBITION**

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There is converging evidence demonstrating that the ability to voluntarily stop or prevent movement is controlled via a cortico-basal ganglia-thalamocortical loop. However, the physiological mechanism underlying this network control is unclear. There is growing evidence that concurrent neural activity in different frequency ranges interact and transiently couple, raising interest for its possible role in information processing and motor control. A particular form, phase-amplitude-coupling (PAC), the instantaneous amplitude of a higher-frequency band within a signal is modulated by the instantaneous phase of a lower-frequency band of the same (or a different) signal. The present study investigated whether PAC within the subthalamic nucleus (STN), and between the STN and motor cortex (M1) contribute to the ability to voluntarily stop or prevent movement. Patients with externalized deep brain stimulation electrodes performed a stop-signal task while electroencephalography and STN local field potentials were simultaneously recorded. Patients were instructed to press a button in response to a visual go-signal but try to inhibit this response if a stop-signal was subsequently presented. The time between the go-signal and stop-signal varied using a one-up/one-down staircase algorithm based on stop success/failure. Results revealed an increase in STN-STN PAC between beta phase (10-30Hz) and high frequency oscillation amplitude (150-400Hz) during successful- compared to failed-stop trials, and a decrease in STN-M1 PAC between beta phase (10-30Hz) and gamma amplitude (50-100Hz) during successful- compared to failed-stop trials. These findings provide novel human evidence for the role of PAC within the response inhibition network and a possible mechanism underlying the ability to stop responses.

202.

## **TEMPORALLY GRADED IMPAIRMENT OF RETENTION INDUCED BY PRIOR LEARNING OF THE SAME MOTOR TASK**

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Learning rarely occurs in isolation from previous experiences. In fact, the brain's response to an ongoing event depends on its previous history of activity. Namely, neurobiological evidence indicates that previous learning, by disrupting the brain's homeostatic state, can transiently saturate neuroplastic capacity, thus potentially impairing subsequent retention capacities. The objective of the present work was to test this hypothesis. Three distinct experiments were conducted in which participants ( $n = 124$ ) adapted twice to the same gradually introduced  $21^\circ$  visuomotor rotation over two separate sessions. Retention was assessed through extinction of adapted behaviors upon removal of the rotation immediately after adaptation. Globally, results revealed that when the two sessions were interleaved with 2 or 12min, but not with 1 or 24h, retention of the second session was impaired as compared to the first one, suggesting a temporally graded saturation of retention capacities by previous learning. Furthermore, putatively inhibitory and excitatory repetitive transcranial magnetic stimulation (rTMS) protocols were applied over M1 during the 12min inter-session interval to modify the history of brain activity with the objective of restoring subsequent retention. Although the rTMS protocols effectively modulated M1 activity, they failed to alter subsequent retention capacities, suggesting that previous learning-induced homeostatic state disruption may be refractory to the effects of rTMS over M1. Globally, the present results indicate that the brain's retention capacities can be impaired by its previous history of learning of the same task and that the passage of time may remain, yet, the best way to restore retention capacities.

90.

## **ADAPTATION IN THE MOTOR SYSTEM FOLLOWING MOVEMENT IMAGERY TRAINING IS RELATED TO MOTOR SYSTEM ACTIVATION DURING MOVEMENT IMAGERY**

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Movement imagery (MI) is a cognitive motor process that shares neural networks with movement execution and observation. Previous research using transcranial magnetic stimulation (TMS) has demonstrated that both physical and observational training can elicit motor-cortical adaptations in the representation of movement (e.g. Classen et al., 1998; Stefan et al., 2005). This same effect has recently been demonstrated with MI (Yoxon & Welsh, submitted). These changes are thought to occur because the training potentiates (increases the excitability of) the representation of the trained movement. In support of this account, a positive relationship was reported between the magnitude of motor adaptations following observational training and the magnitude of corticospinal activation during action observation (i.e. the difference in amplitude of motor evoked potentials [MEPs] between rest and during an instance of action observation). The current experiment assessed this same relationship with MI training. The dominant direction of TMS-evoked thumb movements (i.e. flexion or extension) was determined before and after training. Single-pulse TMS was also used to determine the amplitude of MEPs during imagined flexion and extension of the thumb. During the training session, participants imagined themselves moving their thumb in the opposite direction of the pre-determined dominant direction. A strong positive relationship was found between corticospinal excitation during MI and both the change in the proportion of movements in the training direction. Consequently, it appears that the activation of the corticospinal system is strongly related to motor adaptations following MI training.

190.

## **THE EFFECT OF OBJECT AFFORDANCES ON MOTOR ACTION PRIMING USED IN RAPID BALANCE RECOVERY ACTIONS**

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<sup>1</sup>Kinesiology, McMaster University

There is considerable evidence to suggest that object affordances (see Gibson, 1966) can serve to moderate volitional responses by “priming” the visuomotor system toward certain actions (e.g., Tucker & Ellis, 1998). Typically, these studies assume that shorter voluntary reaction time latencies reflect more efficient movement planning. Questions remain however, as to whether object affordances offer the same motor priming benefits in situations where the temporal window to initiate motor action precludes volitional movement planning (e.g., during an unexpected balance perturbation). In this study, participants sat in a custom-built chair that delivered posterior perturbations and, on each trial, were presented with two of three types of stimuli within their reach (two graspable poles and a flat non-graspable control surface). They were instructed to reach out and grasp one of the poles at the moment of perturbation so as to mitigate the “fall”. To assess cortical activity that may be indicative of motor planning in response to the perception of object affordances, changes in oxyhemoglobin (HbO) in the right and left pre-motor and motor cortices were measured using a continuous wave fNIRS system. Results revealed a significant increase ( $F= 5.2$ ,  $p= .03$ ) in HbO in the right and left hemisphere ( $M = .004$  mM) in response to objects that afford a grasping action, compared to when no grasping opportunity was present ( $M = -.034$  mM). These results suggest that object affordances may be continuously perceived and integrated by the system to be utilized in a potential situation of balance threat.

# **Motor Control and Learning**

## **Verbal Session V**

198.

**BENEFITING FROM BEING ALIKE: INTERINDIVIDUAL SKILL DIFFERENCES PREDICT COLLECTIVE BENEFIT IN JOINT OBJECT CONTROL**Basil Wahn<sup>1</sup>, Laura Schmitz<sup>2</sup>, Peter König<sup>3</sup>, Günther Knoblich<sup>2</sup><sup>1</sup>Psychology Department, University of British Columbia<sup>2</sup>Department of Cognitive Science, Central European University<sup>3</sup>Institute of Cognitive Science, University of Osnabrück

When two individuals perform a task together, they combine their individual skills to achieve a joint goal. Previous research has shown that interindividual skill differences predict a group's collective benefit in joint perceptual decision-making. In the present study, we tested whether this relationship also holds for other task domains, using a dynamic object control task in which two participants each controlled either the vertical or horizontal movement direction of an object. Our findings demonstrate that the difference in individuals' skill levels was highly predictive of the dyad's collective benefit. Differences in individuals' subjective ratings of task difficulty reflected skill differences and thus also turned out to be a predictor of collective benefit. Generally, collective benefit was modulated by spatial task demands. Overall, the present study shows that previous findings in joint decision-making can be extended to dynamic motor tasks such as joint object control.

187.

## **MUSIC AND METRONOMES: SOURCE AND SUBJECTIVE ENJOYABILITY OF RHYTHMIC AUDITORY STIMULI IMPACT MOVEMENT PERFORMANCE**

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When heard before movement initiation, rhythmic auditory stimuli (RAS) can improve temporal and spatial movement features. RAS, including music, can elicit emotional responses that may alter motor performance. The current experiment used two RAS (metronome and drum beats) that were heard before a goal-directed reaching movement to one of two targets in left and right hemispace. Participants rated subjective enjoyability of each condition on a 5-point Likert scale. We hypothesized participants would enjoy the drum more than the metronome, leading to improved performance with the drum. Twenty-one young adults performed 24 trials in each condition: simple metronome, complex metronome, simple drum, complex drum and no sound, all with and without vision. Conditions were blocked and counterbalanced and target location was randomized. Movements were captured with an Optotrak 3D Investigator (NDI) and vision was occluded upon movement initiation with Visual Occlusion Spectacles (Translucent Technologies Inc.). Dependent variables were analysed using a 3 sound (no sound, metronome, drum) by 2 vision repeated measures ANOVA. Spearman's correlation coefficient was used to compare Likert ratings and performance between drum and metronome conditions. Metronome and drum conditions elicited shorter reaction times (RT) compared to no sound, however, the metronome elicited more consistent RTs. The drum led to higher peak velocities compared to the metronome but no differences in endpoint accuracy. Participants rated the drum more enjoyable compared to the metronome, which was moderately correlated to improved performance in RT. Therefore, the source and subjective enjoyability of RAS can impact performance in a goal-directed reaching task.

146.

## **MANIPULATING SENSORY INFORMATION: OBSTACLE CLEARANCE STRATEGIES BETWEEN TYPICALLY DEVELOPING CHILDREN AND ADULTS**

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<sup>1</sup>Wilfrid Laurier University

The purpose of this study was to compare the effects of manipulating visual and somatosensory information during a multiple obstacle clearance task between children and adults. It was hypothesized that compared to adults, children would have difficulty with motor planning and online control during a multiple obstacle crossing task when sensory information was manipulated. Children ( $N=16$ ,  $x = 9 \pm 1.07$  years) and adults ( $N=16$ ,  $x = 22 \pm 0.96$  years) walked along a 7m pathway towards a goal while avoiding stepping on one, or two obstacles. Visual information regarding the number of obstacles was either presented at the start of locomotion, or two steps prior to the first obstacle. Each participant completed thirty-six trials, 18 on flat ground and 18 on foam terrain. Full body kinematic data was collected using the NDI Optotrak motion analysis system (60Hz). Lead and Trail limb foot position variability were determined relative to the first obstacle. For Lead foot variability, there was an interaction between obstacle appearance, type of terrain, and age group, such that children were more variable on foam when obstacle appearance was delayed ( $F(1,29)=6.16, p=0.02$ ). For Trail foot variability, there was an interaction between the amount of visual information provided and age group ( $F(1,29)=10.55, p=.003$ ). Children were more variable when obstacle appearance was delayed compared to adults. The present study found that children have difficulty with online control of locomotion and demonstrate immature motor planning strategies. Children use visual information in a feedforward manner, rather than an online control, resulting in high variability in obstacle clearance behaviours when unexpected obstacles need to be avoided.



156.

# **CHRONIC SHORT SLEEPERS DISPLAY SLOWER REACTION TIME, COMPARED TO ADEQUATE SLEEPERS, BUT MAINTAIN AN INTACT STARTREACT EFFECT.**

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Sleep curtailment impairs cognitive functions. Studies investigating the effect of sleep on simple reaction time (RT) tasks have been limited to acute sleep deprivation/restriction and none of these studies have tried to investigate the mechanisms behind this effect. Using a startling acoustic stimulus (SAS) during a simple RT task has been shown to involuntarily trigger a prepared movement through a faster pathway, termed the StartReact effect. The purpose of this study was to investigate the association between chronic sleep duration and movement preparation, during a simple RT task. Participants included 25 short sleepers (<6h) and 25 adequate sleepers (>7.5h), who performed a simple RT task involving a 20° ballistic wrist extension in response to either a control-tone (80dB) or a SAS (120dB). Testing included 6 blocks of 30 trials, the first 2 blocks were control blocks, and the last 4 blocks were considered experimental blocks where a SAS sometimes replaced the control tone. Results showed a significant sleep duration by type of Go-signal interaction on RT ( $F(1, 22)=5.22$ ,  $p=.03$ ), indicating that short sleepers had significantly slower RT than the adequate sleepers for the control tone but no significant RT differences were observed between groups for the SAS trials. These findings suggest that in addition to acute sleep deprivation, chronic short sleep is also associated with slower RT during voluntary movement execution. However, since sleep duration was not associated with the StartReact Effect, it indicates that the level of preparation is not the cause of these slower RTs.

