SCAPPS Conference

Delta, St. John's, NL
October 12-14, 2017

BOOK OF ABSTRACTS

Thursday, October 12, 2017

Young Scientist Presentations – 7:30-9:00pm

Exercise Psychology Winner: *Erica Bennett*

"I'll Do Anything to Maintain My Health": How Women Aged 65 to 94 Perceive, Experience, And Cope With Their Aging Bodies
Erica Bennett - The University of British Columbia

We explored how physically active women perceived, experienced, and coped with their aging bodies, and examined their perceptions of the utility of self-compassion to manage aging body-related changes. Findings from a thematic analysis of interviews with 21 women aged 65 to 94 revealed that they were appreciative of how their bodies worked and accepting of their physical limitations, yet concurrently critical of their body's functionality and appearance. Participants engaged in physical activity and healthy eating to maintain their health and body functionality, yet also used diet, hair styling, anti- aging creams, makeup, physical activity, and clothing to manage their appearances. To assess their bodies (in)adequacies, they engaged in upward or downward social comparisons with others their age. Participants perceived self-compassion for the aging body to be idealistic and contextual. Findings highlight the importance of health and body functionality in influencing the cognitive, emotional, and behavioral management of the aging body.

Psychomotor Learning Winner: *Christopher Forgaard*

An Examination of The Startle Response During Upper Limb Stretch Perturbations
Christopher Forgaard, Ian Franks, Dana Maslovat, Nicolette Gowan, Jonathan Kim, Romeo Chua - University of British Columbia

Unexpected presentation of a startling auditory stimulus (SAS>120decibels) in a reaction time (RT) paradigm results in the startle reflex and an early release (<100ms) of the preplanned motor response (StartReact effect). Mechanical perturbations applied to the upper limbs elicit short (M1) and long-latency (M2) stretch reflexes and have also been shown to initiate intended motor responses early (<100ms). Ravichandran et al. (2013) recently proposed that unexpected delivery of a perturbation could also elicit a startle response and therefore the StartReact effect may be responsible for the early trigger of a preplanned response. To investigate this further, we examined startle incidence, RT, and stretch reflex modulation for both expected and unexpected perturbations. In Experiment 1, participants performed active (ACT) and passive (DNI) conditions to an expected large perturbation (similar to previous studies examining M2). The startle response was not observed; however, the perturbation still elicited the voluntary response at short latency (<100ms) and goal-dependent modulation of the M2 response was observed. In Experiment 2, participants performed ACT and DNI conditions to a weak auditory stimulus or a small wrist perturbation. On unexpected trials we probed startle circuitry with a large perturbation or SAS. The SAS consistently elicited a startle response in both ACT and DNI conditions, but startle-like activity was only observed on 17.4% of ACT perturbation probe trials.

Our findings suggest that while unexpected upper limb perturbations can be startling, startle triggering of the preplanned voluntary response is not the primary mechanism responsible for goal-dependent modulation of the M2 response.

Sport Psychology Winner: *Celina Shirazipour*

The Role of Quality Elements of Participation in Promoting Physical Activity and The Transition to Civilian Life Among Veterans With a Physical Disability

Celina H. Shirazipour[1], Alice B. Aiken[1], Amy E. Latimer-Cheung[2]
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[2]School of Kinesiology & Health Studies, Queen's University

Physical activity (PA) programs for veterans with a physical disability are developed to promote and facilitate important outcomes, including PA participation and the transition to civilian life. Minimal research has evaluated these outcomes, particularly in regards to the role of experiential elements of quality participation in facilitating these outcomes. The current study aims to evaluate the participation of veterans with a physical disability in PA events. We hypothesized that: (1) PA and its indicators would increase following participation in a PA event; (2) quality elements would mediate the relationship between quality precursors and participation outcomes. Forty-nine (n=32 men, n=16 women, n=1 unspecified) veterans with a physical disability (Mage=43.61±8.81) completed questionnaires prior to and following participation in the event, as well as at a three-month follow-up. Questionnaires assessed precursors, elements, and outcomes of quality participation. Results demonstrated no increase in PA indicators over time. However, a quality indicator of belongingness, linkages to the community, mediated the relationship of coach interpersonal skills on PA indicators of planning and intentions following event participation. Linkages to the community also mediated the relationship between coach interpersonal skills and family integration following event participation, and at the three-month follow-up. These findings provide the first evidence linking quality precursors and elements to indicators of PA and the transition to civilian life, which is important for future program development. This study also contributes to knowledge regarding the role of quality elements in supporting desired program outcomes for veterans post-injury.

Friday, October 13, 2017

Free Communications - 9:00-10:30 am

Motor Control – *Motor Neural Processes*

The Effect of Increasing the Complexity of a Movement on the Motor Pathway
Michael Kennefick, Joel S. Burma, Paul van Donkelaar, Chris J. McNeil
University of British Columbia

In their seminal experiment, Henry and Rogers (1960) sought to understand how the complexity of a movement affected reaction time (RT). They demonstrated that increasing the number of response elements leads to longer RTs; however, the reason for lengthened RTs has remained controversial. While this phenomenon has been interpreted using neural activation models (e.g. Hanes & Schall, 1996), few studies have examined how changes within the motor pathway may contribute to RT differences. Transcranial magnetic stimulation (TMS) is used to examine responsiveness of the motor pathway by recording motor evoked potentials (MEPs) at the target muscle. Therefore, the purpose of this study was to examine how MEPs were affected by the complexity of a movement in a RT paradigm. Participants (n=12) were seated at a KINARM End-Point Lab and completed a ballistic, simple RT task, in which they directed a robotic handle to one, two or three targets. Across the three levels of complexity, participants completed 8 trials at each TMS point for a total of 144 trials. During each trial, TMS was delivered at 0, 50, 60, 70, 80 or 90% of each participant's mean RT at the stimulator intensity which yielded a triceps brachii MEP equivalent to 10% the maximal M-wave. As intended, RTs increased with increasing movement complexity ($p<0.05$). There was an interaction between the complexity of the movement and the stimulation points ($p=0.016$). These findings suggest that there is an increase in neural excitability as a ballistic movement becomes more complex.

Sub-Threshold Transcranial Magnetic Stimulation does not Facilitate Reaction Time in Startle Conditions, Regardless of Movement Complexity
Victoria Smith, Anthony N. Carlsen
School of Human Kinetics, University of Ottawa

Application of sub-threshold transcranial magnetic stimulation (TMS) over motor cortex has been shown to facilitate reaction time (RT), likely by increasing motor cortical activation. Yet, a similar effect was not observed for movements triggered early by a startling acoustic stimulus (SAS), supporting the hypothesis that a SAS acts by triggering a sub- cortically stored motor program without cortical involvement. An alternative explanation is that the simple movement used in previous experiments was already maximally speeded by the startle and no further RT facilitation was possible. The present experiment tested this by employing a more complex movement, which has previously resulted in increased startle RT. It was expected that this would provide a greater available range for sub-threshold TMS to facilitate RT during startle trials. In two experiments, participants performed a simple RT task requiring three keypresses with varying timing complexity following an auditory go-signal or a SAS. On a subset of trials, subthreshold TMS or sham TMS was applied over the motor cortex 30ms following the go-signal or 15ms following the SAS. Results showed that increased timing complexity increased

RT in control trials, but in contrast to previous reports had no effect on startle RTs. Additionally, both real and sham TMS facilitated RT in control trials, whereas there was no effect of either stimulation condition on startle RT. As increased complexity did not increase RT for startle trials it cannot be concluded whether there is limited cortical involvement in SAS-triggered movements, or if an RT floor was reached.

Wrist Movement and the Arm's Orientation Modulate the Spinal Reflex Evoked in the Triceps Muscle to Return the Hand to a Specific Location

Jeff Weiler, Paul Gribble, Andrew Pruszynski
The Brain and Mind Institute: University of Western Ontario

It is commonly believed that spinal circuitry is only capable of simple sensory-to-motor transformations because the spinal reflex (i.e., EMG activity 25-50 ms after a muscle is stretched) is modulated by only a few factors (e.g., rate of stretch; motor neuron excitability). Here we show modulation of the spinal reflex in the triceps muscle that opposes this belief. Participants grasped the handle of a planar 3 degree-of-freedom robot and placed their hand on a home location. The robot then mechanically flexed the participant's elbow, stretching the triceps. At the same time, the robot flexed, extended, or did not mechanically perturb the participant's wrist from an initial neutral position. Importantly, perturbing the wrist changes how elbow movement effects hand position relative to the home location. Participants were required to bring their hand back to the home location following the perturbation, but did so while grasping the robot's handle in different arm orientations. This manipulation diametrically altered how wrist motion moved the hand with respect to the home location. We report three interesting findings. First, the spinal reflex evoked in the triceps was modulated by the different wrist perturbations. Second, this modulation was dependent on the orientation of the arm. And third, the magnitude of the triceps' spinal reflex was appropriate to bring the hand back to the home location. Our findings indicate that spinal circuitry can integrate and process sensory information from multiple muscles to generate rapid motor responses to help return the hand to a desired location.

Performing Rapid Actions Affects Audiovisual Processing

Tristan Loria[1], Tara Lynn Henechowicz[2], Luc Tremblay[2]
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Performing rapid upper-limb movements influence audiovisual integration (i.e., Loria et al., 2016a). The re-weighting of target-congruent sensory information, such as the real-time up-regulation of visual processing during visuomotor tasks, may explain the influence of action on audiovisual processing (e.g., Tremblay & Nguyen, 2010). Yet, presenting temporal order judgment (TOJ) stimuli during a rapid movement towards visual and auditory targets has been shown to facilitate visual and auditory processing, while modulating audiovisual processing (i.e., Loria et al., 2016b). The purpose of the current study was to further probe the influence of action on audiovisual integration. Participants performed a flinging movement, requiring the index finger to align with an audiovisual target at peak velocity (PV). At PV, participants were presented with asynchronous auditory, visual, and audiovisual cues from both sides of the target.

After each trial, participants judged which sensory cue was presented first in a TOJ task. TOJs were also completed at rest. Theoretically, TOJ accuracy should be optimal in the audiovisual condition (Ernst & Bülthoff, 2004). And if engaging in a rapid goal-directed action specifically influences audiovisual processing, only audiovisual TOJ accuracy should decline between the rest and movement conditions. The results showed greater accuracy for audiovisual than auditory TOJs only at rest while TOJ accuracy did not differ across the sensory conditions after flinging movements. Further, contrasting TOJ accuracy between the resting and movement conditions only revealed a decrease in performance for audiovisual TOJs. Overall, unisensory processing appeared unaffected during rapid limb movements while audiovisual processing was specifically hindered.