79.

## COMPARING MEASURES OF REACTION TIME

Jarrold Blinch<sup>1</sup>, Callie DeWinne<sup>1</sup>

<sup>1</sup>Texas Tech University

Reaction time is the interval from stimulus onset to movement initiation. It is relatively straightforward to measure stimulus onset to within a few milliseconds. Movement initiation, however, is more difficult to measure. Common strategies to measure movement initiation include mechanical events (e.g. release of a home button), absolute thresholds (e.g. velocity > 50 mm/s), and relative thresholds (e.g. velocity > 5% of peak velocity). We compared these three measures in this methodology-based study. Forty-one participants completed a 2-choice reaction time task where they held down a home button until a short- or long-distance target button illuminated. There was a load cell under the home button and an LED and accelerometer on the participant's finger. Participants were instructed to press the target button as quickly as possible. Reaction time based on button release was 282 ms, [273, 291]. The velocity at button release was 147 mm/s, [129, 165]. It follows that reaction time based on a lower absolute velocity threshold of 50 mm/s was significantly shorter (255 ms, [246, 265]). Reaction time was comparable with a threshold of 5% of peak velocity (253 ms, [245, 261]), likely because 5% of peak velocity was 49 mm/s, [45, 53]. Interestingly, this was the only measure with a significant difference between short- and long-amplitude movements (249 ms [247, 250] vs. 257 ms, [255, 259]), a response complexity effect. Correlations between the measures were all larger than .9, but the significantly largest correlation was between absolute and relative velocity thresholds (.985, [.976, .994]).

# **Motor Control and Learning**

## **Verbal Session VI**

263.

## **HETERONYMOUS MUSCLE RESPONSES TO NOISY ACHILLES TENDON VIBRATION DURING STANDING**

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**Background and Aim:** Primary (Ia) afferents have been shown to influence both homonymous (parent muscle) and heteronymous (muscles other than the parent muscle) motoneurons. Specifically, the Ia muscle spindle afferents of Soleus have been shown to influence motoneurons of muscles acting at the knee and hip joints through both monosynaptic and polysynaptic pathways in humans [1,2]. The purpose of this study was to investigate the heteronymous (thigh and back muscle) responses to noisy Achilles tendon vibration during quiet standing. **Methods:** Noisy vibration (10-115 Hz) was applied to right Achilles tendon to investigate the frequency characteristics of the heteronymous responses in bilateral Semitendinosus, Vastus Lateralis, and Erector Spinae muscles. Participants (n=12; 5 Male) maintained standing balance for a series of two minute trials. Coherence was estimated between the tendon probe acceleration (input signal) and the rectified EMG (output signal) of each muscle. **Results:** We found significant coherence between the tendon probe acceleration and the EMG of ipsilateral Soleus (across a 10-70 Hz bandwidth), Semitendinosus (10-60 Hz), and Vastus Lateralis (10-60 Hz). Responses were observed bilaterally in Erector Spinae (10-50 Hz), with both ipsilateral and contralateral muscles showing similar coherence. **Conclusions:** Results from this study provide evidence that muscle spindle feedback from the triceps surae influences the activity of proximal muscles that are important for the control of standing balance. [1] Pierrot-Deseilligny et al., Exp. Brain Res. 42, 337-350, 1981; [2] Meunier et al., Exp. Brain Res. 96, 534-544, 1993;

265.

## **AGE-RELATED CHANGES IN SOLEUS IA REFLEX CHARACTERISTICS DURING QUIET STANDING.**

Margot E. Schmidt<sup>1</sup>, Robyn L. Mildren<sup>1</sup>, Gregg L. Eschelmuller<sup>1</sup>, Jean-Sébastien Blouin<sup>1</sup>, Mark G. Carpenter<sup>1</sup>, J. Timothy Inglis<sup>1</sup>

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**BACKGROUND:** Age-related sensorimotor changes are thought to alter the Ia reflex pathway in various ways, including reduced muscle spindle sensitivity, slowed nerve conduction velocity, and reduced synaptic transmission. In the Soleus muscle, these changes may affect older adults' control of standing balance, however, previous research has found inconsistent results in standing posture. The objective of this study was to characterize changes in the Soleus muscle response to Achilles noisy tendon vibration (NTV) during standing across a broad age range. **METHODS:** Soleus surface EMG and forceplate data were recorded while participants (n = 43, age range 20-82) stood quietly. NTV (10 – 115 Hz) was applied to the Achilles tendon at three different amplitudes (5, 10, 15 m/s<sup>2</sup>). Coherence, phase, and cross-covariance were estimated between vibration acceleration and rectified surface EMG. Reflex scaling was calculated as the slope of peak-to-peak cross-covariance versus stimulus amplitude. Pearson product moment correlation coefficients were calculated between age and (1) peak-to-peak cross-covariance (2) reflex scaling, and (3) centre of pressure (COP) mean power frequency (MPF). **RESULTS:** Peak-to-peak cross-covariance between NTV and Soleus EMG was negatively correlated with age ( $r = -0.68$ ), as was reflex scaling with stimulus amplitude ( $r = -0.50$ ). COP MPF was positively correlated with age ( $r = 0.44$ ). **CONCLUSIONS:** The results suggest that with age, the vibration-evoked Soleus response during standing decreases in strength and amplitude scaling. These findings may be related to the changes in balance control observed with normal aging.

214.

## **ATTENUATION OF THE VISUAL CONTROL OF BALANCE UNDER VIRTUAL POSTURAL THREAT**

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**Background:** Virtual reality (VR) can be used to induce the sensation of self-motion. In presenting a visual stimulus to elicit balance correcting responses, the visual control of balance may be evaluated. It is unclear what type of visual stimulus should be presented to optimally perturb balance and whether subsequent responses are influenced by a threat to posture. **Objectives:** 1. Explore stimuli relevant for the visual control of balance in VR. 2. Determine whether the use of vision for balance control is influenced by postural threat. **Methods:** 32 healthy, young adults (18 males) completed 5-minute, standing trials in VR with LOW (0m) and HIGH (7m) height conditions. A continuous, stochastic visual stimulus (frequencies: 0-1Hz, amplitude: +/-5cm) was presented as an anteroposterior translation. Outcome measures included center of pressure (COP), kinematic displacements, electromyography, psychological states, and electrodermal activity (EDA). **Results:** Significant coherence (between stimulus and COP) was observed across frequencies (~0.2-1Hz) at both LOW and HIGH. There was no difference of coherence between conditions, however, the gain was significantly larger at ~0.4Hz for LOW. Two cumulant density peaks were identified (~0.5s and ~1.9s) with significantly larger amplitudes observed in the LOW condition. At HIGH, there were significant increases in reported anxiety, fear, and EDA, and significant decreases in perceived stability and confidence, when compared to LOW. **Conclusions:** A wide range of frequencies relevant for the visual control of balance were identified with the stochastic visual stimulus. Results suggest a decrease in the sensory gain of the visual system under postural threat.

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## **EFFECTS OF DISTRACTION ON THREAT-RELATED CHANGES IN BALANCE CONTROL**

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Postural threat elicits changes in standing balance and broad shifts in attention focus, including directing more attention to balance. Distracting attention from balance using cognitive tasks has been shown to promote more automatic balance control in healthy individuals in non-threatening conditions, and to normalize balance in patients with persistent postural-perceptual dizziness. This study investigated whether distracting attention from balance modified threat-induced changes in standing balance control in healthy young adults. Participants (n=21) stood without (No Threat) and with (Threat) the possibility of receiving a temporally unpredictable anterior-posterior (AP) support surface translation. In the Threat condition, a perturbation was delivered after a pseudo-random delay (5-60s) following the start of each trial; only standing data from 60s trials were analyzed. In both threat conditions, participants completed no task (Control), or mentally counted how often a pre-selected letter (LS), or number (NS) occurred in a sequence. Electrodermal responses (arousal), AP centre of pressure (COP) mean position, root mean square (RMS), mean power frequency (MPF), and low (0-0.05 Hz) and high (0.5-5 Hz) frequency COP, were calculated. Participants significantly increased arousal, leaned further forward, and increased MPF when threatened, independent of task. High frequency COP increased when threatened, however, this increase was significantly smaller for the LS task. Threat-independent reductions in RMS and low frequency COP were observed for the LS compared to Control task. Distracting attention with a specific cognitive task modified threat-induced high frequency changes in standing balance. The generalizability of this effect should be explored for different threat and dual-task scenarios.

151.

## **VESTIBULAR-EVOKED BALANCE RESPONSES IN THE UPPER LIMB DURING ARM-SUPPORTED BALANCE**

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The vestibular system encodes head movement in space, which provides essential information for estimation of self-motion, gaze stabilization and balance control. Recently, vestibular-driven signals were shown to be relevant for sensorimotor processing during the preparation phase of arm movements. However, previous evidence is based on unilateral, arm-supported reaching tasks. Thus, the purpose of this study was to probe vestibular-evoked responses of the arm during unilateral and bilateral arm-supported and unsupported balance. This was accomplished via stochastic binaural, bipolar electrical vestibular stimulation (EVS; 0-25 Hz, RMS = 0.9 mA) delivered for 120 s over the mastoid processes in 5 experimental conditions with vision occluded. Participants performed either unsupported or arm-supported unimanual and bilateral whole-body balancing tasks. During the unsupported task, participants rested both arms by their sides or grasped a dumbbell at 90° elbow flexion. In contrast, the arm-supported task required participants to grasp an earth-fixed stationary handle either unilaterally or bilaterally. Vestibular-evoked responses were quantified in the time domain with a cross-correlation analysis (i.e., cumulant density function) between the EVS input and the motor output (i.e., elbow flexor and extensor surface electromyography). Cumulant density estimates surpassed 95% confidence intervals in the elbow flexors and extensors only when the muscles were involved in arm-supported balance, but not when holding the dumbbell. These findings indicate vestibular driven signals produce myogenic responses in muscles that are engaged actively in the whole-body balance task and not during irrelevant muscle activity (i.e., holding a dumbbell).



# **Motor Control and Learning**

## **Verbal Session VII**

43.

## **MINDFULNESS TRAINING AND REPEATED COLD EXPOSURE AFFECTS COLD TOLERANCE BUT NOT MOTOR SKILL PERFORMANCE**

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Motor performance is impaired when individuals are exposed to cold, and little is understood about how this is ameliorated. Our purpose was to determine whether mindfulness training combined with repeated cold exposure could improve motor performance and tolerance in cold conditions. Twenty-four participants were randomly assigned to either a cold exposure training group or a mindfulness + cold exposure training group. Participant's baseline performances were assessed on timed grooved pegboard and knot untying tasks, and a cold tolerance test, which was the maximum time participants would voluntarily submerge their hands in 2 °C water. Next, participants performed the training for their specific group. The cold exposure group submerged their hand in cold water 8 times for 90 seconds with 2 minute rewarming, while the mindfulness + cold exposure group performed identical training but was concurrently read a mindfulness script during each exposure. Following training, participant's hands were warmed and they performed a maximum duration exposure to cold test, which was immediately followed by performance of the grooved pegboard and knot untying tasks. Both groups improved their grooved pegboard and knot untying performance from baseline. However, maximum cold exposure duration was significantly greater in the mindfulness + cold exposure training group compared to the cold exposure group. Mindfulness did not influence motor performance but increased tolerance to cold. This study demonstrates that individuals who are repeatedly exposed to cold/wet environments could increase their cold tolerance by implementing mindfulness techniques. These findings may have implications for cold water survival.

204.

## **LOWER LIMB FITTS' TASK MOTOR PERFORMANCE IN PATIENTS WITH AND WITHOUT IMAGING EVIDENCE OF UNILATERAL LUMBAR NERVE ROOT COMPRESSION**

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<sup>1</sup>University of Manitoba

The present experiment sought to determine if diagnostic imaging findings of nerve root compression could predict lower limb Fitts' task performance. Patients presenting with back, and or leg pain to a surgical screening spine assessment clinic (N=45) were recruited and stratified into 3 groups based on clinical presentation: 1) positive imaging, positive neurological deficit; 2) positive imaging, negative neurological deficit; and 3) negative imaging, negative neurological deficit. Each group performed great toe pointing movements to squares projected on a platform with 4 possible indices of difficulty (ID). An NDI 3D Investigator (300Hz) recorded all movement in the sagittal plane. Movement time (MT), reaction time (RT), peak velocity (PV), peak acceleration (PA), time to peak velocity (ttPV) and time to peak acceleration (ttPA) were analyzed using 3 Group (1,2,3) by 4 ID (3,4a,4b,5) ANOVA models. Performance variables were also compared to traditional questionnaire-based clinical outcome measures. Main effects for ID were found for MT, PV, PA, ttPV and ttPA. No group, or group by ID interactions were found. Pearson's Correlation analysis revealed significant associations between self-report measures and motor performance variables for Group 2. Positive correlations were found for effected limb MT and the Oswestry Disability; effected limb MT and the Roland Morris Disability Questionnaire; and non-effected limb ttPA and non-effected limb Quadruple Numeric Pain Rating Scale (QNRS). A negative correlation was found for effected limb RT and the effected limb QNRS. Findings are discussed related to Fitts' Law interpretation, and clinical implications for performance-based outcome measure application.

106.

## **MOTOR IMAGERY INTERVENTION AMONG POST STROKE PATIENTS: A STUDY PROTOCOL**

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<sup>1</sup>University of Muenster

**Background:** Motor imagery (i.e., mental rehearsal of movement) can produce neural activity normally attributed to practicing the actual movements. Research provides us with the finding that motor imagery capacity may be intact even when physical capacity is not, as it is found in many stroke patients. Imagining limb movements could stimulate the redistribution of brain activity and accompany recovery of limb function, aiding the stroke rehabilitation process. **Study Design:** The present study has a single-center quasi experimental longitudinal design involving one intervention group (IG) and one control group (CG). **Participants:** According to G-power analysis  $N = 58$  participants in total will be needed ( $f = .25$ ,  $\alpha = .05$ ,  $\text{Power} = .95$ ,  $r = .20$ ). **Inclusion criteria** are age between 18 and 65, stroke diagnosis, intact anticipation of laterality, and Mini Mental State Examination  $> 25$ . **Recruitment** will be done in a German rehabilitation center. **Intervention & Measures:** The IG mentally rehearses movements in six 30 min sessions under close supervision. Their recovery is compared to the CG who attends a relaxation program. Patients in both groups are assessed before and after four weeks, three, and six months. Motor imagery training effectiveness is evaluated using measures of disability, workability, and quality of life. **Discussion:** This study will increase our knowledge about the efficacy of MI on both disability and quality of life. The results of this study will help to make motor imagery treatment protocols for adults who suffered from stroke more evidence-based.

266.

## FALLS IN PARKINSON'S DISEASE: A PROPRIOCEPTIVE OR COGNITIVE DEFICIT?

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Falls are one of the most debilitating occurrences of Parkinson's disease (PD), resulting in injury, hospitalizations, and reduced quality of life. As PD progresses, balance impairments worsen, making falls almost inevitable. Unfortunately, balance impairments are unaffected by dopaminergic-medication, leading researchers to investigate the causes of these balance impairments. Cognitive impairment and proprioceptive decline have the potential to underlie balance impairment and falls. Therefore, the purpose of this study was to determine whether cognitive impairment or proprioceptive decline are more indicative of balance impairment in PD, and to determine how anti-Parkinsonian medications influence balance impairment. 15 participants were categorized as "fallers" or "non-fallers" based on a 6-month fall history. They were then randomized into "same-day" or "next-day" testing to assess effects of anti-Parkinsonian medication (utilizing the motor symptom assessment of the UPDRS-III). Each participant completed the MoCA, a proprioceptive limb-matching task, and subsequently a balance assessment using Biodex (CTSIB). OFF-medication, passive proprioception significantly predicted balance impairment( $b=5.152, t(5)=3.512, p=.006$ ), and explained a significant amount of variance in balance impairment( $R^2=.784, F(1,5)=11.901, p=.001$ ). ON-medication, active proprioception significantly predicted balance impairment( $b=1.768, t(5)=9.678, p<.001$ ), and explained a significant amount of variance in balance impairment( $R^2=.801, F(1,5)=13.059, p<.001$ ), whereas cognitive assessment revealed much lower predictability( $b=-0.128, t(5)=-4.316$ ). These results suggest that proprioception is a better predictor of balance impairment (likely fall risk) than cognitive impairment. Further, these results suggest that balance deteriorates as proprioception gets worse and when in the ON-medication state. Practically, proprioception may be important to assess as a predictor of PD participants that may be at risk of balance impairment.

269.

## **EVALUATING SPECIFIC MOTOR SYMPTOM IMPROVEMENTS WITH PD SAFEX EXERCISE REHABILITATION**

Kishoree Sangarapillai<sup>1</sup>, Ben Norman<sup>1</sup>, Quincy Almeida<sup>1</sup>

<sup>1</sup>Wilfrid Laurier University (Movement Disorders Research and Rehabilitation Centre)

The cardinal motor symptoms of Parkinson's Disease (PD) include, postural instability, bradykinesia, tremor and rigidity. The overall Unified Parkinson's Disease Rating Scale (UPDRS-III) indicates, the gold-standard treatment for PD (dopaminergic-therapy) is very effective in improving these symptoms. However, recent research indicated that 2 of the 4 cardinal symptoms of PD (balance and tremor) remain unimproved by dopaminergic-therapy. This prompts the investigation of other alternative and adjunct treatments such as exercise rehabilitation. Unfortunately, like drug studies, exercise studies often focus on overall symptom-improvement yet fail to monitor changes to specific symptoms. This may be problematic for individuals with different symptomatic phenotypes. If tremor/balance were the main concern, then adjunct therapies may be critically important when these symptoms may be dopa-resistant. Thus, it is important for all therapies to examine individual symptomatic-improvement. Interestingly, recent studies show PDSAFEx™ (a sensory integration therapy) to have a significantly improve motor symptoms in comparison to traditional exercise (Sage et al., 2012). Yet, the effects of PDSAFEx™ on individual PD symptoms is unknown. Thus, the purpose of this study was to explore the effects of PD SAFEx™ on PD symptoms in adjunct to medications. UPDRS-III scores of 229 cases were retrospectively examined and analysed in SPSS using Wilcoxon pairs signed-rank test to evaluate specific symptom-improvements. PDSAFEx™ was confirmed to improve overall motor symptoms ( $p=0.0001$ ), but more importantly a significant improvement to tremor ( $p<0.00001$ ) and balance ( $p<0.00001$ ) were also identified. These findings suggest that PDSAFEx™ is an important adjunct to medications, since it is able to address all four cardinal symptoms of PD.

142.

## PHYSICAL LITERACY IN EARLY CHILDHOOD EDUCATORS

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The preschool years are a critical time for physical literacy and activity behaviours, key components of early motor development, and early childhood education and care (ECEC) settings are potential targets to promote engagement in these behaviours. Physical literacy is a holistic viewpoint from which to examine the multiple factors that may influence individual physical activity participation. The purpose of this project is to assess the physical literacy of educators and determine which components of physical literacy are associated with behaviours and intentions to provide physical literacy and activity opportunities to children in their care. Employed early childhood educators (n=94) were recruited to participate. Motivation, confidence, knowledge, understanding, physical competence and physical activity were assessed using existing measures or measures created specifically for the study. Overall educator physical literacy was moderate, except for understanding (mean=4.2/5) and physical activity behaviour (steps/day=11,832). Intentions and behaviours were high (mean range=4.2-4.5/5). Significant main effects were seen for understanding and object control skills with a select number of intention and behaviour questions, but no relationship was seen for the remaining components of physical literacy. While measured physical literacy was moderate, this was not associated with on intentions and behaviours for the provision of physical literacy and activity, which were high. Further research is needed to determine if educator reported behaviours translate into quality physical literacy and activity experience in ECEC and sustained physical literacy and activity for children attending ECECs.

# **Motor Control and Learning**

## **Poster Session I**



226.

## **PREDICTING THE ACTION OUTCOME OF LEFT- AND RIGHT-FOOTED PENALTIES IN A REPRESENTATIVE EXPERIMENTAL SETTING IN SOCCER**

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Anticipation of left- compared to right-sided actions of an opponent seems to be more difficult. The present study aimed to investigate whether prediction accuracy and gaze behavior of left- vs. right-footed penalties differ from each other in a representative experimental setting. 29 participants (soccer goalkeepers, soccer players, non-soccer players) predicted shot direction (left/right) of left- and right-footed penalties from a goalkeeper's perspective. Stimuli were presented in life-size on a large screen (3.2 x 2.1 m) and occluded at ball contact. Participants had to perform a full-body movement towards the predicted shot direction. Accuracy was defined in terms of the correct re-sponse direction. Percentage of time of gaze was examined for five areas of interest (head, upper body, hip, supporting leg, shooting leg). A 2 (condition) x 3 (group) ANOVA for accuracy revealed a significant main effect for condition ( $F(1,27) = 5.3, p < .05$ ), with higher accuracy for right- ( $M = 68\%$ ) compared to left-footed ( $M = 64\%$ ) penalties. All other main effects and interactions did not attain significance. A 2 (condition) x 3 (group) x 5 (area) ANOVA for gaze revealed a significant main effect for area ( $F(4,104) = 4.0, p < .05$ ), showing the longest viewing time toward the shooting leg. All other main effects and interactions did not attain significance. The present results indicate higher accuracy for right- compared to left-footed penalties. However, gaze behavior did not differ between left- and right-footed penalties. It can be argued that information processing is different for left- vs. right-sided actions.

58.

**LATERALITY IN SPORT: DOES SPORT-SPECIFIC TRAINING IMPACT EVERYDAY LIMB PREFERENCE?**Camila Rios<sup>1</sup>, Sara Scharoun Benson<sup>1</sup><sup>1</sup>University of Windsor

Factors such as preference, context, and location of an object in space affect whether an individual will reach across the midline of the body in a specific movement (Bryden, Scharoun, & Dargavel, 2014). The high demand for bilateral limb-use in sport-specific training may also influence limb selection. Whether limb choices within sport are specific to training or not, discrepancies in everyday actions may develop relative to what choices would be made without such training. To test this prediction, 10 athletes (volleyball, baseball, soccer) and 10 non-athletes completed questionnaires (Waterloo Handedness Questionnaire, athletic profile) and a preferential reaching task that consisted of manipulating wooden dowels and rubber mallets located at 3 equidistant locations (left, right, midline) in 2 conditions (pick-up, use). Limb choice for manipulation was recorded as the dependent measure. Findings provided preliminary evidence supporting the hypothesis that athletes would demonstrate more bilateral preference than their non-athlete counterparts. As differences were found predominantly in left space, sport-specific training may play a role in athletes displaying a higher degree of comfort and competence with their non-preferred limb. A tentative explanation for this might be that comfort and competence levels with a non-dominant limb are impacted by years of high-level sport-specific training in sports requiring bilateral limb use. Data collection will continue with the goal of disentangling this impact based on the type of sport played.