Perceptual Ability is Diminished at Peak Limb Velocity of a Goal-Directed Movement but is Unaffected During Motor Preparation

Joëlle Haj[j1], Dana Maslovat[2], Erin K. Cressman[1], Anthony N. Carlsen[1]
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Inspection time (IT) paradigms provide a measure of visual processing speed by establishing the amount of time required to accurately identify a visual stimulus. The most commonly used stimulus is a “pi” figure with differing leg lengths, which is presented for various durations (20-200 ms). Following presentation the stimulus is masked and participants choose which leg was longer. Previous research has indicated improved perceptual ability during movement preparation (Hagura et al. 2012) and execution (Tremblay and Nguyen 2010), which may be attributed to enhanced visual processing. The aim of the present experiment was to examine visual processing speed prior to and during performance of a motor task using an IT paradigm. Participants (n=28) performed the IT task under three conditions. In the no-movement (NM) condition, participants grasped a manipulandum handle while performing the IT paradigm. In the peak velocity (PV) condition, participants reacted to a go-signal by making a rapid 30-deg elbow extension movement to a target, with the IT stimulus presented at peak limb velocity. In the movement foreperiod (FP) condition, participants performed the same movement but the IT stimulus was presented prior to the go-signal. In all conditions the IT stimulus was randomly presented for between 15-105 ms and then masked for 400 ms. Contrary to expectations, IT performance was significantly poorer in the PV condition in comparison to both the NM and FP conditions, which did not differ. Collectively, these findings suggest that visuo-perceptual ability is not enhanced during movement preparation, and is diminished during movement production.

Comparing Statistical Methods for Analyzing Human Limb Trajectories of Goal-Directed Movements

Ghislain d'Entremont, Jennifer Swansburg, Heather Neyedli
Kinesiology, Dalhousie

Recently, there has been increased interest in comparing the trajectories of movements made under different conditions to infer information about cognitive processes relating to aspects of motor control such as action planning. One of the more recent analysis methods involves computing the area between two trajectories to targets on opposite sides of the participant’s midline for each experimental condition and then submitting those areas to a repeated measures

ANOVA. Unfortunately, this method necessarily collapses the nuanced trajectory information into a single score. Therefore, we propose a new method - Bayesian Hierarchical Gaussian Process Regression (BHGPR) - which can be used to compare the entire trajectory among experimental conditions. The experimental data that was used to compare these analysis methods were taken from a study in which participants made reaching movements to targets, appearing on either side, preceded by either high (78.5%) or low predictive cues. The authors from this past study had predicted that movements to non-valid targets preceded by predictive cues would contour a lesser area than those from any other condition. The results from the comparison between traditional methods of analyzing trajectories and BHGPR indicate that BHGPR can be used to compare entire trajectories using credible intervals to demonstrate specific regions where the two trajectories differ.

Sport Psychology – *Disability, Chronic Conditions and Exercise*

Quality Participation in Parasport: Integrating Evidence and Community Insights to Develop a Conceptualization of Optimal Parasport Experiences

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Through parasport, adults and young athletes with physical impairments often report increases in well-being and related psychosocial perceptions compared to non-athletes. While researchers often attribute these benefits to social participation that goes-along with parasport, few existing frameworks comprehensively describe the components of optimal parasport experiences. We sought to generate an evidence-informed conceptualization of optimal parasport participation, using a view of participation across disability settings that highlights six experiential elements (Belongingness, Autonomy, Challenge, Mastery, Engagement and Meaning; Martin-Ginis, Evans, Mortenson, & Noreau, 2016). We integrated existing literature and stakeholder input within a three-phase process based on AGREE-II guideline development methods. In Phase One, we formed propositions about optimal experiences based on insights from systematic reviews and qualitative studies. In Phase Two, we developed a provisional conceptualization informed by an expert round-table and an online descriptive survey with 80 parasport athletes, parents, coaches, and administrators. In Phase Three, we refined the conceptualization using an online expert panel with researchers and sport administrators (n = 20). As a result, an initial list of quality elements grew to a conceptualization that uniquely defines the six elements in ways that represent the parasport context. We also identified 27 optimal conditions that may promote quality experiences across the physical (e.g., accessibility) and social environment (e.g., coach-athlete communication), as well as sport activities (e.g., safety). This conceptualization provides direction for future research and is a foundation that parasport organizations may apply through

tools to enhance participation in their unique contexts (e.g., developing guidelines for sport programs).

Exploring Attitudinal Change Towards Disability Through the Impact of Integrated and Non Integrated Parasport Events

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The concept of attitude is one of the most distinctive and indispensable concepts in social psychology (Allport, 1935). Individual attitudes represent an interaction between thoughts, feelings and behaviours as cognitive, behavioural, and affective components. Attitudes can be defined as learned global evaluations of a person, object, or issue that influence thoughts and actions which are applicable to dispositions of single individuals or broad patterns of a culture or society (Allport, 1935). The understanding of attitude formation and change are important to assess as it has implications for decision making, and behaviour change (Ajzen, 1991; Ajzen & Fishbein, 1970). Considering that attitudes are developed through social and educational experiences (Paradis et al., 2017), the purpose of the present study was to assess the impact of integrated and non-integrated parasport events on attitudes towards persons with disabilities. Spectators were surveyed onsite at both the Commonwealth Games (n = 541) and the ParaPan American Games (n = 808) using a modified version of the Scale of Attitudes towards Disabled People (Anotnek, 1982). Results revealed that both events had a perceived impact on improving attitudes towards disability and awareness of disability, with the integrated event, Commonwealth Games impacting attitudes to a greater degree than the non-integrated event at the ParaPan Am Games. Results are discussed pertaining to the implications for parasport and sporting events as an agent of attitudinal change.

From the Athletes Perspective: How do Coaches Shape the Quality of Athletes' Experiences in Parasport?

Veronica Allan[1], M. Blair Evans[2], Jean Côté[1], Amy Latimer-Cheung[1]
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[2]Pennsylvania State University

While coaches of able-bodied athletes have been studied extensively, empirical research examining parasport coaching practices remains largely limited. In other words, although coaches are commonly recognized for their important role in the sport environment, few studies have explored the influence of coaches on athletes' experiences in parasport. Thus, the purpose of this study was to explore athletes' perceptions of how coaches shape the quality of their experiences in parasport throughout development. As part of a larger study examining the factors that influence the quality of parasport participation, a diverse sample of athletes with physical disabilities (N = 21) participated in a two-part life history interview. After broadly outlining their sport history, participants responded to questions targeting the role that coaches played in shaping their experiences. These experiences were the foundation of participants' broader conversations about effective coaching in parasport. Using a thematic analysis, three overarching themes were identified and interpreted as pillars of quality coaching in parasport: (a)

consideration, (b) collaboration, and (c) professionalism. How the three pillars are balanced to create quality experiences for athletes was related to the specific coaching context, ranging from entry-level or recreational to the developmental stream and high performance. Juxtaposed against these themes, athletes also described ineffective coaching practices stemming from experiences of ableism in parasport. Whereas these findings reveal nuances to effective parasport coaching, the resulting themes are situated within established theories about coaching and leadership in numerous domains. Practical recommendations for parasport practitioners are discussed.

Exploring Stereotypes of Athletes with a Disability: A Behaviours from Intergroup Affact and Stereotypes (Bias) Map Comparison

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According to the Stereotype Content Model, individuals with a physical disability are often perceived as a social group with high warmth (e.g., friendliness) and low competence (e.g., intelligence), which subsequently tends to elicit negative feelings and behaviours. Associating this stigmatized group with physically active behaviours has proven to be a promising strategy towards modifying perceptions of warmth and competence. However, it remains unknown how associating sport with adults with a physical disability can predict this trend. Survey data from able-bodied participants (N=181) were used via cluster analyses to create a BIAS map, comparing the warmth and competence rankings of adults with a physical disability and able-bodied adults when depicted as an elite or recreational athlete (i.e., Paralympians, Olympians, recreational athletes with a physical disability, recreational able-bodied athletes) and non-athletes. All sport groups were clustered in higher competence BIAS map regions compared to non-athletes with a physical disability. Results also highlight that athletes with a physical disability are similarly clustered with their able-bodied counterparts. Moreover, an additive effect was observed regarding warmth and competence as the level of sport association became more elite. Paralympians and Olympians clustered in high warmth-high competence, while recreational able-bodied and athletes with a physical disability clustered in medium warmth-medium competence regions. These findings suggest that perceiving more active and elite sport statuses for individuals with a physical disability may mitigate the stereotypes commonly applied to this group. Future work will focus on how these modifications can influence subsequent feelings and behaviours towards adults with physical disabilities.

Weight-Related Shame and Guilt Predict Exercise Behaviour: A Test of the Compensatory Health Beliefs Model

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[2]Wharton Medical Centre

The compensatory health beliefs model (CHBM) suggests that humans engage in compensatory health behaviours (i.e. exercise) to alleviate or neutralize negative affective states (i.e. guilt,

shame) that result from failure to achieve health goals (i.e. weight management). However, engaging in exercise behaviours for compensatory reasons has been associated with maladaptive psychological outcomes that may impede long-term exercise engagement. The present study utilized tenets of the CHBM to (i) examine the acute guilt and shame after self-weighing in predicting compensatory intentions and behaviors to exercise, and (ii) to assess if the emotional effects of self-weighing on compensatory exercise outcomes vary as a function of perceived competence to manage weight. Women seeking weight management (N=52, Mage=57.4?8.9; MBMI=35.3?6.2 kg/m2) completed a 7-day protocol of self-weighing and reported weight-related emotions, and exercise intentions and behaviours. Multilevel models revealed that when women felt more shame related to their weight than usual, they experienced more intentions to exercise (ß=0.53, p<.01), yet less exercise behavior (ß=-0.45, p<.05). Further, the relationship between each emotion and exercise behavior was observed only for women with low perceived competence for weight management. Specifically, experiencing higher shame than usual is associated with less exercise engagement, while higher guilt than usual is associated with more exercise engagement. In partial support of the CHBM, shame appears to have negative consequences for goal-directed exercise engagement while guilt appears to motivate reparative action. Reducing the negative emotional experiences associated with self-weighing may be necessary to promote adaptive exercise engagement among women managing their weight.