71.

## **CORRELATIONS BETWEEN PERCEPTUAL AND MOTOR PERFORMANCE TESTS IN ELITE TABLE TENNIS PLAYERS**

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**Introduction:** Perceptual and motor performances are important basis to elite table tennis (TT) players. If a rapid perceptual speed could cooperate with good motor ability may lead to excellent performance in certain sports. The purpose of this study was to investigate the correlations between perceptual and motor tests in elite TT players. **Methods:** Twenty-two elite TT players (11 males, 11 females) were recruited in this study. We measured TT players' eye-hand coordination with the Finger-Nose-Finger (FNF) task for both dominant and non-dominant hands to represent motor performances. Besides, the ability of attentional control with the Covert Orienting of Visual Attention (COVAT) and dynamic visual attention with Multiple Objects Tracking (MOT) tasks were measured to indicate the perceptual performances. Pearson correlation coefficient was conducted to examine the correlations between perceptual and motor tests. **Results:** The results revealed that the correlations among dominant and non-dominant test in FNF ( $r(20) = .86$ ,  $p < 0.001$ ) and COVAT ( $r(20) = .44$ ,  $p < 0.05$ ) were moderate to strong. In addition, there was a moderate negative correlation between track one target in the MOT tasks and the Inhibitory Reaction Time (IRT) in COVAT ( $r(20) = -.46$ ,  $p < 0.05$ ). **Conclusion:** The negative correlation between MOT and IRT in COVAT reflect that the relations between attentional control and the dynamic visual attention are positive in TT players. Although there are no significant correlations between FNF and other perceptual tasks, future studies may focus on clarifying the associations among motor and perceptual abilities.

182.

## **DOES CONTEXTUAL INTERFERENCE IMPACT THE RETENTION OF COMPLEX BIMANUAL LAPAROSCOPIC SKILLS?**

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Laparoscopy simulation trainers have increased in accessibility which has encouraged endorsement of evidence-based training protocols. Yet, well-known motor learning effects may not extend to complex bimanual motor skills practiced with these devices. Contextual interference is a robust effect that is also feasible to implement in training. Blocked practice provides low contextual interference through repetition of the same skill over multiple trials before initiating a new skill. High contextual interference is produced through random practice where there is a random switching of practiced skills per trial. Blocked practice has been shown to increase skill performance during acquisition whereas random practice improves skill retention and transfer. We studied contextual interference learning effects during practice using a laparoscopy box trainer and a peg-transfer task. Participants completed fifty-four practice-trials using either blocked or random practice where they transferred pegs between two Maryland forceps to build one of three specified patterns. Participants undergoing blocked practice completed 18-trials of each pattern before proceeding to the next pattern. Participants undergoing random practice pseudo-randomly alternated between the three patterns. After a 10-min delay, all participants built each pattern once as a retention test. An identical retention test was performed after 10-days. Performance was measured by the time required to complete patterns with videos being used to determine duration in seconds. Time-to-completion in both the 10-min and 10-day retention tests did not significantly differ between those in either group. Our results thus far suggest high contextual interference practice schedules do not encourage retention of complex bimanual tasks.

233.

## **VISUAL PERCEPTION MODULATES MOTOR OUTPUT OF MANUAL THERAPY THRUST DELIVERY**

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Vision is the predominant sensory modality informing motor output. Perception through vision may lead to motor changes in decision making when scaling output generated by clinicians who deliver manual therapies. The present study examined the effects of various life-sized, human-shaped, visual stimuli on kinetic and kinematic characteristics of spinal manipulative thrusts delivered by experienced chiropractors (n=8) to a low fidelity model. Sex, height, and body mass index (BMI) of the stimuli were varied across trials in a randomized order (6 trials per stimulus, 108 trials per participant). Instrumentation recorded at 300Hz for 5 seconds during each trial and included a force transducer between the clinician's hand and the model, an accelerometer, and an infrared emitting diode on the clinician's distal ulna. Dependent variables included thrust force, thrust duration, displacement, peak acceleration, and time to peak acceleration (TTPA) of the thrust. Three-way repeated measures ANOVA models were used to analyze dependent measures, followed by Tukey's HSD to compare significant effects. Sex of the visual stimuli had a significant effect on thrust force (female<male). Height yielded a significant effect on thrust duration (average<tall). Significant effects of BMI on thrust force and peak acceleration (underweight<obese) were found. A 2-way interaction was observed for TTPA, which revealed that a tall stimulus with a healthy or underweight BMI caused significantly longer TTPA than other stimuli. These results provide evidence that visual characteristics of a simulated patient; specifically, sex, height, and BMI; impact how a clinician delivers a dose of spinal manipulative thrust to that patient.

279.

## **VIBRATION FOR STIMULATING LIMB PROPRIOCEPTORS: MEASUREMENT, CHARACTERISTICS, AND CHALLENGES**

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Using tendon/muscle vibration to stimulate Ia afferents in rehabilitation research is increasing in popularity. Tendon vibration can also be used to stimulate the mechanoreceptors with the goal of attenuating proprioception. For therapeutic purposes, vibration must be within known amplitude (~0.5mm) and frequency (80-120Hz) ranges. However, there is no standard and portable method established for measuring vibration characteristics. The aim of the current study was to describe the characteristics of the movements of a vibration motor and explore the feasibility of using an affordable accelerometer to measure vibration characteristics. Movements of a small vibration motor mounted on a participant's wrist were simultaneously measured using an Optotrak 3D Investigator and accelerometer. Five vibration intensities (55%, 65%, 75%, 85%, 100% motor capacity) were measured for five 30-second trials each. The main outcome measures were frequency, displacement and peak acceleration of the vibration from the Optotrak and accelerometer. Pearson correlations showed a strong positive relationship between accelerometer and Optotrak measurements of vibration frequency for 55%, 65%, 75%, 85%, and 100% vibration intensities ( $r=0.86, 0.99, 1.00, 1.00, 1.00$ , respectively). The maximum acceleration of the motor's movement ranged from  $\pm 42.5$  to  $\pm 149.0 \text{ m.s}^{-2}$  for different vibration intensities as measured by the Optotrak. This range of acceleration is above the measurement range of the accelerometer used (range  $\pm 3g$ ). Thus, the measurements of the accelerometer for vibration amplitude could not be validated. The results of this study showed that affordable accelerometers are capable of measuring the frequency of the vibration with high precision. A follow-up study will explore the validity of vibration amplitude measurement using an accelerometer with a measurement range of  $\sim \pm 10g$ .

115.

## **"WIGGLE WIGGLE, LITTLE FINGER": THE IMPACT OF EYE MOVEMENTS ON MANUAL MOTOR OVERFLOW DURING THE IMAGINATION OF A FITTS' AIMING TASK**

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<sup>1</sup>University of Toronto

When individuals execute a reciprocal aiming task, eye movements tend to precede the hand movements to enhance error correction and accuracy. This coupling also occurs when imagining the motor task. In fact, the eye movements still emerge even when the hand remains relatively still during the imagination of the manual aiming movements. The eye movements may be an expression of motor overflow that arises during the imagination process. Recent work in our lab suggests that suppressing eye movements decreases imagination accuracy. The activation of the internal representation and motor overflow during imagination can also be measured through small accompanying involuntary movements of the finger. The purpose of this study was to understand how the suppression of eye movements affects the manual motor overflow that emerges during the imagination of a Fitts' reciprocal aiming task. Participants first imagined, then executed the task in two conditions: 1) no instructions on eye movement (no-fixation); and, 2) instructions to fixate their eyes on a central target (fixation). During imagination, participants indicated the start and end of imagination by lifting their finger, holding it up, and bringing it back down once they were finished imagining the task. The manual motor overflow was measured as the movement of the participant's finger while it was held in the air. Although Fitts' law still emerged within conditions, the manual motor overflow was similar across the fixation and no fixation conditions. Thus, manual motor overflow does not seem to be influenced by eye movements during action imagination.

215.

## **EXECUTIVE TASK-SET INERTIA MANIFESTS VIA RESPONSE SUPPRESSION AND NOT VECTOR INVERSION**

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<sup>1</sup>University of Western Ontario

Alternating between different tasks represents an executive function essential to daily living. In the oculomotor literature reaction times (RT) for a ‘standard’ stimulus-driven (SD) prosaccade (i.e., saccade to veridical target location at target onset) increase when preceded by a ‘non-standard’ antisaccade (i.e., saccade mirror-symmetrical to target location at target onset), whereas the converse does not elicit a switch-cost. The prosaccade switch-cost has been attributed to lingering neural activity – or task-set inertia – related to prosaccade suppression (i.e., response suppression) and decoupling stimulus-response spatial relations (i.e., vector inversion). It is, however, unclear whether response suppression and/or vector inversion contribute to this switch-cost. Here, Experiment 1 had participants alternate (i.e., ABBB paradigm) between minimally delayed (MD) pro- and antisaccades. MD saccades require responses after target extinction necessitating response suppression across pro- and antisaccades – used to determine whether vector inversion contributes to a task-set inertia. In Experiment 2, participants alternated between SD pro- and MD antisaccades to determine if a task switch-cost is selectively imparted when a stimulus-driven and standard response is preceded by a non-standard response. Experiment 1 showed that RTs for MD pro- and antisaccades were not influenced by the preceding trial-type; i.e., vector inversion did not engender a switch-cost. Experiment 2 showed that RTs for SD prosaccades were increased when preceded by a MD antisaccade. Accordingly, the executive demands of response suppression engendered a task-set inertia for a subsequent stimulus-driven and standard response (i.e., SD prosaccade) – a finding supporting the view that response suppression is a hallmark feature of executive function.



153.

## **PUPIL SIZE DURING AN ANTISACCADE TASK AT ACUTE AND SUB-ACUTE STAGES OF CONCUSSION RECOVERY**

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<sup>1</sup>Western University

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The antisaccade task (i.e., saccade mirror-symmetrical to a target) is an effective tool for the identification and management of executive dysfunction following a sport-related concussion (SRC). Convergent evidence shows that persons with a SRC exhibit impaired antisaccade kinematic metrics during the acute and chronic stages of SRC recovery, and perhaps most notably, such deficits persist even when clinical signs of concussion resolve. It remains unclear whether these behavioural deficits are related to the executive demands of response execution (i.e., attentional fluctuations or concussive symptoms) or response preparation (i.e., neural recruitment and activation). Therefore, the current study employed pupillometry measures of the antisaccade task in persons with a SRC – and their aged- and sex-matched controls – during the early (~12 days post-SRC) (i.e. initial assessment) and later stages (14-30 days post-SRC) (i.e. follow-up assessment) of their recovery. Notably, task-evoked pupil dilations (i.e. TEPDs) provide a neural correlate of top-down inhibitory control and saccade preparation, and therefore provide a means to dissociate preparatory impairments from other factors influencing executive control. At the initial assessment, the SRC group exhibited longer antisaccade RTs ( $p=0.001$ ) and larger TEPDs ( $p<0.01$ ) than the control group. At the follow-up assessment, the SRC group showed improved antisaccade RTs ( $p<0.02$ ) and sustained larger TEPDs ( $p<0.03$ ). Accordingly, persistent executive dysfunction following a SRC is related to inefficient preparatory activity. Thus, concomitant pupillometry and antisaccade metrics provide an index of both cognitive and autonomic function that may serve to provide effective biomarkers for concussion diagnosis and management.

273.

## **A SINGLE-BOUT OF AEROBIC EXERCISE FACILITATES TASK-SWITCHING EFFICIENCY: EVIDENCE USING SPATIALLY COMPATIBLE SACCADDES**

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A single-bout of aerobic exercise provides a short-term boost to executive function. The majority of the work examining this post-exercise benefit has employed a task requiring response suppression. It is, however, important to recognize that executive function involves a constellation of cognitive processes including the flexible (re)allocation of attention – an activity essential to activities of daily living. Here, we employed a task-switching paradigm (i.e., AABB) to determine whether a 20-min single-bout of exercise (via cycle ergometer) at a moderate intensity (80% of HRmax) facilitates the ability to efficiently and effectively switch between task-types. Participants (N=18) performed a task-switching paradigm pre- and post-exercise wherein responses alternated between stimulus-driven (SD) and minimally delay (MD) saccades. SD prosaccades require the evocation of a saccade at target onset, whereas MD saccade requires a response after target extinction and therefore require an executive mediated task-set. Results showed that alternating from a MD to SD saccade resulted in an increase in RT ( $p < .05$ ), whereas the converse switch did not ( $p = .12$ ). More notably, the ‘magnitude’ of the aforementioned switch-cost reliably decreased from the pre- to post-exercise assessment by 18 ms ( $p = .017$ ). Accordingly, results show that a single-bout of aerobic exercise facilitates task-switching efficiency and demonstrates that aerobic exercise provides a benefit to a constellation of executive-mediated functions.

200.

## **RAKE-IT-BALL: TRYING TO MEASURE TOOL-EMBODIMENT THROUGH A BODY-PART COMPATIBILITY TASK.**

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Tool embodiment refers to the effects of tool-use on the coding of space and our body schema such that the tool becomes “an extension” of our physical effectors. One task that was thought to index this phenomenon was the body-part compatibility task because it provided an index of what is or is not being coded as a body part in the body schema. Previous employment of a body-part compatibility task has revealed a modification of the body schema when a tool was manipulated physically or virtually. The present study investigated the validity of the body-part compatibility task to measure tool-embodiment by assessing two types of interactions: 1) perception of the physical tool-interaction task, and 2) completion of math questions without any tool-interaction. Before and after the tool-interaction task, participant completed a body-part compatibility task in which they responded to targets presented on the image of a model holding a rake. Targets were presented on the foot, hand and rake. The first group made reaching movements to a target presented on an image of the actual tool interaction task while the control group completed math problems instead of any type of tool interaction. The results of the two groups were similar wherein the pattern of reaction times (RTs) indicated the emergence of tool-embodiment. The RTs to targets presented on the hand and the rake were found to be similar after completing a tool-irrelevant interaction task. These results indicate that the body-part compatibility task may not correctly assess tool-embodiment.

167.

## EXPLORING PERCEPTION RESPONSE TO MULTISENSORY INCOMPATIBILITY EFFECTS

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<sup>1</sup>McMaster University

This study examines how two sources of sensory information (vision and audition) interact to affect anticipatory judgements in an interception action task. Participants ( $n=12$ ) predicted, by pressing a button, when a stimulus travelling at either a fast (224.13mm/s) or slow (113.49 mm/s) speed in a straight-line trajectory would enter a specified target zone. On each trial, the stimulus would disappear after either 33% or 66% of distance traveled from its start position. At the initiation of stimulus movement, a loud (70dB), soft (50db), or no (0db) burst of white noise was presented for 150 ms. Consistent with our hypotheses, Main Effects for stimulus Velocity ( $F(1,11)=1754.7$ ,  $p.<0001$ ) and Vision ( $F(1,11)=5.85$ ,  $p.<.05$ ) were revealed for measures of Constant Error suggesting that both play a role in perceptual judgement biases. Of greater interest, is the interaction of sound and vision ( $F(2,22)=25.05$ ,  $p.<.0001$ ). Specifically, when the loud initiation sound accompanied the 33% vision stimulus, overshoot bias was significantly reduced. Conversely, when the loud sound accompanied the 66% vision stimulus, overshoot bias increased (and vice versa). This suggests that in situations where visual information is less reliable, robust auditory information serves as a useful substitute. When, however, more vision is available, that same robust auditory information seems to interfere with perceptual judgements. These results are further discussed in terms of models of sensorimotor integration in action planning, as well as with respect to several recent studies examining the influence of noise on spatial accuracy judgements in tennis (e.g., Sinnett & Kingstone, 2010; Cañal-Bruland, 2018).

194.

## THE INFLUENCE OF VERBALIZATION ON MOTOR CONTROL

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Words have enormous power, including the ability to influence how we perceive and explore our environments. When navigating towards a target spatial information is available relative to self (egocentric) and relative to other objects in the environment (allocentric). Egocentric information is thought to be more precise, but also more transient than allocentric information. The COBALT-Control Based Learning Theory (Willingham, 1998) posits that unconscious actions rely heavily on egocentric information while conscious and controlled movements are more dependent on allocentric information. Since verbalizing target features requires explicit attentional awareness (conscious control), a higher reliance on allocentric information is expected compared to non-verbalized movements. It is therefore also plausible that verbalized actions should lead to lower movement accuracy. On the other hand, talking strategies are reported to enhance movement learning and endpoint accuracy in certain environments (Theodorakis et al., 2012; Janelle et al., 2003; Tod et al., 2009). We assessed if verbalization during movement influences the type of information used to guide the movement and investigated the effects of verbalization on endpoint accuracy. Participants made swiping gestures on a tablet to one of seven targets located along a semi-circle array. During verbalization trials participants called out the relative position of the active target (1 to 7) while performing the movement. The proportion of ego-allocentric reliance was inferred by analyzing the endpoint error distribution (Rossetti, 1998). Surprisingly, verbalization did not lead to a higher reliance on allocentric information than the control condition, the only effect of verbalization we observed was as a reduction in variable error in the radial direction.

# **Motor Control and Learning**

## **Poster Session II**

80.

## **MEDIOLATERAL STABILITY AND VESTIBULAR CONTROL OF BALANCE: DO THE FEET CARE?**

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Upright postural control is essential for performing tasks of daily living. Widening stance width increases postural stability and decreases the amplitude of vestibular-evoked whole-body balance responses. The vestibular-evoked whole-body balance response is the summation of all muscle activity contributing to the postural task. Recent reports indicate the importance of the abductor hallucis (AH) and digiti minimi (ADM) during standing balance – similar to other postural muscles – but it is unclear how vestibulomyogenic responses are modulated when mediolateral stability is manipulated. The purpose was to investigate the effects of increased mediolateral stability on vestibular-evoked balance responses in muscles with a primary force generating function in the mediolateral (i.e., toe abductors) and anteroposterior (i.e., plantar flexors) direction. Continuous, random electrical vestibular stimulation (EVS; peak-to-peak amplitude:  $\pm 4\text{mA}$ ; frequency bandwidth: 0-25Hz) was delivered via carbon-rubber electrodes placed over the mastoid processes. Indwelling electromyography (EMG) of the AH and ADM and surface EMG of the medial gastrocnemius and soleus were sampled. Participants were exposed to four 90-s trials of EVS with vision occluded, head facing forward, and feet together (FT;  $\sim 2\text{cm}$ ) or apart (FA;  $\sim 26\text{cm}$ ). Vestibular-evoked balance responses were evaluated using a cross-correlation like analysis (i.e., cumulant density) to determine the relationship between EVS and EMG. The vestibular-evoked balance response decreased by 60-90% from FT to FA in all muscles ( $p < 0.05$ ), with the toe abductors displaying the largest reductions. These findings indicate that the vestibulomyogenic response in muscles preferentially acting in the mediolateral and anteroposterior direction are reduced by increased mediolateral stability. Funded by NSERC.

280.

## **POSTURAL AND EMOTIONAL CHANGES FOLLOWING REPEATED EXPOSURE TO STANDING AT A VIRTUAL HEIGHT.**

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Postural threat influences standing balance control, yet only some of these changes are attenuated with repeated exposure to the threat (Johnson et al. 2019; Zaback et al. 2019). This study used virtual reality to repeatedly expose subjects to a height-induced postural threat to determine if similar emotional and postural changes are observed. We hypothesized that repeated exposure to a virtual-height would minimize the emotional response, however, most threat-related balance control changes would remain unchanged. Seven healthy young adults (6 females) completed a series of 60-s quiet standing trials while wearing a head-mounted display and immersed in a virtual lab standing on a “Low” height (0.8m above ground, away from the platform edge; 2 trials) and “High” platform (3.2m above ground, at platform edge; 15 trials). Each trial was followed by a seated rest. Fear of falling, perceived anxiety and confidence, and attentional focus were measured using questionnaires. Electrodermal activity (arousal) and forceplate-derived centre of pressure (COP) measures were recorded for each trial. Fear, anxiety, confidence, arousal, and attentional focus all significantly changed with initial exposure to a virtual-height and were subsequently attenuated following repeated exposure. In contrast, most height-related changes in balance control did not adapt with repeated exposure. These results suggest that some threat-related postural changes are context dependent, and repeated exposure to virtual heights can be used to examine relationships between emotional state, attentional focus, and postural control.



225.

## **TITLE: EYE-MOVEMENT CHANGES ASSOCIATED WITH A HEIGHT-INDUCED THREAT**

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Height-related threat effects on the sensori-motor control of posture has been broadly studied; however, the effect on eye-movements during stance are less known. Kugler et al. (2014) showed that subjects susceptible to fear of heights have a more restricted gaze behavior when standing on heights compared to controls. Thus, we hypothesized that individuals will demonstrate less exploratory gaze behaviour when standing on high compared to low heights. Subjects (n=4, 1 female) were asked to stand facing towards a blank canvas for 5 minutes at 0.80 m above ground (away from the edge; Low) and 3.2 m above ground (at the edge; High) on a hydraulic lift (order counter-balanced across subjects). Eye movements were measured with the Dikablis eye tracker, and 6 QR code markers were used to define a fixed area for analysis (10.9 m<sup>2</sup>). Calibration trials (1 min) were performed after each condition to correct for offsets (along the horizontal and vertical axes) and normalize the subject's eye-level. The average standard deviation of gaze patterns along the horizontal direction was comparable; 36.9 cm in Low versus 31.3 cm in High. In contrast, the average standard deviation along the vertical direction was much smaller at Low (56.9 cm) versus High (122.5 cm). Contrary to past findings that subjects fearful of height freeze their gaze to the horizon (Kugler et al. 2014), these results indicate that individuals employ a more exploratory eye-movement pattern when standing on high heights.

196.