Self-Compassion and the Self-Regulation of Exercise: Reactions to Failures

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Most Canadians are not active enough to achieve the health benefits available through regular exercise. Low exercise adherence may be due to the self-regulatory effort required to maintain this behaviour. Self-compassion, treating oneself kindly in the face of failures, is recognized for its adaptive influence on self-regulation of health behaviours, including exercise. However, no research has examined self-compassion and its influence on individuals' response to exercise failures. This online, cross-sectional study's purpose was to investigate the role of self-compassion in the adaptive self-regulation of exercise goals in the context of a recalled exercise failure. Participants were 105 adults aged 18-64 years (M=42.94, SD = 17.18), who could recall a past exercise failure within the last six months. Participants completed online measures of self-compassion, self-esteem, demographics and then provided a detailed description of a past exercise failure. After, they completed questionnaires to assess adaptive self-regulation in this context. Semi-partial correlations revealed that after controlling for self-esteem, self-compassion was negatively related to external motivation ($r = -0.207$, $p < 0.05$), and state rumination ($r = -0.391$, $p < 0.005$) after an exercise failure. Hierarchical multiple regressions revealed that after controlling for age and self-esteem, self-compassion predicted unique variance in exercise goal re-engagement (r2 change = 0.07, F square change (1,101) = 7.6, $p < 0.05$) and negative affect (r2 change = 0.04, F square change (1,101) = 7.75, $p < 0.05$) after an exercise failure/set-back. Findings suggest that self-compassion may assist with the adaptive self-regulation of exercise after an exercise failure.

Exercise Psychology – *Physical Activity Strategies and Interventions*

From Intervention to Evaluation: Assessing the Feasibility of an Exercise Program for Individuals with Severe and Persistent Mental Illness

Garcia Ashdown-Franks, Catherine Sabiston
University of Toronto

Mental illness in Canada carries a yearly economic burden of $51 billion. It is important to identify factors that can mitigate this burden by improving the health and well-being of individuals with severe and persistent mental illness (SPMI). Exercise may be one such factor. The purpose of this study was to examine the feasibility and effectiveness of a six-week tailored one-on-one exercise program for a local community mental health organization. Participants completed pre and post-intervention questionnaires to assess changes in mental health. Physical activity was assessed using both self-report and objective (accelerometers) measures. All quantitative measures are used for evaluation of the feasibility of the program. Interviews with the participants, key organizational stakeholders, and the trainers were also conducted. Overall, study retention and compliance with the study protocol was excellent. Participants (N=5) reported increases in physical activity levels and also improvements in additional lifestyle behaviours such as diet and substance use. Positive changes to mood were noted and perceptions of confidence increased. Participants reported desires for leadership roles in starting physical activity programs in their community homes and as ambassadors for health for people with SPMI. Interviews with the key organizational stakeholder and trainers provide support for the feasibility of the exercise program. As mental illness continues to strain the healthcare system, it is imperative that treatments other than pharmacology and psychotherapy are explored. Exercise may offer positive effects on the health of individuals with mental illness and ultimately reduce the burden of mental illness.

Cognitive Reframing: Implementing a Novel Strategy to Challenge Exercise-Related Cognitive Errors

Sean R. Locke[1], Lawrence R. Brawley[2], Mary E. Jung[1]
[1]University of British Columbia
[2]University of Saskatchewan

Exercise-related cognitive errors (ECEs) represent a biased view of information that distorts individuals' view of exercise. Individuals with greater ECEs express more struggle in deciding to exercise, lower confidence to manage exercise, and have lower and more erratic exercise engagement. Cognitive reframing is an evidence-based counselling strategy whereby individuals are taught to identify, challenge, and reframe their unhelpful and negative thoughts. The present study assessed the influence of a cognitive reframing strategy tailored for exercise in modifying negative exercise thoughts of individuals making ECEs. Adults struggling to regularly exercise (N=12) received a 20-minute cognitive reframing session. Pre- and post-reframing cognitions were assessed (i.e., ECEs, decisional struggle, self-regulatory efficacy to manage ECEs [SRE], exercise intention). Overall, participants reduced their ECE level (Mean change=.57, Cohen's d=.27) and decisional struggle (Mean change=2.94, Cohen's d=2.1), and increased their intentions (Mean change=1.43, Cohen's d=.47) and SRE (Mean change=22.6, Cohen's d=.74). The reframing process will be illustrated via a participant case. "Pam" initially viewed exercise

through the Catastrophizing ECE, believing she was always being judged when she exercised. She used reframing to change that thought to, “very few people might actually try to judge me”. She was also overwhelmed by the thought that the only way to fitness was through intense exercise; an All-or-Nothing ECE. She reframed this view to, “maybe I can be successful by starting slow”. Cognitive reframing may hold potential as a cognitive strategy to help individuals who view exercise through the biased thinking of ECEs.

Glucofit: A Pilot Study Evaluating a Brief Action Planning Intervention in Individuals with Type-2 Diabetes Following a Community-based Physical Activity Program

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There is a need to support physical activity (PA) participation among people with type 2 diabetes mellitus (DM). The Health Action Process Approach (HAPA) provides a framework for interventions; post-intentional factors which can translate intentions into behaviour are considered. Consistent with HAPA, action planning is one strategy that improves self-efficacy (SE) and hence which may support PA among people with DM. This pilot study evaluates the effects of a brief action planning (BAP) intervention among people with DM diabetes attending a community PA program. Adults with DM (n=22) recruited through a community PA program completed baseline measures of the HAPA constructs and self-reported PA. Participants engaged in supervised PA twice per week for 3 months. They received four weeks of BAP via telephone delivered by a BAP counselor once per week. Questionnaires were re-administered following the BAP. Ten (45.5%) participants completed the BAP calls. Paired t-tests revealed significant improvements in maintenance SE (p=.05) and task SE (p=.04) following BAP; there were trends toward improvements in planning SE (p=.15) and action control (p=.19). Overall PA was maintained post-BAP (p=.92), with a trend towards increases in low-intensity PA (p=.61). Findings from this pilot study suggest that BAP may be useful to improve maintenance SE for PA and maintain PA among people with DM following a community PA program. Further research with a larger sample is warranted to further understand the impact of BAP in supporting PA among people with DM.

Give me a Break! Countering Workplace Sedentary Behaviour with Standing Break Strategies

Madelaine Gierc[1], Larry Brawley[2]
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In recent years, both empirical trials and the popular media have advocated for the use of standing breaks – short, purposeful bouts of activity – to mitigate the deleterious effects of sedentary behaviour (SB). While strategies like “stand when talking on the phone” are intuitively appealing, research has yet to examine whether individuals perceive such strategies as being realistic and desirable. The current study examined perceptions of standing breaks in office workers. Participants (N=344) from multiple workplaces completed a prospective questionnaire which assessed standing break engagement, reactions to eight specific standing break strategies, and Theory of Planned Behaviour (TPB) constructs. Overall, the eight standing break strategies

were rated as being moderately realistic (M=4.9/7, SD=2.23), though MANOVAR indicated significant between-strategy variation (Wilk's ?=0.628, p<0.001). "Stretching after a task" was rated as being most realistic, whereas "standing meetings" as being least realistic. TPB constructs accounted for 58.8% of the variance in ratings of strategy realisticness, and 19.7% of variance in willingness to try a strategy, ps<0.05. Time-1 perceptions of realisticness/willingness were weakly associated with Time-2 standing break behaviour, and moderately associated with participants' reported enjoyment of a strategy. While standing breaks were generally well received by office workers, there exists substantial between-strategy variability. Moreover, simply supporting a given standing break strategy is not sufficient to prompt engagement. Further research on the psychosocial factors that shape standing break behaviour is needed, such as why some break strategies are better received, and whether such factors predict strategy use.

Spousal Attempts to Support Activity through Pressure and Persuasion Associated with Declines in Physical Activity in a Walking Intervention with Older Adult Couples

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We pilot tested a walking intervention designed to leverage available social support among older adult couples to promote increased physical activity. Based on self-determination theory, the purpose of this study was to examine whether greater autonomy support and less persuasion and pressure from one's spouse promoted greater increases in physical activity in an 8-week collaborative versus individual goal-setting intervention. 32 couples age 50 and older were randomized together into a concurrent individual (each person set and evaluated their own goals) or a collaborative (couples set and evaluated cumulative goals together) goal-setting condition. Physical activity was measured using accelerometers. Autonomy support, persuasion, and pressure from one's partner were assessed via questionnaire. While this pilot study was not powered to detect interactions, the condition by persuasion interaction ($p = .11$) and the condition by pressure interaction ($p = .08$) displayed meaningful trends. Persuasion and pressure were not associated with change in MVPA in the individual condition, but more use of persuasion and pressure by one's spouse was associated with declines in MVPA in the collaborative condition. There was no meaningful interaction between autonomy support and condition ($p = .75$). Larger studies are needed to determine whether these effects are significant and robust. But results suggest that future research examining physical activity interventions that involve social support among couples should consider the quality of supportive interactions, and address minimizing pressure and persuasive tactics.

Effects of Mental Fatigue on Exercise Intentions and Behaviour

Denver M. Y. Brown, Steven R. Bray
McMaster University

Exerting cognitive control results in mental fatigue, which is associated with impaired performance and increased perceived exertion during physical endurance tasks. However, there has been little research on the effects of mental fatigue on people's performance or perceptions

about engaging in lifestyle exercise. The purpose of this study was to examine the effect of mental fatigue on intended physical exertion and exercise performance reflective of current physical activity guidelines. Using a randomized, counterbalanced design, participants completed two 50-minute experimental manipulations (high vs. low cognitive control exertion) before exercising. At Visit 1, participants performed a graded exercise task to familiarize them with a range of exercise intensities and their corresponding ratings of perceived exertion (RPE). At Visits 2 and 3, participants reported their intended RPE for 30-minutes of self-paced, cycling exercise, performed the experimental manipulations, re-rated their intended RPE, and then completed 30-minutes of exercise. Total work and average heart rate (HR) were recorded during each exercise session. High cognitive control exertion resulted in significantly greater mental fatigue (d = .73) and significant reductions in intended RPE (Mean difference = -0.62). Participants also performed less total work (-12.7 kJ) at lower average HR during exercise (-7.5 bpm) in the high cognitive control condition. Results suggest mental fatigue alters the amount of physical effort people are willing to invest in an exercise workout and follow through with those intentions by doing less work. These are the first results showing people may deliberately adjust their physical effort to cope with mental fatigue.

Sport Psychology – *Sport in Indigenous and Vulnerable Communities*

A Physical Literacy Strategy for Urban Indigenous Families through the Life Cycle

Jessica Fraser-Thomas[1], Pat Green[2], Landy Anderson[3], Michael Auksi[3], Catherine Belshaw[3], Ryan Besito[3], Tayyaba Khan[4], Keith McCrady[3], Michelle Silver[4], Lauren Wolman[1]
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Extensive historical, cultural, and social factors have contributed to poor health outcomes among Indigenous People in Canada (Adelson, 2005). In 2015, the Truth and Reconciliation Commission (TRC) “call[ed] upon the federal government to support reconciliation by ensuring policies to promote physical activity as a fundamental element of health and well-being” (p.10). Our community-based research project aimed to develop a Physical Literacy Strategy for Urban Indigenous Families Through the Life Cycle; this two-year project involved reciprocal collaboration between researchers and community members, with the aim of social change (DeLemos, 2006). Our conceptualization of physical literacy (Whitehead, 2016) was grounded in a holistic understanding of Indigenous People’s health and wellness, including the physical, mental, emotional, and spiritual dimensions represented by the Medicine Wheel (Waldram, et al., 2006). The project included: (a) a community needs assessment conducted through six sharing circles (Lavallée, 2009) with 90 community members across the life course; these explored individuals’ experiences related to health, wellness and physical activity, and perceptions of cultural connectedness; (b) a three-month physical literacy intervention program exposing participants to a range of health and wellness activities within the immediate and broader community; and (c) post-program discussions involving sharing and reflection. Five key recommendations emerged, offering an important starting point for change within this urban Indigenous community. We discuss the project in the context of previous research, the TRC’s

(2015) calls to action, and implications for a spectrum of stakeholders including government, educators, community organizations and partners.

Relevance of an Existing Knowledge-To-Action Model to Research Involving Indigenous Youth

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Graham et al. (2006) observed practice often lags behind research in health professions. In response, they produced a knowledge-to-action (KTA) model guiding knowledge translation. The model is general, allowing for application in a number of fields. In Canada, a major concern and avenue for research is reconciliation with Indigenous peoples. The Truth and Reconciliation Commission published a number of calls to action directing reconciliation. Five calls relate to Indigenous peoples' sport participation. Although sport participation may produce numerous positive outcomes, such as positive youth development, cultural irrelevance of sport programs may hinder prolonged engagement. Through talking circles held in three urban settings across western Canada, we engaged Indigenous youth in discussions examining their experiences with cultural (ir)relevance in sport and physical activity, including suggestions for improvements. Community nights were held at two of the locations to disseminate results to wider audiences. The purpose of this analysis was to relate the research process followed to Graham et al.'s KTA model as a means of identifying model components that may be improved upon for similar, future work. We conclude the iterative process of the KTA model may not be conducive to Indigenous youth stakeholders' prolonged participation in research, as the commitments and life circumstances of members of this demographic often change rapidly. We suggest addressing this concern with youth early into the process and, with their cooperation, identifying ways to deal with participation hindrances pre-emptively. Early identification of, and strategies to overcome barriers to participation may result in greater research partner retention.

Enhancing the Sport Experiences of Indigenous Youth through Participation in Traditional Games

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[1]University of Alberta

A well-documented need exists for sport policies, programs, and initiatives that are inclusive of Indigenous peoples in Canada. Though little published research has focused on traditional sporting activities (i.e., traditional games), they may play a particularly unique role in supporting positive sport experiences among Indigenous youth. The purpose of this community-based participatory research was to better understand how participation in traditional games can enhance the sport experiences of Indigenous youth. The integrated Indigenous-ecological model, as described by Lavallée and Lévesque (2013), is a contextually and culturally relevant model that provided a theoretical framework for this research. Eighteen Indigenous youth (Y = 8; ages 14-18 years) and adults (A = 10) living in various communities in the Northwest Territories, Canada participated in this research. Data was generated via one-on-one interviews or talking

circles, and was analyzed using the three-step process of content analysis as described by Elo and Kyngäs (2008). The words of participants suggest that participating in traditional games can enhance the sport experiences of Indigenous youth by: (1) promoting cultural pride, (2) interacting with Elders, (3) supporting connection to the land, (4) developing personal characteristics, and (5) developing a foundation for movement. Findings from this research contribute to a necessary knowledge base that can serve as a foundation for beginning to address Sport Canada's stated goals to enhance the participation of Indigenous peoples in sport.

Rethinking Positive Youth Development and Barriers to Physical Activity Programs for Urban Indigenous Youth

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Despite the evidence that structured physical activity is critical for development related programming, issues clearly remain in designing and implementing culturally appropriate programs that meet the needs of marginalized youth and communities. There is a particular desire for programs that are developed outside of Euro-centric conceptions of health, embodiment and sport. Research in sport psychology has indicated that more studies are required to understand youth participation in sport and physical activity from diverse cultural perspectives (Blodgett et al., 2008; Schinke & Hanrahan, 2009). Indigenous community members and leaders alike have acknowledged the value of sport for Indigenous children and youth, but they also highlight key barriers for youth to access related programs. Our current study uses a community-based participatory framework (Fletcher, 2003) to engage 43 Indigenous youth (aged 12-19) from three Canadian urban centres (Kamloops, BC; Edmonton, AB; Winnipeg, MN). Sharing circles were used to explore Indigenous perspectives on the barriers that they encounter to access physical activity programs. The youth identified key socio-economic, institutional and cultural barriers that were central to limiting their access. Diverse experiences were noted between different First Nation groups as well as between those Indigenous youth that lived in urban reserves and those that did not. The results not only reveal how Indigenous youth face distinct barriers to access activity programs in urban environments, but also demonstrate that these programs, when designed in culturally appropriate manners, can empower Indigenous youth and become a significant positive influence on their growth and development.

Crime Prevention or Positive Youth Development? An Evaluation of the Nunavik Youth Hockey Development Program

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The Nunavik Youth Hockey Development Program (NYHDP) targets Inuit youth in all 14 communities of Nunavik and is funded under a crime prevention strategy by the local government (Bean & Haman, 2015). The program consists of two components: a recreation-based and a competitive program. Recently, the local government decided to cancel the competitive program based in part on an independent evaluation that concluded the program did not achieve its intended goal of crime prevention. In response to this decision, at the request of

program's founder (Joe Juneau, NHL), two members of the study team spent a week conducting a case study of the final select Bantam/Midget Girls Team at a training camp in Inukjuak to examine the perceived impact of the NYHDP. Over 8 days we conducted 10 individual and 2 focus group interviews with program leaders, coaches, teachers, players, parents of players, community leaders, and social support workers. Additionally, we participated in and observed hockey practices and classroom sessions. The athletes attending this camp faced many challenges in their daily life, including suicide, emotional/physical abuse, and substance use. The program was perceived positively and offered participants an opportunity to escape the challenges of their everyday lives. However, the program outcomes did not appear to be directly related to crime reduction per se. Additionally, while there was a link between the NYHDP program and education, this link was tenuous and could be strengthened. The NYHDP may be better characterized as a youth development intervention rather than a crime prevention program.

"I Started Noticing This Bigger Gap": How Feelings of Difference Impact Sport Competence among Young People Living in Neighbourhood Improvement Areas

Lauren Wolman, Jessica Fraser-Thomas, Yuka Nakamura
York University

Sport involvement is suggested to offer a context for health and wellness, civic engagement, economic development and prosperity, and other physical, psychological, and social benefits (Canadian Sport Policy, 2012; Fraser-Thomas et al., 2005); however, sport can also be a site for differentiating, marginalizing and excluding individuals and groups (Spaaij et al., 2014). This study explored the lived experience of sport participation among 16 youth and young adults living in Neighborhood Improvement Areas within Toronto. Recognizing that culture is fundamental to an individual's experiences, behaviours, and identity, we utilized a "cultural praxis" framework, which combines blended theory, lived culture, and social action (Blodgett et al., 2015). Specifically, we adopted a narrative inquiry approach guided by the principles of community-based research (e.g., Conrad & Campbell, 2005). Findings indicate that feelings of difference (e.g., body, skills, opportunities) influenced perceptions of sport competence, which in turn affected sport participation outcomes (e.g., drop-out, poor performance, and resilience). Participants often expressed feelings of difference in the context of geography, ethnicity and gender. Findings are discussed through the lens of Harter's (1978, 1982) Competence Motivation Theory and Cultural Studies Framework (Fisher et al., 2003). This research suggests that broader contextual issues need to be considered when exploring sport competence and motivation for sport participation. Specifically, findings highlight the importance of acknowledging feelings of difference in sport contexts, creating more welcoming sport environments for all youth and young adults, increasing access and opportunities, and enhancing perceptions of competence.

Free Communications & Symposium -1:30-3:00pm

Motor Control – *Multisensory Integration & Adaptation*

Long-Term Retention of Proprioceptive Recalibration

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Proprioception is recalibrated following reaches with misaligned visual feedback of the hand, such that one's sense of felt hand position is shifted in the direction of the visual feedback provided (Cressman and Henriques 2009). In this study we examined the ability of proprioceptive recalibration to be retained over an extended period of time (i.e. 4 days), and the benefits of additional training on retention in the form of recall and savings (i.e. faster re-learning on subsequent testing days). 24 participants trained to reach to a target while seeing a cursor that was rotated 30° clockwise relative to their hand on an initial day of testing. Half of the participants then completed additional reach training trials on 4 subsequent testing days (Training group), whereas the second half of participants did not complete additional training (Non-Training group). Participants provided estimates of their felt hand position on all 5 testing days to establish retention of proprioceptive recalibration. Results revealed that proprioceptive recalibration was recalled 24 hours after initial training and that there was no benefit of additional training. Retention in the form of savings was observed on all days for the Training group and on Day 5 in the Non-Training group. These results reveal that proprioceptive recalibration does not benefit from additional training but is retained in the form of recall and savings. Moreover, the different time scales (i.e. 1 day for recall versus 4 days for savings), suggest that distinct processes may underlie recall and savings of proprioceptive recalibration.