## **DIFFERENCES IN PERCEPTIONS OF APERTURE CROSSING DURING A VIRTUAL REALITY CHOICE REACTION TASK ACCORDING TO THE TEMPORALITY OF VISUAL STIMULI**

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<sup>1</sup>Wilfrid Laurier University

The purpose of this study was to determine whether the amount of viewing time prior to crossing a converging aperture would affect individuals' perceptions about passability. It was hypothesized that shorter durations of viewing would negatively affect response time (RT) and passability accuracy of a converging aperture. Eleven adults ( $x=20.77\pm0.83$  years) walked along a 7.5m pathway towards a goal in virtual reality while two avatars moved at various rates along 45° converging angles towards a theoretical crossing area. Aperture widths at the theoretical crossing area ranged from 0.8 to 1.8x shoulder width, at increments of 0.2. Visual information was removed at 0.5, 1.0, 1.5, or 2.0s prior to theoretical crossing and participants were instructed to indicate whether they were able to successfully pass through the approaching avatars without rotating their shoulders. Results revealed that there was a main effect of disappearance time on RT, such that removing the scene 2.0s prior to crossing resulted in slower RTs ( $M=1.157$ ,) compared 0.5s, 1.0, or 1.5 ( $M=0.608$ ;  $M=.845$ ;  $M=1.059$ ; respectively). There was also a main effect of disappearance time on accuracy, such that participants' estimation of passability became less accurate as the disappearance time increased from 0.5s to 2.0s ( $p<.001$ ). Results demonstrate that individuals' perceptions about passability of apertures is affected by the temporality of visual stimuli. Less viewing time negatively affected RTs and accuracy in perceiving the passability of an aperture. Suggesting that individuals utilize heuristic information in situations where there is less viewing time and are unable to extrapolate future aperture widths.

231.

## **RETICULOSPINAL INVOLVEMENT IN FORCE PRODUCTION DEPENDS ON EFFECTOR AND DEGREE OF FORCE MODULATION**

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The nervous system executes movements primarily through the corticospinal and reticulospinal descending tracts. Although it was previously thought that the reticulospinal tracts are predominantly used for locomotion and postural adjustments, recent evidence implicates reticulospinal involvement in voluntary movements, although in differing degrees depending on the type of movement and muscles involved. The purpose of the current study was to assess the relative degree of reticulospinal contributions to various movements executed using wrist flexors versus wrist extensors. Participants performed a bimanual force production task that required either wrist flexion, wrist extension, or wrist flexion with one arm and wrist extension with the other arm. In addition to the use of different effectors, participants either produced a constant force or were required to track an oscillating force target to assess how force modulation affected the pathways involved in movement control. Neural contributions were assessed using EMG-EMG coherence, which quantifies the relative degree of common drive to both muscles in the frequency domain. During the constant force task, results showed increased 8-20 Hz coherence for bimanual flexion movements compared to all other conditions, indicative of greater reticulospinal drive. Additionally, increased coherence in the 8-12 Hz (alpha) band was found for force tracking as compared to constant force for all movement types, which may represent continuous monitoring of force feedback and tracking error. Overall, these findings provide evidence that brainstem structures contribute to force production differentially depending on involved effectors and may be implicated in force control and error prediction.

276.

## **INVESTIGATING ATTENTIONAL DEMANDS OF A CONTINUOUS PRIMARY MOTOR TASK USING PROBE REACTION TIME AND MEASURES OF CORTICOSPINAL EXCITABILITY**

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The performance of a secondary motor task during an ongoing motor task can require attention; however, it is unclear how the attentional demands of the ongoing task may affect the preparation and execution of the secondary task. Previously, probe reaction time (RT) tasks have been used as secondary tasks to investigate the attentional demands of various primary tasks. The purpose of the present experiment was to investigate whether the attentional demands of a cyclical primary motor task vary with location within a movement cycle, and whether these variations are reflected as differences in probe RT and/or measures of corticospinal excitability. Participants performed a continuous tracking task involving cycles of wrist flexion and extension with their left hand. A probe RT task involving isometric force production was performed with the right hand in response to auditory stimuli (80 dB and 120 dB) that occurred as the left hand cycled through one of five locations. Additionally, on separate trials, transcranial magnetic stimulation was applied over the left primary motor cortex to assess corticospinal excitability associated with the probe RT task. Generally, probe RT latencies were shorter following a reversal in direction of the left hand (i.e., after the left wrist cycled from flexion to extension) and there were no differences in corticospinal excitability. These results suggest that the attentional requirements for a continuous motor task vary across locations within a movement cycle, and these variations are reflected behaviourally as differences in probe RT.

185.

## **SLEEP CHARACTERISTIC SCORES CAN PREDICT RESPONSE LATENCY ON A SIMPLE REACTION TIME TASK.**

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The Pittsburgh Sleep Quality Index (PSQI) is the most prevalent subjective sleep measurement tool in the literature as it assesses multiple sleep characteristics. It differentiates between “poor” ( $\geq 6$ ) and “good” ( $< 6$ ) sleep by measuring seven domains: sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction over the last month. Inadequate sleep contributes to impaired cognition and slower reaction time (RT). In a large sample ( $n = 50$ ), we investigated whether individual PSQI scores could predict RT. RTs were assessed using a simple RT task paradigm that involved a ballistic wrist extension in response to an auditory stimulus. Results from a linear regression showed a significant positive relationship between the PSQI global score, sex, and RT. The constant was 123 ms, the slope coefficient was 5 ms per PSQI point, and 22 ms was subtracted for male participants. The  $R^2$  value was 0.19, indicating that 19% of the variation in RT can be explained by the model. Additionally, sleep duration alone was not significantly correlated with RT. Therefore, it may be important to consider multiple sleep characteristics when it comes to the relationship between inadequate sleep and slower RTs.

172.

## **VIDEO SPEED DEMONSTRATION UNDER MIXED-MODELING CONDITIONS DOES NOT INFLUENCE LEARNING OF A NOVEL MOTOR SKILL**

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<sup>1</sup>University of Ottawa

<sup>2</sup>McMaster University

Speed of a video demonstration has been manipulated by few researchers, mainly with an interest in slow-motion versus real-time. These few experiments yielded conflicting evidence regarding the benefits of slow-motion video. Further, video demonstration speed research has only included observation of a single model type; however, recent research has shown learning advantages for the use of mixed-models over that of single model types. Given this, and the contradictory findings concerning video speed, the aim here was to explore the effects of slow-motion video demonstration under mixed-modeling conditions (skilled model plus self-observation) on the learning of a novel motor skill. Fifty-one participants were tasked with learning a pirouette-en-dehors while assigned to one of three groups with different mixed-model observation video speeds: (1) slow-motion (2) real-time, or (3) a combination of slow-motion and real-time. Following a pre-test, participants received 72 practice trials, divided into eight blocks, comprised of five physical and four observational practice trials. Physical performance and cognitive representation assessments were completed at pre-test, after even-numbered blocks, and at a 24-hour post-test. Participants' scores improved for both physical performance and cognitive representation assessments throughout acquisition ( $p < .001$ ) and scores were higher at post-test when compared to pre-test ( $p < .001$ ). There were no significant differences between the groups. Thus, under mixed-modeling conditions, slow-motion video demonstration (either alone or combined with real-time speed) did not provide additional learning benefits over real-time demonstration.

240.

**KNOWLEDGE OF RESULTS: ERROR ESTIMATION DOES NOT LEAD TO A BETTER MOTOR LEARNING IN A TIMING COINCIDENCE TASK**

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Previous research has shown that require participant to estimate their error could improve motor learning. However, there is no information about the improvement of the accuracy on the error estimation during the learning process, and in the most cases they required participants to estimate their performance not error. In the present study, we investigated if there are advantages in motor learning when participants are required to estimate error in a timing coincident task. Forty undergraduate students aged 18 to 35 years old were divided into two conditions: (1) knowledge of results (KR) with error estimation and (2) KR without error estimation. The experiment was carried out in three phases: acquisition, retention, and transfer. In the acquisition phase, all participants performed 100 trials with a range of KR amplitude of 70 percent of trials. For condition 1 they were required after every trial to estimate error about the previous response after receiving KR. The same procedures were adopted in learning tests for both conditions, but the KR was not provided. Contrary to what has been shown in other studies, requiring error estimation did not enhance learning and no difference in error estimation accuracy was found. One possible explanation is that, although error estimation encourages learners to attend to their intrinsic feedback, it is not enough to improve in this process; KR information is needed. Thus, better performance can be expected when participants can choose the moment to ask for KR and compare it to their error estimation.

230.

## THE IMPACT OF PRACTICE CONDITION ON THE PERCEPTION OF TARGET SIZE

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<sup>2</sup>Department of Kinesiology, Brock University

The purpose of this study was to examine self-reported target size perception as a function of task based on three different practice conditions (errorless, errorful, and self-control) during a golf-putting task. We predicted participants in the self-control condition (i.e. choosing their putting distance order) and the errorless group (putting from the closest to farthest putting hole distance) would self-report the largest perception of putting hole size compared to the participants in the errorful practice condition (putting from the farthest to the closest putting hole distance) during acquisition and retention. All three experimental conditions were required to self-report their perceived putting hole size upon completion of 20 practice trials at each distance during the acquisition period (25 cm to 200 cm, in increments of 25 cm) and the retention period (100 cm and 200 cm). A repeated measures ANOVA showed the participants in the self-control and errorful conditions perceived the putting hole to be larger than the participants in the errorless condition during acquisition ( $p < .001$ ). However, only the participants in the self-control condition perceived the putting hole to be larger than the participants in the errorless condition in the retention test ( $p = .022$ ). The results of the present partially supported our experimental prediction. Our results suggest perceived putting hole size was influenced by practice condition, rather than exclusively task success, challenging the existing action-specific literature.



119.

## **OPTIMIZING CHALLENGE THROUGH PERFORMANCE-CONTINGENT PRACTICE IN DART-THROWING**

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Based on the challenge point framework, learning is most effective when challenge is appropriate to the skills of the learner, is dynamic, and changes as practice proceeds (Guadagnoli & Lee, 2004). One way that challenge can be manipulated is through task difficulty progressions related to target distance. Practice can get progressively easier or harder (errorful or errorless practice respectively) or be scaled to match the performance of the learner (maintaining moderate error/challenge). Novices in dart throwing ( $n = 20$ ) were assigned to either a performance-contingent group (progressed to different distances from the dartboard based on performance) or a yoked group (practiced the same distances as pre-test matched partner). They practiced throwing for 210 trials in blocks of three (staying or moving nearer or further from the target depending on success). Both groups improved in accuracy, but they did not differ on measures of performance outcome. However, there were positive correlations between average practice distance, challenge ratings, and accuracy. Participants who were more accurate in retention rated their practice as more challenging and practiced at further distances from the target. Although we did not show benefits from such a challenge-based practice schedule compared to a yoked schedule, both groups improved and as evident from the correlations, the benefits from the yoked group were probably due to an appropriate scaling of challenge. We intend to compare these data to schedules based on error minimization (near to far distance progressions), as well as schedules based on low (near) or high (far) challenge.

278.

## **ERROR ESTIMATION ABILITIES AND SELF-CONTROLLED FEEDBACK SCHEDULES**

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<sup>1</sup>Department of Kinesiology, McMaster University

The learning advantages of self-controlled feedback schedules are often attributed to the development of a more sensitive error detection and correction mechanism. That is, during practice participants engage in error estimation processes upon movement completion, which guides the feedback decision. Indeed, past research has shown that self-controlled feedback schedules lead to more accurate error estimation in retention and transfer relative to yoked feedback schedules (e.g., Carter et al. 2014). A limitation of these experiments is that no baseline of one's error detection and correction mechanism was collected. Thus, it is difficult to rule out participants in the self-controlled group naturally having more accurate error estimation abilities. Here, we addressed this limitation by randomly assigning half of the self-controlled participants to error estimate after each trial in a no-feedback pre-test. On Day 1, participants practiced an aiming task involving a rapid 40-deg extension movement in exactly 225 ms. Participants returned 24-hrs later to complete no-feedback retention and transfer tests, and all participants were asked to error estimate after each trial. Participants had less accurate error estimations in pre-test as compared to retention, and retention was more accurate than transfer. Self-controlled error feedback schedules (e.g., -24-deg) lead to more accurate estimations compared to self-controlled graded feedback schedules (e.g., too short). These data, along with previous findings, suggest that self-controlled feedback is effective for training error estimation abilities. However, this benefit may be restricted to feedback that provides both magnitude and direction information rather than only direction information.