Modulation of Tactile Suppression during Goal-Directed Movement

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When we move our ability to detect tactile events on the moving limb is reduced. This process, known as movement-related tactile suppression, prevents unimportant sensory information from bombarding our central nervous system. This study explored whether movement-related suppression can be modulated according to task-relevance. In three experiments participants performed volitional self-driven (Experiment 1-3) and motor-driven (Experiment 1-2) reaching and grasping movements. Over the course of the movement, weak electrical stimulation was presented at task-relevant (i.e., index finger and thumb) and irrelevant sites (i.e., forearm) on the moving limb. In Experiment 1, participants displayed reduced detectability during movement (90% resting detection). This was true for all locations on the moving limb irrespective of task-relevance and during both self and motor-driven movements. In Experiments 2 and 3 a range of stimulus amplitudes were presented to one task relevant location during both self and motor-driven movements (Experiment 2) and to a task relevant and irrelevant site during self-driven movements (Experiment 3). This change in methodology allowed us to get a direct estimate of perceptual thresholds and asses the magnitude of movement-related tactile suppression. During

both self and motor-driven movement, participants exhibited an increased perceptual threshold at the index finger (Experiment 2). The magnitude of suppression however, was greater at the irrelevant site (forearm) than at the relevant site (index finger; Experiment 3). Collectively these experiments suggest that although tactile suppression may be a general consequence of movement, this suppression can be modulated in a relevance-dependent manner.

Bimanual Transfer of Explicit and Implicit Contributions to Visuomotor Adaptation

Jean-Michel Bouchard, Erin K. Cressman
School of Human Kinetics, University of Ottawa

Prior research has demonstrated that visuomotor adaptation in one limb, in response to reaching with altered visual feedback of the hand, can be transferred to the untrained limb, specifically when participants are aware of the manipulation (Wang, Joshi, & Lei, 2011). The current study asked if explicit and implicit processes engaged during visuomotor adaptation are transferred from the trained to untrained limb and if these processes are retained. Twelve right-handed participants performed a reach training task to three visual targets while seeing a cursor rotated 40° clockwise relative to their hands on a screen. Participants were instructed on how to counteract the perturbation using a strategy. Following the rotated reach training trials, participants were required to complete two types of no-cursor trials with their trained (left) and untrained (right) hands. Specifically, participants were instructed to aim to the target as accurately as possible (to assess implicit contributions) and to use any strategy they had gained during learning (to assess explicit contributions). Results revealed that explicit and implicit components of visuomotor adaptation transferred to the untrained limb following reach training. While retention of explicit contributions to adaptation was seen in both hands 24 hours after initial training, implicit contributions were not retained in either limb. Together, these results reveal that both implicit and explicit contributions to adaptation can be transferred between limbs and that when participants are provided with a strategy, explicit contributions tend to dominate over time.

Trajectory Deviations Towards, and Away from Predicted Locations Based on Symbolic Cues in Reaching Tasks

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Dalhousie University

Rapidly integrating information in our environment for response planning is critical for accurate actions. Predictive cues and attention orienting help us to predict and plan an action relative to what may come next. It is unclear how cues with no spatial information to orient the actor to the upcoming action affect action planning. The purpose of the current study was to determine whether participants subconsciously pre-plan an action following non-spatial, symbolic, predictive cues. High and low predictive cues preceded target appearance. It was hypothesized that as participants subconsciously became aware of the predictability of the cues, that when the target appeared on the non-predicted side, the trajectory of their movements would reflect a pre-planned response associated with that cue; i.e., deviate towards the predictive side before correcting their movement to bring their hand towards the target. No such deviation was expected for the low predictive cue. Results contradicted the hypothesis, demonstrating that participants actually deviated away from the predicted side following the predictive cue. These

results indicate that learned, non-spatial symbolic cues may produce inhibition of return type behaviour.

The Influence of Awareness on Explicit and Implicit Contributions to Visuomotor Adaptation

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Explicit (strategic) and implicit (unconscious) processes play a role in visuomotor adaptation (Bond & Taylor 2015; Werner et al. 2015). We investigated the contributions of explicit and implicit processes to visuomotor adaptation when awareness was manipulated directly versus indirectly, and ask how these contributions change over time. Participants were assigned to a Strategy or No-Strategy group. Those in the Strategy group were made aware of the visuomotor distortion directly. Participants were further subdivided into groups to train with a large (60°), medium (40°) or small (20°) visuomotor distortion, providing the potential for awareness to develop indirectly. Participants reached with their respective distorted cursor, followed by a series of no-cursor reaches to assess the contributions of explicit and implicit processes to visuomotor adaptation after every 30 reach training trials. Within the no-cursor reaching trials, participants reached (i) with any strategies they had gained during training (explicit + implicit processes), and (ii) as accurately to the target as possible (implicit processes). Results showed that implicit contributions to visuomotor adaptation were greatest in the No-Strategy group and took time to develop. Explicit processes were greatest in the Strategy group, increased with rotation size in the No-Strategy group, and remained consistent over time. Taken together, results reveal that there are notable differences in explicit and implicit contributions to visuomotor distortions depending on if, and how participants become aware of the perturbation. Moreover, the results highlight the importance of instructions when evaluating reaching performance in no-cursor trials, as they can modulate reaching errors.

The Impact of Response Complexity and Cue Modality When Performing a Choice Eye-Hand Coordination Task

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Actions aid our ability to communicate. Actions that support communication range in complexity and the motor plan may incorporate information from multiple sensory stimuli. The present study sought to understand how individuals plan and execute movements related to communication. Potential targets were presented on a touchscreen monitor and occupied 2 degrees of visual angle. An auditory (animal sound) or visual (animal picture) cue was presented along with the two pictures of animals located 16.5 degrees of visual angle to the left and right of the central fixation point. Participants (n=24, Meanage=25.1±4.42 years) sat with their forehead resting in an EyeLink1000plus eye-tracker configured in tower arm mount (SR Research Ltd., Ottawa, ON; 500Hz collection frequency). Participants were asked to look, press a key, or point, to the correct image on the touchscreen monitor (CNE, Gainsville, FL) as quickly and accurately as possible. Saccade and hand reaction times (RT) were analyzed. In all conditions, the visual stimulus produced a shorter RT than the auditory stimulus, which is consistent with vision being

the preferred modality for a target localization task. Saccade RT was longest and most variable in the eyes-only condition, suggesting eye movements alone were more challenging and novel. Hand RT was longer and more variable for the key-press condition, which is thought to indicate better integration of peripheral vision during pointing movements. Compared to previous studies, participants were better able to prepare a motor plan for a more complex eye-hand coordinated task because the target was located in peripheral vision.

Sport Psychology – *The Social Content of Sport & Sport Teams*

Examining Social Support among Olympic Athletes and their Main Support Providers

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Olympic athletes face an array of stressors associated with sport (Fletcher & Sarkar, 2012), and social support can be valuable in helping athletes deal with stressors (Gould & Maynard, 2009). However, much of this research has focused on athletes and has not explored the impact that providing support has on support providers. Thus, the purpose of this study was to explore the experience of providing and receiving support between female Olympians and their respective main support providers at the Olympic Games. Five female Olympians and each of their main support providers participated in a semi-structured interview. Data were thematically analyzed (Braun & Clarke, 2006). Participants described the process of support provision (e.g., mode and frequency of contact, emotion regulation), positive and negative outcomes of support provision (including the development of dependence between athletes and supporters), and the impact of organizational structures on the provision and receipt of support. It appeared that the substantial amount of time spent together and the frequent use of technology to provide support fostered the development of athlete dependence on their supporters, with some supporters adopting a parental role with their athletes. Support providers experienced difficulties maintaining other social relationships due to their commitment to supporting their athlete, which led some support providers to perceive a lack of support available for themselves. The results also suggested that the distribution of monetary and non-monetary resources by sport organizations can have a large impact on the provision and receipt of social support.

The Role of Team Comedians within Interdependent Sport Teams

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Informal roles in sport teams (i.e., roles that develop naturally within the team without formal prescription) have the potential to influence team functioning (Cope et al., 2011). One such role is the team comedian—an athlete who consistently uses humour in their team environment (Cope et al., 2011). Despite the various interpersonal functions of humour (e.g., enhancing relationships, maintaining social dominance; Martin et al., 2003), there is a dearth of literature that examines team comedians and their use of humour within sport teams. Previous research efforts have been generally limited to quantitatively examining the humour styles of coaches (Grisaffe et al., 2003) or athletes (Sullivan, 2013) and associated outcomes. The purpose of the

current study was to examine the nature of team comedians on sport teams in depth, focusing on the antecedents of occupancy of this role, specific behaviours, and associated outcomes. Semi-structured interviews were conducted with 17 athletes (4 focus groups) and 9 coaches (1 focus group and 4 individual interviews) from 4 interdependent sport teams. Deductive and inductive thematic analysis of the interview data suggested that the interaction of athletes' personality (e.g., extraversion) and situational factors (e.g., practice vs. in-game) may allow athletes to emerge as team comedians, and that these individuals typically used verbal and physical types of humour. Both positive (e.g., relieving tension within team) and negative (e.g., diverting teammates' attention) outcomes were noted. The current study offers valuable insights pertaining to informal role transmission processes, and emphasizes the dynamic nature of humour within sport settings.

Role Conflict Negatively Predicts Role Perceptions and Cohesion in Interdependent University Sport Teams

Brennan Petersen, Mark Eys
Department of Kinesiology and Physical Education, Wilfrid Laurier University

Roles, important structural components in groups, delineate group members' jobs and responsibilities. Through this division of labour, group members must function interdependently to achieve shared group outcomes. A critical perception that individuals hold regarding their role is the degree to which incongruent expectations are present (i.e., role conflict). This perception is divided into several dimensions: intra-sender conflict, inter-sender conflict, person-role conflict, and inter-role conflict. Previous research has demonstrated that role conflict can negatively affect individual- and group-level variables (e.g., other role perceptions, task cohesion). However, two limitations pervade this research. First, role conflict is generally assessed unidimensionally. Second, the dimensions of role conflict focus on one individual's role and do not reflect additional interpersonal factors. Therefore, the purpose of this study was to determine the multidimensional effects of role conflict on role clarity, role efficacy, and task cohesion. Furthermore, an interpersonal aspect of role conflict (i.e., inter-individual role conflict) was proposed and explored. Participants (N = 107, Mage = 21.37) completed questionnaires at two time points, approximately three weeks apart. Multiple regressions determined which role conflict dimensions were predictive of the outcome variables. Results demonstrated person-role conflict (? = -.47 to -.22) and inter-sender conflict (? = .30) negatively predicted role clarity. Additionally, inter-individual role conflict was shown to negatively predict role clarity (? = -.30), role efficacy (? = -.25), and task cohesion (? = -.21). These results partially support a priori hypotheses and the notion that role conflict is a negative aspect of group dynamics in sport.