164.

## **“I CAN’T MOVE IN THIS”: CLOTHING INFLUENCES MOVEMENT EFFICIENCY**

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<sup>1</sup>University of Toronto

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Seminal research has shown that wearing revealing clothing may increase women’s body-related self-conscious emotions, which consumes cognitive resources and in turn diminishes mental performance (Fredrickson et al., 1998, *J Pers Soc Psychol*). Here, we manipulated women’s clothing to determine whether increased body-related awareness also impacts motor performance. Women were randomly assigned to wear a tight vs. loose black athletic outfit ( $n = 40/\text{group}$ ). Participants executed rapid aiming movements to a target presented with an overlapping penalty circle. Participants gained points when the target was contacted and lost points when the penalty circle was contacted. Task success required selecting an “optimal” endpoint based on participants’ own movement variability and the rewards/penalties associated with the regions of the aiming environment. The groups did not differ in endpoint selection and movement variability ( $p > .57$ ), indicating that both groups accomplished the movement task goals. However, the tight-clothing group performed with significantly greater movement time variability ( $p = .001$ ) and only the loose-clothing group significantly decreased their movement time across blocks of trials ( $p = 0.028$ ). Thus, the loose-clothing group demonstrated more efficient action execution. These findings suggest that the clothing worn can impact motor performance – a result consistent with research demonstrating that a focus on the body hinders the performance of skilled motor behaviour. These findings may have implications for best practices in physical activity contexts.

# **Motor Control and Learning**

## **Poster Session III**

181.

## **INVESTIGATING STATIONARY LIMB LOCALIZATION USING PSYCHOPHYSICS: BEWARE OF PROPRIOCEPTIVE DRIFT.**

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Quantifying the accuracy and variance of hand localization without vision is integral to understand the reliability of the proprioceptive system. Psychophysical methods primarily compare the endpoint position of a passively moved limb to a stationary visual reference (e.g., Sadler & Cressman, 2019). The purpose of the current study was to understand the ability to localize one's stationary, rather than passively moved, limb without vision using psychophysical methods. Participants placed their unseen limb under a half-silvered mirror with their index and ring finger atop of tactors. One finger was stimulated and then a visual mask was presented followed by a briefly flashed comparison dot. Participants then dictated whether the comparison dot was left or right of their stimulated finger position. An adaptive staircase procedure used the participant's response to determine the position of the comparison dot on the next trial. The initial comparison position was either fixed (task 1) or based on the participant's initial perceived finger positions (tasks 2 and 3). Additionally, a proprioceptive cue presented every 5 trials had participants lift their arm, clench their fist and isometrically flex their wrist and elbow flexors/extensors (task 3; Wann & Ibrahim, 1992). In all three tasks, the perception of participants' finger position drifted in the magnitude of ~3cm, resulting in unreliable psychophysical estimates of perceptual accuracy and variability. The results suggest that when isolating somatosensory cues and not allowing for any visual recalibration, researchers must be aware of and account for large perceptual drifts in one's stationary limb position.

282.

## **A STEP AND A SHIFT: EXAMINING SENSORY-MOTOR CONTROL OF GOAL-DIRECTED AIMING**

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Sex differences in the control of manual aiming have been demonstrated following target perturbations and under prismatic displacement. However, the locus of these differences has yet to be explained beyond evolutionary or socio-cultural theories. This study examined potential sensory-motor control differences between males and females using a double-step perturbation paradigm. Eighteen participants were recruited (9 Females). Participants aimed at a square (0.5cm<sup>2</sup> at 40cm within the midline) as quickly and as accurately as possible. Perturbations occurred at movement initiation (MI) and then at 100ms after MI. Target perturbations included a 12cm displacement to the left or right or none. Prismatic displacement was achieved with liquid crystal goggles switching from the right lens with normal vision to the left lens that had either a 30-diopter Fresnel prism (17degrees) or a placebo lens. In total, there were 12 conditions: 2-Order (Target 1st, Target 2nd) by 3-Target (Left, Centre, Right) by 2-Prism (None, Right). 3D Position was recorded by a Certus at 500Hz for 2s. Participants landed farther from the target when the prism was presented compared to the placebo lens regardless of whether the prism was presented first or second. When the prism was presented at MI, participants displayed more error than when it was presented at 100ms. Males had shorter movement time, especially when the placebo lens was presented at MI and then the target remained at the centre. Results indicate the necessity to revisit modern models of goal-directed aiming with the intention of incorporating individual differences in sensory-motor control.

124.

## **VISUAL ORIENTING AND MULTISENSORY PERCEPTION: THE ROLE OF CUE FREQUENCY**

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Attention can facilitate multisensory perception. The impact of visual attention on audio-visual perception was investigated using an established cueing paradigm which has revealed facilitatory effects of attention at short (100 ms) stimulus onset asynchronies (SOAs), and inhibitory effects at longer (e.g., 500 ms) SOAs. White disk(s) were presented within a cued (i.e., congruent) or uncued (i.e., incongruent) location, 100 or 500 ms after the cue. The congruent location was considered attended at the 100 ms SOA, but inhibited at the 500 ms SOA. The disk flashed (F) either once or twice. Auditory beeps (B) were presented that were consistent (i.e., 1F1B) or inconsistent with the number of flashes (i.e., 1F2B or 2F1B). Typically, the number of perceived flashes is biased towards the number of beeps (i.e., multisensory perception). If attention facilitates multisensory perception, the beeps should elicit the strongest bias 100 ms after the cue, and a reduced bias at the 500 ms SOA. At the 100 ms SOA, the 1F2B condition yielded a greater number of flashes at the congruent relative to the incongruent location (i.e., increased auditory bias). In the 2F1B condition, more flashes were reported in the congruent relative to the incongruent location (i.e., reduced auditory bias). At the 500 ms SOA, the beep's influence was comparable for congruent and incongruent trials. The results suggested that following attentional orienting, multisensory perception was biased towards stimuli that occurred more often within a trial, regardless of modality. In addition, inhibitory orienting mechanisms did not significantly influence audio-visual perception.

222.

## **SINGLE-PULSE TMS OVER THE PARIETAL CORTEX DOES NOT IMPAIR TRIAL-BY-TRIAL ADAPTATION**

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Whether the parietal cortex contributes to implicit adaptation of internal models remains unclear. Using electroencephalography, we recently reported increased parietal activity in response to an intermittently imposed visuomotor rotation as well as a directional reaching bias on the subsequent trial. This raised the possibility that the parietal cortex could contribute to the trial-by-trial movement adjustments that subtend implicit adaptation. The goal of the present study was to test whether the observed parietal responses were causally related to this type of learning. Participants reached toward visual targets while being pseudo-randomly submitted to a 45° visuomotor rotation. On half of all rotation trials, single-pulse transcranial magnetic stimulation (TMS) was applied over either the left (electrode P3; N = 14) or right (electrode P4; N = 14) parietal cortex 150 ms after visual feedback provision (i.e. the approximate timing of the parietal responses in our previous study). It was hypothesized that a directional reaching bias (i.e., trial-by-trial adaptation) would be lesser on trials that followed rotation with the TMS condition (i.e., when the parietal cortex was disrupted) as compared to no TMS. Consistent with our hypothesis, a potent directional reaching bias was observed on post-rotation trials ( $p < 0.002$ ), indicating that visuomotor rotation resulted in robust trial-by-trial adaptation. Contrary to our hypothesis, however, parietal stimulation did not significantly impact the post-rotation bias ( $p = 1.00$ ). These results indicate that neural activity in parietal areas 150 ms after visual feedback provision is not critical for trial-by-trial adaptation, and thus possibly implicit adaptation.



104.

## IMPROVED DISCRIMINATION OF VISUAL SENSORY PREDICTION ERRORS WITH TENDON VIBRATION

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Implicit sensorimotor adaptation is driven by the difference between the expected and actual sensory consequences of a movement, known as a sensory prediction error (SPE). In a visuomotor rotation task, adaptation is assumed to be driven by the SPE between the rotated visual feedback and the sensory prediction based on the intended action. Via adaptation, movements shift away from the target in the opposite direction of the perturbation, thus reducing the SPE based on visual feedback. However, as a result of adaptation, an SPE resulting from the mismatch between the expected and actual proprioceptive feedback increases. Thus, one constraint on the extent of adaptation to the visual rotation may lie in how visual SPEs interact with proprioceptive SPEs (Morehead et al., 2017). As a starting point, we asked how the perceived trajectory of self-selected reaching movements is affected by the addition of proprioceptive noise. Participants (10) performed rapid reaching movements and judged whether visual cursor feedback representing fingertip position was rotated clockwise or counterclockwise with respect to their reach (Synofzik et al., 2010). We used simultaneous biceps-triceps tendon vibration during the movement to implement proprioceptive noise (Bock & Thomas, 2011). We derived estimates of discrimination sensitivity (JND) under conditions of tendon vibration and no vibration. Contrary to our expectations, all participants' JNDs improved with concurrent vibration (8.2 deg) compared to no vibration (16.5 deg). We speculate that the presence of proprioceptive noise may increase the weight given to the visual prediction, resulting in the paradoxical improvement of the JND.

110.

## AWARENESS GOVERNS THE EXTENT OF VISUOMOTOR ADAPTATION

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We asked if awareness of a visuomotor perturbation may govern the extent of visuomotor adaptation achieved. Participants ( $n = 49$ ) were divided into 2 groups (Abrupt and Gradual group), and reached in a virtual environment where a cursor on a screen misrepresented the position of their hand. In the Abrupt group, the cursor was immediately rotated  $45^\circ$  CW relative to hand motion, whereas in the Gradual group, the  $45^\circ$  cursor perturbation was gradually introduced over trials ( $1^\circ$  increments every trial). Participants reached with the rotated cursor (Reach Training) and then with an aligned cursor (Washout). Following Reach Training, participants were designated as aware (Abrupt:  $n = 15$ , Gradual:  $n = 11$ ) and unaware (Gradual:  $n = 17$ ) based on perceptual reports (e.g., a questionnaire and drawing task where they drew the path their hand took to get the cursor on target). While all participants were able to adapt to the cursor perturbation during Reach Training, unaware participants made faster and more curved movements in order to counteract the cursor rotation compared to aware participants. Performance differences between aware and unaware participants were also seen following removal of the perturbation (Washout). Specifically, analyses revealed that during the early phases of Washout, unaware participants showed greater reach errors than those who were aware, regardless of how the perturbation was introduced during Reach Training. Together, these findings indicate that awareness may govern the extent of (implicit) adaptation to a visuomotor distortion.

157.

## **BIMANUAL TRANSFER OF VISUOMOTOR ADAPTATION IS DRIVEN BY EXPLICIT ADAPTATION**

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Reaching with altered visual feedback of the hand's position in a virtual environment leads to reach adaptation in the trained hand, and also in the untrained hand (Wang & Sainburg, 2002). We asked if reach adaptation in the untrained (right) hand is due to transfer of implicit adaptation (i.e., IA; unconscious) and/or explicit adaptation (i.e., EA; conscious strategy) from the left (trained) hand, and if the transfer of IA and EA change depending on how one is made aware of the visuomotor distortion. Participants (n=60) were divided into 3 groups (Strategy (provided with instructions on how to counteract the visuomotor distortion), No-Strategy (no instructions provided), and Control (EA not assessed)). EA was probed in the Strategy and No-Strategy groups immediately after reaching with a cursor that was rotated 40 deg clockwise relative to hand motion. IA was assessed at a similar time, for all 3 groups. Results revealed that, while EA was greater for the Strategy versus No-Strategy group, EA transferred between hands for both groups. IA in the trained hand was greatest in the No-Strategy group. IA did not significantly transfer between hands, and in fact, the extent of IA observed in the untrained hand was not related to the extent of IA initially observed in the trained hand. These results suggest that while initial EA and IA in the trained hand are dependent on how one is made aware of the visuomotor distortion, transfer of visuomotor adaptation is driven almost exclusively by EA, regardless of instructions provided.

100.

## **THE EFFECT(S) OF INCREASED ATTENTIONAL DEMANDS ON MECHANICAL PERTURBATION EVOKED RESPONSES**

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Mechanical perturbations to the arm elicit short- and long-latency reflexes (SLR 25-50 ms; LLR 50-100 ms) as well as a voluntary response (beginning at ~100 ms) in stretched muscles (Hammond 1956). It is well documented that the EMG activity during the LLR modulates based on behavioural goals similar to the subsequent voluntary activity (Scott 2016). Interestingly, it has been suggested that such goal-dependent “reflex” activity and perturbation-triggered voluntary reaction may be impervious to increased attentional demands (Schmidt 1987). The purpose of the current study was to investigate the influence of increased attentional demands on modulation of the LLR and onset latency of a voluntary response using a psychological refractory period (PRP) paradigm. Participants performed a verbal response (Response 1) to the onset of an auditory stimulus (S1), while also reacting to an extension perturbation of the wrist (S2) with a rapid flexion response (Response 2). The stimulus onset asynchrony (SOA) between S1 and S2 varied from 100-1000 ms. Results indicated that the voluntary response to the perturbation was susceptible to a PRP effect (delayed at short SOAs), however the amount of delay was much smaller than traditional PRP studies. By contrast, the magnitude of the LLR was facilitated to the greatest extent on these short SOA trials, possibly due to intersensory facilitation. We also found instances of response reversals at short SOAs whereby the voluntary response to S2 began prior to the vocal response to S1, which may be attributed to the fast RT associated with responding to a perturbation.

285.

## **EVALUATING VISUOMOTOR COORDINATION IN CHILDREN WITH AMBLYOPIA**

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Amblyopia is a developmental disorder of the visual cortex characterized by poor vision that cannot be corrected by lenses. Clinically, diagnosis depends on interocular visual acuity differences. However, many children with amblyopia also show deficits in a number of other visual facets such as binocular vision, motion perception, and visuomotor coordination. These deficits are not targeted by current treatment and may be responsible for high treatment failure rates. The purpose of this study is to identify the specific kinematic parameters that are the most characteristic of the disrupted visuomotor mechanisms in amblyopia, by using a bead-threading task that has been shown to be sensitive to disrupted binocular vision. Children with amblyopia and controls aged 4-13 were recruited. Each participant completed visual acuity and stereoacuity assessments before completing 30 trials of the bead-threading task under binocular, right eye only, and left eye only viewing conditions. Each trial involved precision-grasping and threading a bead onto a vertical needle. Hand-movement data were collected using a Leap Motion tracker and then analyzed to extract kinematic parameters of peak velocity, grasp duration, and threading duration. Children with amblyopia (N=6) and age-matched controls (N=7) showed similar average peak velocities. However, inspection of the duration data suggested that children with amblyopia may be less accurate during the grasping and threading phases than controls. Thus, it is possible that children with amblyopia show similar deficits to adult patients, who demonstrated significantly longer grasping and threading phases in a previous study.

246.

## **THE EFFECTS OF ENDOGENOUS AUDITORY CUE-TARGET CONGRUENCY ON UPPER LIMB RAPID GOAL-DIRECTED REACHING.**

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Sutton, J.C., Aina, A.O., and Glazebrook, C.M. Previous research found that congruent exogenous auditory cues biased and enhanced goal-directed reaching in a multi-target task. The current study assessed if endogenous auditory cues, that require voluntary shifts in attention, can similarly be used to effectively capture attention when performing a multi-target reaching task. Eleven right-handed individuals (mean age 22.2 years; 5 males) with normal or corrected-to-normal vision and hearing, performed a rapid multi-target reaching task towards four 4cm square targets displayed on a touch screen (Dell ST2220T). Three endogenous auditory cues (no sound, valid and invalid) were randomized. An Optotrak 3D Investigator (NDI) was used to measure reach trajectories at 500Hz. Following a variable fore-period (300-850ms) the target array turned green, which was the visual signal for participants to begin moving. Upon movement initiation, an auditory cue (0Hz, 250Hz, or 1250Hz) was emitted and one of four equiprobable visual targets was identified. Participants were asked to quickly and accurately continue their reach to the identified target. Performance measures and movement trajectories were analysed using repeated measures ANOVAs (3 Cue X 4 Target and 3 Cue X 4 Target X 5 Movement Proportion, respectively). Reaction time was significantly shorter in the valid condition. Movement trajectory deviations between upper and lower targets became significant at 60% of movement time, regardless of the auditory cue. Thus, the present results do not support the same advantage of cue-target congruency for endogenous auditory cues that was observed previously for exogenous auditory cues.

176.

## **BEEP, AIM, REPEAT: MOVEMENT REPETITION BIAS DURING SEQUENTIAL AIMING MOVEMENTS.**

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Consecutive goal-directed actions are not executed completely independently from one another. Actions are influenced by both recent motor history, and the characteristics of future movements. Hence, during movement sequences, current movement can be biased toward the direction of a preceding target and/or an upcoming target through the activation of movement repetition mechanisms: use-dependent and advance preparation processes, respectively. Here, we sought to assess the contribution of use-dependent and advance-preparation processes during sequential actions. Participants performed two consecutive aiming movements in time with the last two tones of a sequence of five. First movement was made to a fixed target (450 relative to origin), followed by a movement to either 450 or 900 direction. Hence movement pairs were always 450-450 or 450-900. A movement bias would be revealed if there were larger movement angles on the first 450 movement in a 450-900 movement pair than on the first 450 movement in a 450-450 movement pair. Participants performed the pairs of movement in different blocks in which movement pairs (450-450 or 450-900) were blocked or alternated. In the blocked trials, participants were presented with a single target combination (450-450 or 450-900), whereas for the alternating trials, the target combination alternated between 450-900 and 450-450. Unexpectedly, the results revealed larger movement angles in the blocked 450-450 trials than blocked 450-900 trials and the alternating trials. These results were not consistent with predictions based on use-dependent and advance preparation mechanisms. These results will be discussed with regard to planning efficiency and movement repetition processes.

145.

## **BIMODAL CUEING CAN FACILITATE RHYTHMIC TRAINING FOR SEQUENTIAL UPPER-LIMB MOVEMENTS**

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Auditory rhythmic training has been shown to enhance motor performance (e.g., walking: Thaut et al., 1996). The current study recruited healthy individuals to examine the effect of unimodal (i.e., auditory or visual cues) vs. bimodal cues on the spatiotemporal adaptations of a sequential upper-limb reaching task with varying movement amplitudes. This was done because congruent bimodal information facilitates perception relative to unimodal information (Ernst & Bühlhoff, 2004). Participants performed reversal movement sequences that involved 6, 12, and 18 cm amplitudes and were asked to maintain the same movement duration for all amplitudes. Before each trial in the sensory-cued conditions, the rhythm was specified with four auditory beeps, visual flashes, or audiovisual cues. The sequences were also performed without these pre-trial cues (i.e., no-cue conditions). Movement time error (MTE) corresponded to the difference between the participant's sub-movement times and the prescribed rhythm. Within the sensory-cued and no-cue conditions, small amplitude movements yielded the largest MTEs. Critically and as hypothesized, the sensory-cued audiovisual condition yielded lower MTEs relative to the auditory and visual conditions, although this was limited to the small amplitude movements. Interestingly, these lower MTEs for the small movement amplitude were also observed in the no-cue condition following the audiovisual condition vs. those following the auditory-cued conditions. Follow-up analyses involving linear de-trending confirmed that the benefits of bimodal cueing were specific to the sensory training and not a performance improvement over time. Thus, combining auditory with visual cues can enhance rhythmic training, which could also be useful in rehabilitation settings.



171.

**CANADIAN PHYSIOTHERAPISTS' SELF-REPORTED ATTENTIONAL FOCUS USE FOR INSTRUCTIONS AND FEEDBACK IN REHABILITATION**Julia Hussien<sup>1</sup>, Mariam Gerguis<sup>1</sup>, Diane Ste-Marie<sup>1</sup><sup>1</sup>University of Ottawa

Research on a wide array of populations and tasks has shown that adopting an external focus (EF) of attention (i.e., attention on movement outcome) enhances motor performance and learning as compared to adopting an internal focus (IF; attention on movement kinematics). Given that the goal of much research is to have findings translated into applied settings, the aim of this study was to determine the relative percentage of time that Canadian physiotherapists would use IF and EF statements in their practice. To do this, a questionnaire was designed that included six scenarios: three for which physiotherapists would provide feedback and three for which instruction would be given to clients. For each scenario, an IF and an EF cue were presented and physiotherapists selected the percentage of time each would be provided to a client. Questionnaires were distributed both online and as paper copies through clinics, and at the CPA's annual forum; preliminary data was collected for N=62 physiotherapists (mean age= 43 ± 12 years). Overall, results showed that participants self-reported an average relative frequency of IF statements of 66.6% (SD=19.6) for feedback and 70.5% (SD=16.0) for instruction. However, cue provision appears to be task-dependent, since a majority of physiotherapists self-reported providing EF cues more often than IF ones for a functional reaching task and a strength training scenario. Gaining a comprehension of rehabilitation tasks, and the effect of their unique features for physiotherapists' use of attentional focus cues, is essential to inform the design of possible future educational workshops.

173.

# **STARTLE REFLEX ACTIVATION IS RELATED TO EARLY RESPONSE TRIGGERING AND IS INDICATIVE OF AN ALTERNATE RESPONSE INITIATION PATHWAY**

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The presentation of a loud, startling acoustic stimulus in a simple reaction time (RT) task has been shown to substantially decrease RT. This so called “StartReact” effect has been attributed to early and involuntary response triggering due to activation of the startle reflex pathway. However, the relationship between the startle reflex, response triggering, and latency of the response is not fully understood. The purpose of the current study was to examine the conditions under which a prepared response can be triggered by an auditory stimulus. Participants performed a simple RT wrist extension task in response to a visual go-signal. On selected trials, an auditory stimulus of different intensities (80dB, 100dB, 110dB, 120dB) was presented either 300ms or 1000ms prior to the visual go. The presence/absence of a startle reflex was determined by activation of the sternocleidomastoid (SCM+/SCM-), and response triggering was defined as EMG onset occurring within 300ms of the auditory stimulus. As expected, the incidence of SCM+ trials was higher with increasing intensity and later presentation of the auditory stimulus. When SCM activation was observed, the incidence of response triggering was much higher across all intensities  $\geq 100$ dB, and these responses exhibited shorter RT latency than those triggered in the absence of SCM activation. Conversely, when responses occurred in response to the visual go, RT latencies were similar across all conditions. Together, these results suggest that the presence of SCM activation is an important marker for response triggering and is indicative of a separate and faster response initiation pathway.