A Social Network Perspective on Teammate Interactions as Cue to Cohesion

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Early group dynamics theorizing suggested that member interactions form a structured network that can serve as cue for cohesiveness (Shaw, 1964). In terms of structure, research has found that the overall exchange of knowledge and information may serve as one of these cues to perceptions of cohesiveness, with greater exchange associated with greater task cohesiveness (McLaren & Spink, under review). Further, it has been speculated that a network that is less

centralized and more dense (characterized by a greater proportion of connections between group members) would be associated with greater perceptions of cohesiveness (Shaw, 1964). Using social network analysis, these relationships between networks and cohesion were examined in two studies. Participants from intact teams (N = 205) in Study 1 identified team members with whom they regularly exchanged information (ego network) and reported perceived task cohesion. A discriminant function analysis was used to differentiate between the two groups (those who interacted with a greater proportion of teammates versus those who interacted with fewer) in terms of cohesion. Results revealed a significant difference, Wilks' Lambda = .87, $p < .001$. As predicted, those interacting with more teammates reported greater task cohesion than those interacting with less. Using an experimental vignette design, participants (N = 127) in Study 2 read one of two network team descriptions that varied in centrality and density. As expected, those who read about the team described with lower centrality/higher density reported higher task cohesion than those who read the higher centrality/lower density team description ($p < .001$).

Teammate Social Behaviors, Burnout, and Engagement in Adolescent Athletes

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The social context of youth sport can shape motivational experiences such as athlete burnout and engagement (Coakley, 1992; Udry, Gould, Bridges, & Tuffey, 1997). Social support is commonly linked to these experiences, yet sport involves a broader set of social behaviors that requires examination (DeFreese & Smith, 2014). Therefore, the purpose of this study was to explore several teammate-based social behaviors as predictors of burnout and engagement in adolescent athletes. Participants (N = 92; M age = 16.4 years, SD = 1.3) completed established measures of teammate-based social behaviors, loneliness, burnout, and engagement. Social support and loneliness predicted burnout perceptions of reduced accomplishment (? = -.15, .21) and sport devaluation (? = -.24, .21), whereas co-rumination predicted emotional and physical exhaustion (? = .23). Explained burnout variance ranged from 5% to 15%. Social support and loneliness predicted engagement perceptions of confidence (? = .23, -.33), dedication (? = .26, -.21), and enthusiasm (? = .35, -.22), whereas only social support predicted vigor (? = .27). Explained engagement variance ranged from 11% to 18%. Results highlight that social support, a positive social behavior, as well as loneliness, a negative social perception, are important correlates of adolescent athletes' motivational experiences. Results also suggest that the exhaustion dimension of burnout may have social correlates that are distinct from other burnout perceptions, with co-rumination warranting close attention in future research. Further examination of teammate social behaviors and athlete social perceptions holds potential to extend understanding of young athletes' motivational experiences.

Longitudinal Examination of Interpersonal Emotion Regulation, Social Support, and Team Performance among Varsity Athletes

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[5]McGill University
[6]The University of British Columbia

Interpersonal emotion regulation (IER) refers to social interactions that are intended to improve or worsen the emotions of others (Niven et al., 2011), and IER may function as a mechanism of social support (Marroquin, 2011). Athletes' IER has been associated with emotional and motivational outcomes in sport (Tamminen et al., 2016); however, there is no research to date examining how IER and perceptions of social support or cohesion are associated with performance. The purpose of this research was to examine these associations among a sample of 110 varsity team sport athletes. Participants completed measures of perceived social support (Freeman et al., 2009), social cohesion (Eys et al., 2009), and athletes rated the extent to which they engaged in affect-improving or affect-worsening IER with teammates in the days prior to and following a competition. There were significant decreases in athletes' affect-worsening IER in the days leading up to competition, while affect-improving IER decreased significantly in the days following competition. Social support moderated pre-competition trajectories of receiving affect-worsening IER in predicting the outcome of the competition: for athletes who perceived more social support from teammates, receiving less affect-worsening IER before competition was predictive of the team winning their competition. Social cohesion did not moderate any of the associations between IER, time, and performance outcome. These results indicate that athletes' perceptions of social support as well as daily interpersonal emotion regulation interactions among teammates have implications for team performance.

Exercise Psychology – *Youth*

How Do You Like Me Now? Body Representation in Young Girls Exploring the Resonance Effects of the New Barbie Dolls

Amy Nesbitt, Mellissa deJonge, Timothy Welsh, Catherine Sabiston
University of Toronto

There are well-documented negative body image effects related to the unrealistic body shape of the "original" Barbie doll. Matel® has recently produced new Barbie dolls with "tall", "curvy", and "petite" body types, yet the impact of these new body types has not been studied on young girls' body images. The present research was conducted to investigate youth's internalization of the different Barbie representations, as well as participants' explicit preferences toward different Barbie body types. Participants (N=38, Mage=10, SD=2.24 years) completed a body-part compatibility task to evaluate how each individual implicitly related their body to different doll images, and an online questionnaire assessing explicit preferences for each body type. Based on

the results, there were significant ($p < .05$) body-part compatibility effects for the original, curvy and petite dolls, but not for the tall Barbie. The effects were not modulated by age or ethnicity. These findings indicate that participants' internal representations of their own body matched all doll images except the doll with the tall, thin body type. This pattern of compatibility effects was not consistent with the explicit measures (e.g., curvy Barbie was most likeable but reported as least desirable, whereas original and tall Barbie were both rated low on likeable, but high on desirable). Overall, these data indicate that the manner in which young girls implicitly resonate and identify with dolls with different body types is not consistent with their explicit preferences and these findings may have body image implications for the internalization of body ideals.

Application of the Behaviour Change Technique Taxonomy to Coaching Strategies Used in Inclusive Physical Activity Programming for Children and Youth

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Coaches play a vital role in shaping the experience of children and youth in the physical activity (PA) programs they deliver. This study focuses on an inclusive PA program, Igniting Fitness Possibilities (IFP), which embraces the emerging abilities and motivation levels of school-aged children and youth with diverse abilities. An integral component of IFP is individualized coaching where participants are provided with opportunities to learn, practice, and reflect on their PA development. The purpose of this study was to examine the use of behaviour change techniques (BCTs) during the coaching sessions. Methods: Coaching logs of 11 coaches in eight of the IFP pilot programs held across the Greater Toronto and Durham regions between Winter 2015 and Spring 2017 were coded by a trained research assistant. Data were extracted and coded across the entire sample of 42 children and youth using Michie et al.'s BCT Taxonomy (v1). Thirty-two of the 93 BCTs were coded across the eight IFP programs, with instruction on how to perform the behaviour, demonstration of the behaviour, and behavioural practice/rehearsal being the most frequently used BCTs by coaches. The number of BCTs per program ranged from eight to 19. Coaching strategies relating to 'providing choice' and 'modifying activities to participants' abilities' were often used, yet did not align with the BCT Taxonomy. Findings highlight key BCTs within the context of inclusive, community-based PA programs that are important to target for enhancing the PA experiences of children and youth with diverse abilities.

Evaluating the Effectiveness of Physical Activity Messages for Parents of Children with Disabilities

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Media messages can influence 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). Parents of CWD have a variety of specific and unique needs when supporting their children to engage in PA. The effects of general PA messages on the support behaviour of parents of CWD is unknown. Guided by the Adapted Social Issue Advertising Believability Model, this study examined the effect of messages on parents'

psychosocial cognitions regarding child PA and parent support behaviour. Parents of CWD (N=83) were randomized to view one of four PA messages; a) inclusive, b) non-inclusive, c) neutral, and d) Parasport. Psychosocial variables were assessed before, immediately post and two weeks post viewing. Preliminary repeated measures analyses identified significant ($p<.05$) main effects for time such that attitudes, perceived behavioural control, subjective norms, and planning for parent PA support increased from baseline to post-viewing. Parent support behaviour also increased from baseline to two-week follow-up. There were no time x condition interaction effects suggesting that message effects did not differ by condition. PA messages may be useful to enhance support behaviour among parents of CWD. Further research is necessary to understand the development of optimally effective PA messages targeting parents of CWD.

Physical Activity of Young People with Attention Deficit Hyperactivity Disorder and/or Autism Spectrum Disorders

Nicole J. Reinders[1], Paula C. Fletcher[1], Shannon L. Steward[2], Pamela J. Bryden[1]
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Young people with Attention-Deficit/Hyperactivity Disorder (ADHD) and/or Autism Spectrum Disorder (ASD) are less likely to engage in physical activity (PA) than typically developing individuals, which influences symptoms and wellbeing. The present study explored PA rates among individuals with ADHD and/or ASD via secondary data analysis of The Child and Youth Mental Health (ChYMH) assessment and the Child and Youth Mental Health Instrument for Developmental Disabilities (ChYMH-DD). This study utilized ChYMH/ChYMH-DD data collected between 2013 and 2016 from individuals aged 4 TO 18 years. Young people with provisional diagnoses of AHDH (n=931, Mage=11.68 years ± 3.49), ASD (n=163, Mage=12.24 years ± 3.38), or dual diagnosis (n=151, Mage=12.17 years ± 3.00) were included. The "total hours of exercise or PA" measure indicated that 63.7% (ADHD), 47.2% (ASD), and 47.7% (dual) of young people achieved less than 3 hours of PA over a three-day period. Spearman's rho found that increasing PA was negatively correlated with the following: age, cognitive skills, communication, distractibility/hyperactivity, and sensory difficulties. Conversely, PA was positively correlated with involvement in extracurricular activities, clubs/teams, and family recreation. PA was more common in males than females and in children than youth, which is reflective of typically developing individuals. This study found that over 50% of young people failed to reach 60 minutes of PA at any level per day. More research is needed to determine the intensity and type of PA, why increased symptom severity was associated with higher rates of PA, and causality of PA behaviours in those with ADHD and/or ASD.

Teachers' Attitudes towards Inclusion in Physical Education: An Eye-Tracking Study

Robert J. Ruscitti, Rebecca L. Bassett-Gunter
York University

Many teachers have negative attitudes towards inclusive physical education (PE), leading to the irregular inclusion of students with disabilities (SWD) in PE classes. Research regarding the effectiveness of inclusive teacher training resources on attitudes towards inclusive PE is valuable. Teachers' attention to, and cognitive processing of information may be related to resource effectiveness. Guided by the Elaboration Likelihood Model, this study examined: a) the

impact of an informational resource on teachers' attitudes regarding inclusive PE, and b) the association between attention, cognitive processing and attitude change. Teachers (N=50; 70% female) completed The Physical Educators' Attitudes Towards Teaching Individuals with Disabilities-III scale before and after exposure to an inclusive PE teacher training resource. Attention data were collected via eye tracking technology, and cognitive processing was measured using thought listing and message recall tasks. Teachers' attitudes improved from baseline to i) post-information ($t(49) = -3.160$, $p < .05$), and ii) two week follow-up ($t(41) = -2.043$, $p < .05$). Attention ($B=.157$, $p<.01$) was a significant predictor of teachers' attitude change ($R2=.630$, $F(4,42)=16.996$, $p<.01$). Information from an inclusive PE teaching resource was effective in promoting teachers' attitude change towards inclusive PE. In addition, attention held a significant role in predicting teachers' attitude change. These findings suggest that the refinement and development of additional inclusive PE teaching resources to increasingly engage teachers' attention may become a valuable approach for promoting attitude change in teachers. Strategies for engaging teachers' attention to inclusive PE teaching resources require further examination.

Effects of Different Doses and Types of Classroom-Based Physical Activity Breaks on Cognition

Jeffrey Graham[1], Emily Bremer[1], John Cairney[2]
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Emerging research supports the efficacy of classroom-based physical activity (PA) breaks on various aspects of cognition. Previous studies have manipulated the dose of PA (i.e., 5, 10, and 20min, Howie et al., 2015) and type of PA, ranging from more traditional forms of PA to cognitively engaging PA (Schmidt et al., 2016). Cognitively engaging PA requires a degree of mental effort and has been shown to be superior to traditional forms of PA for improving cognition. The purpose of this study was to investigate the effects of different doses and types of classroom-based PA on cognition in a single study. Participants ($N = 116$, $Mage = 12\pm0.98$) completed two batteries of cognitive tests (Stroop task, Trail Making Test, Forward Working Memory, and 1-minute Math test) separated by either a teacher-led PA break or regular classroom work (control participants). The PA break consisted of 5, 10, or 20 minutes of traditional classroom-based PA (e.g., jumping jacks, squats) or cognitively engaging PA (i.e., solved math problems alongside PA). Results showed that the PA conditions improved on all aspects of cognition when compared to controls ($ps > .05$). Importantly, improvements were mediated by higher self-efficacy and changes in positive affect and intrinsic motivation following the PA breaks. However, there were no differences in cognitive improvements between the PA conditions with regards to type or dose of PA. Findings have implications for classroom-based PA breaks and suggest that even 5 minutes of PA can increase aspects of cognition associated with learning and academic achievement.

SYMPOSIUM – 1:30-3:00 pm

Mind the Gap – Examining Coaching Approaches Oriented to *Adults in Sport*
Bettina Callary, Bradley Young, Scott Rathwell, Joe Baker

Mind the Gap – Examining Coaching Approaches Oriented to Adults in Sport

Presenters:
1st: Bettina Callary
2nd: Bradley Young
3rd: Scott Rathwell
4th: Joe Baker

SYMPOSIUM OVERVIEW
The International Sport Coaching Framework 1.2 (2013) notes that more meaningful, authentic and enriched athlete experiences arise when coaches employ strategies that are considerate of age-cohort nuances. Callary, Rathwell, and Young (2015, 2017) explored competitive Masters swim clubs to gain a better understanding of how coaches influence Masters Athletes' (MAs; adults) sport involvement and experiences. This symposium investigates how Callary et al.'s qualitative findings as well as frameworks borrowed from adult education translate to the quantitative measurement of coaches' approaches, internationally and across multiple sports. We are particularly interested in understanding the extent to which adult-oriented teaching principles are in play in a Masters coached context and how this aligns with MAs' interests and the outcomes they feel they get from coached sport settings. Outcomes from adult sport have been considered by Baker, Fraser-Thomas, Dionigi and Horton (2010) in another program of research informed by developmental psychology. Thus, in describing the prevalence of various adult-tailored instructional approaches, the prevalence of specific adult-accommodating coaching principles, we also consider how such practices potentially link to MAs' perceived outcomes in sport.

Creating and Vetting Survey Items for Coaches of Masters Athletes from Qualitative Exploratory Studies

Bettina Callary[1], Bradley W Young[2], Scott Rathwell[3]
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[2]University of Ottawa
[3]University of Lethbridge

Callary, Rathwell, and Young (2015, 2017) interviewed Masters Athletes (MAs) and coaches in an open-ended and non-theoretical manner, and conducted interpretative phenomenological and thematic analyses that developed themes in line with adult learning principles. The purpose of this presentation is to outline the development of a measurement tool asking coaches to self-report how frequently they use approaches that are commensurate with adult teaching principles that a small sample of Masters swimmers have indicated they want and need from their coaches (Callary et al., 2015), and that a small sample of coaches of Masters swimmers have perceived that they variably deliver (Callary et al., 2017). We also present findings of the vetting procedure in the validation of the instrument. The three researchers suggested and collaboratively vetted 67 items across 12 themes built from their qualitative findings, flagging and subsequently cutting 17 items. The items were emailed to 12 known expert coaches of MAs to ask them to consider, on a scale of one to four, how much they agree that each item, as written, makes sense and is not awkward, and pertains to coaching MAs. Two items were flagged based on coaches' responses, but after our discussions, remained in the pool to ensure a minimum of three items per theme. The findings suggest initial content validity for survey items that will provide a descriptive profile for the use of andragogic learning principles by sport coaches working with MAs.

Exploratory Factor Analyses and Initial Inspection of Coaches' Responses to a Survey of Adult-Oriented Coaching Practices

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Qualitative research has shown that adults athletes have particular preferences for how they want to be coached (Callary, Rathwell & Young, 2015; Ferrari, Bloom, Gilbert & Caron, 2016), which are often discrepant from dominant approaches with younger cohorts (Callary, Rathwell & Young, 2017). A prior presentation outlined the process by which information about adults' preferences was articulated as items and vetted for content validity. This study examined the initial factor structure of these survey items using 185 coaches' (91 m, 94 f; M yrs coaching adults = 12.9, derived from USA, Canada, UK and Australia) responses relating to adult-oriented sport coaching practices. Coaches responded to 51 items representing 13 initial factors (6 factors for 'accommodating adults', 7 factors for 'coaching behaviours and attributes'). An initial exploratory factor analysis (MLE with oblique rotation, forced 13-factor model) fell short of criteria for good fit, chi square (690) = 1072.3, p = .00, CFI = .85, TLI = .73, RMSEA = .06 [90% CI = .060 - .075], SRMR = .034. Factor loadings indicated 13 flagrant items and modification indices suggested many issues with cross-loading. Consequently, exploratory structural equation modeling was employed to refine the model, resulting in seven factors, with reduced multicollinearity and divergent validity. Discussion focuses on the nature of the

resulting survey instrument, including: (a) how it captures pertinent categories for Masters coaching self-assessment; and (b) its utility for examining congruency associations between coach-report and athletes' perceptions of adult-appropriate coaching behaviours, and whether congruency is associated with quality sport experiences.

Preliminary Investigation of the Validity of the Instructional Perspective Inventory with an International Sample of Masters Coaches

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Callary et al. (2017) advocated for the incorporation of andragogic principles when investigating coaching practices related to Masters athletes. No valid survey instruments exist for examining adult-learning principles in the coached Masters sport context. Targeted literature searches within Google Scholar, Pubmed, Psychinfo, Jstor, and Proquest uncovered 13 tools for assessing andragogy outside of sport. We identified the Instructional Perspectives Inventory (IPI; Henschke, 1989; Lubin, 2013) for use within sport because (a) it is the only andragogic tool that measures coaching behaviours from the perspective of the coach, and (b) there is preliminary evidence of reliability, content and factor validity. Our study investigated the suitability of a sport-modified IPI for assessing Masters sport coaches' use of andragogic principles with their athletes. We detail our initial process of modifying items and vetting content validity, with researchers (n = 3) and coaches (n = 12), to ensure relevance to the sporting context. Next, we analyzed 185 sport coaches' (51 % female; M age = 53.4 yrs, range 19 – 87) responses on the modified IPI, which comprised 38 items. Exploratory Factor Analyses (oblique rotations) assessed Lubin's (2013) 8 factor structure. Results showed good model fit: CFI = .903, SRMR = .042, RMSEA = .054 (90% CI = .042 – .065), $?^2$ (703) = 2260.299, $p < .001$, and $?^2/df = 3.215$. However, two items failed to load on any factor, and nine had problematic cross-loadings. Subsequent Exploratory Structural Equation Modeling analyses suggested a 27 item solution, loading onto 3 factors based on adult coaches' data.

Aging Capital: The Potential of Sport for Developing Positive Attributes in Older Adults

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Over the past few decades there has been an impressive increase in the number of older adults participating and competing in sport. Older adult participation in sport is linked to a range of outcomes (both positive and negative), but these outcomes tend to be specific to the older adult population and do not occur automatically. This presentation will summarize our research program examining how sport participation affects indicators of older adult health, ranging from indicators of physical health (e.g., disease and injury), to more global indicators of well-being (e.g., expectations of aging and life satisfaction). Further, we examine the notion that

involvement in sport is useful for developing important 'assets' for optimally managing one's aging experience. Borrowing from research in Positive Youth Development, this work assumes that sport is an optimal activity for the development of assets such as confidence and social support. Collectively, this research program emphasizes the potential of sport for improving elements of older adult life, but notes a range of limitations with our current understanding. Importantly, this work indicates adult sport is much more nuanced than previously considered and that future work needs to acknowledge this complexity. Although these data were not exclusively collected in a coached context, they are pertinent to other presentations in this symposium; accordingly, we initiate discussion about how the consequences of older adults' sport participation can be improved via access and availability to quality programming and coaching.

Poster Session I - 4:30-6:00 pm

1. **What Happened Out There!? And Other (Potentially Uncomfortable) Topics of Discussion. Female Volleyball Players' Experience of Postgame Debrief**

Erin Harris[1], Darren Kruisselbrink[2], Kim D. Dorsch[1]
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[2]School of Kinesiology, Acadia University

Debriefing has become an increasingly common practice in sport (Hogg, 2002; Macquet, et al., 2015; McArdle et al., 2010). For the purpose of this study, debriefing is defined as "a discussion between the coach and athlete that is conducted after competition, with the aim of achieving positive changes and improvements in the following competition" (Macquet et al., 2015). While postgame debriefing in sport has been purported to have numerous positive outcomes (e.g., aid learning, increase psychological recovery; Hogg, 1998; 2002), it is crucial to examine the athletes' perceptions of this process in order to examine its efficacy. To this end, nine female varsity level (USport) volleyball players participated in semi-structured interviews aimed at uncovering their thoughts and feelings related to postgame debriefs. Athletes identified two dominant themes and objectives that they want from the debriefing process: (a) communication, and (b) the desire for personal growth and learning. Athletes seek the opportunity to share thoughts/feelings about the game and engage in two-way communication with their coach. Eight of the nine participants reported wanting feedback about how they can improve as an athlete and be more effective on the court. These findings suggest that athletes do see value in post-game debriefing but the effectiveness of this practice is dependent on a number of factors. For example, the coach's ability to facilitate and teach the athletes was one of the biggest factors in whether or not athletes found a debrief to be effective.

2. **The Effects of Psychological Skills Training on Mental Toughness and State Anxiety Among Youth National Level Shooters**

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In recent years, the importance of psychological skills training (PST) has been recognized, and the number of athletes using psychological training strategies has increased globally. While extensively utilized overseas, PST programs are seldomly conducted with Indian elite sportspersons and are generally not available to youth athletes. The present study examined the effects of a six-week psychological skills training (PST) program on mental toughness and sport anxiety. Sixteen youth national level target shooters (10 boys, 6 girls; M = 16.21 years) followed a PST program for 1 hour per week. The intervention consisted of goal-setting, concentration, relaxation, thought stopping, imagery and confidence building. Participants completed three inventories: Mental Toughness Inventory (MTI; Gucciardi, Hanton et al., 2015), Competitive State Anxiety Inventory-2 (CSAI-2; Martens et al., 1990) and Mental Skills Questionnaire (Bull, 1986). Data were collected at three times evenly dispersed over the course of the six-week intervention: pre-, mid and post-intervention. Over the course of the intervention, mental toughness significantly improved, in addition to reductions in state anxiety. Positive significant relationships were observed between mental toughness and imagery ability, self-confidence, anxiety and worry management, concentration, relaxation ability. Key words: Psychological skills training, mental toughness, state anxiety, target shooting.

3. **Softball Coaches' Perceptions of Athlete Entitlement**

Kim D. Dorsch, Mikaila Etheredge
Faculty of Kinesiology and Health Studies, University of Regina

The mainstream media has been increasingly describing Millenials, and particularly, athletes, as entitled often deeming them as a plague and a curse. Within the psychology literature, entitlement has been defined as “the expectation of special privileges over others and special exemptions from normal social demands” (Raskin & Terry, 1988, p. 890). However, in the academic sport community, entitlement is a neglected topic. This research aims to understand entitlement in softball as well as its impact on team functioning from a coach’s perspective. A qualitative, phenomenological approach was used to conduct the research. Eight participants from the United States and Canada who currently hold or have held a head coaching position in softball at a junior college, college, or university level were asked to discuss their experiences coaching athletes who they believe have high perceptions of entitlement as well as the impact they believe these athletes have had on team functioning. Softball coaches described the characteristics of those athletes that they felt had high perceptions of entitlement as lacking in work ethic, expecting rewards, feeling superior, uncompromising, mentally weak, and difficult to coach. Consequently, the impact on the team was primarily negative and disruptive to the team’s chemistry. Coaches used strong words such as “cancer” and “poison” to describe the impact of these players on the team. The findings of this research project show that entitlement exists in softball and the effects of athletes holding such perceptions can be extremely disruptive.

4. **Manipulating Athletes' Perceptions of Role Ambiguity**

Michael Godfrey, Mark Surya, Mark Eys
Wilfrid Laurier University

Role ambiguity refers to a lack of clear information associated with a group member's position (Kahn et al., 1964), and researchers have found that athletes are more satisfied and perceive their team as more cohesive when roles are clear (i.e., less ambiguous; Eys & Carron, 2001; Eys et al., 2003). However, most role ambiguity research has been descriptive and cross-sectional in nature. As such, researchers have emphasized the importance of examining role ambiguity using experimental methods (Beauchamp et al., 2002), though this requires a protocol for manipulating perceptions of one's role. One potential protocol takes advantage of the availability heuristic, which suggests individuals perceive events differently based on the ease by which they are recalled (Tversky & Kahneman, 1973). The purpose of the present study was to determine if athletes' perceived role ambiguity could be manipulated by the number of roles requested when asked to describe their contributions to their team. Participants included 112 (Mage = 20.20) male (n = 76) and female (n = 36) university/college/club athletes from interdependent team sports who were asked to provide descriptions of three or ten role responsibilities. Results were examined in light of starting status and interaction effects were found demonstrating that starters in the ten role condition expressed more role ambiguity than starters in the three role condition ($p < .05$; no differences were found for non-starters). Evidence of similar interaction effects among conditions regarding role satisfaction was found. Discussion is focused on theoretical implications of manipulating athletes' perceptions of role ambiguity.

5. **Team Communication Networks, Task Cohesion, and Performance: A Case Study**

Colin D. McLaren, Kevin S. Spink
University of Saskatchewan

Through the lens of team cognition (Cooke, 2015), recent field and experimental research supports early group dynamics theorizing that communication network structure may serve as a cue to perceived cohesion (McLaren & Spink, 2017). Specifically, a communication network that is lower in centrality and higher in density (based on information and knowledge exchange between team members) offered a coordinated cognitive system where members feel like they were on the same page (i.e., cohesive) and the team had a greater probability of success. Using a case study approach, the current study analyzed two soccer teams, who differed in overall league success, and competed in a game. Communication networks (players identified the members they exchanged information with during the game) and perceptions of task cohesiveness were assessed. Team A (n = 13), the second-ranked team (7-1-1) in the six-team league, won the game (4-0) over Team B (n = 13), the fifth-ranked team (2-7-0). Based on past research (McLaren & Spink, 2017), it was hypothesized that the more successful team (generally and current outcome) would have the more coordinated network structure and report higher perceptions of task cohesion. As hypothesized, Team A (the more successful team) presented a more coordinated network structure (i.e., lower centrality, greater density) that also included shorter distances between members and more members

in the core of the network versus the periphery when compared with Team B. Along with this more coordinated communication network structure, athletes on Team A also reported greater perceptions of task cohesion.

6. **Development and Validation of a Trust in Sport Questionnaire**
Brogan Bailey, Lori Dithurbide
Dalhousie

Many professional athletes and coaches have cited great team chemistry as an essential factor in producing a winning team and research has shown there are several team variables that positively contribute to team performance (Beauchamp & Eys, 2014). One variable that has lacked considerable research within sport group dynamics literature is trust. Organizational trust research has provided the impetus for trust research to move into the world of sport. The purpose of this research is to develop a sport-specific measure of trust. Procedure followed a typical scale development parameter: 1) an understanding was developed through a comprehensive literature review of trust in sport and organizational science; 2) items were generated, a comprehensive list of items were developed and narrowed through an expert review process and think aloud protocol; and 3) a confirmatory factor analysis was conducted to identify the factor structure of the questionnaire based on participant's responses. Validity and reliability were also tested for. The initial pool items were refined through expert reviews and a Think Aloud Protocol. These steps refined the questionnaire and moved research into the next phase. The factor structure of the Trust in Sport Questionnaire was confirmed and validated. The development of a definition and measure of trust in sport that will allow future researchers to effectively assess trust within sport and examine how it relates to different sport variables.

7. **Understanding Sport Dropout: Exploring the Experiences of Adolescent Girls with Body Image Concerns**
Madison F. Vani, Eva Pila, Catherine M. Sabiston
University of Toronto

In adolescence, girls report lower perceptions of sport enjoyment and commitment, and are more likely to withdraw from sport compared to boys. Recent findings with adolescent girls suggest that negative body-related emotions may predict the gender disparity in sport. Specifically, greater body-related shame, guilt, and envy, and lower pride are related to lower sport enjoyment and commitment. As the extant literature focuses on the sport experiences of female athletes, the body-related experiences of girls who withdraw from sport are not well understood. The present study purposefully sampled adolescent girls (N = 12) who withdrew from sport for body and weight-related reasons and utilized individual semi-structured interviews to explore girls' sport experiences and disengagement. A thematic analysis was used to analyze the data, whereby seven main themes emerged. Girls described a culture of "body talk" that was normative; how body-consciousness leads to compensatory behaviours (i.e., dieting, exercise, covering up); how sport promotes appearance and fitness-related social comparisons; the differential presentations of body-consciousness in social vs. sport

contexts; how negative evaluations of appearance influence perceptions of competence in sport; the detrimental nature of evaluation and competition in sport; and how enjoyment of sport is impacted by social influences in and out of sport context. Overall, negative body-related experiences in sport were key contributors to disengagement and providers of support (e.g., coaches, teammates) contributed to experiences of body consciousness. Strategies to improve sport outcomes for adolescent girls should focus on reducing negative body-related emotions and targeting negative weight-related commentary.

8. **Investigating Gender Differences in Physical Activity Behaviour and Social Cognitions Towards Physical Activity among First-Year Medical Students**

Katrina A. D'Urzo, Ashley M. Johnson, Brittany M. McEachern, Iain A. C. McPhee, Andrea M. Brennan, Alyssa A. Fenuta, Rebecca J. Lau, Celina H. Shirazipour, Jennifer R. Tomasone
School of Kinesiology and Health Studies, Queen's University

Evidence suggests active physicians and medical students are more likely to counsel patients about physical activity (PA) yet many remain inactive. Investigating determinants of medical student PA is a necessary step in developing promotion strategies that foster consistent PA behaviour and counselling throughout the medical career. Research has shown that gender differences in medical student PA behaviour may exist; thus, the purpose of this study was to examine gender differences in PA behaviour and social cognitions (SC) among first-year medical students. Based on the Theory of Planned Behaviour, it was hypothesized that differences in SC towards PA may influence the observed PA habits of medical students. First-year medical students from Ontario [n=95; 23±2 years (31 males)] completed questionnaires assessing PA levels and SC towards PA participation throughout medical school. Males reported greater moderate-to-vigorous PA (MVPA) per week compared to females (M:245±204 min/week vs. F:160±120 min/week, p=0.012). No differences in SC toward PA were observed between genders (all ps>0.05). Bivariate correlations revealed that for males, attitudes and intentions to participate in PA were significantly correlated with MVPA (all rs>0.511; ps0.301; ps<0.05). These results provide insights into the theoretical constructs that influence medical student PA, and how these factors may differ between genders. Promotion strategies that address gender differences in MVPA may be an important step to increase medical student PA habits and the PA counselling they provide.

9. **Identifying 'Real-World' Initiatives for Evidence-Based Physical Activity Practice: A Case Study of Community-Based Physical Activity Programs for Persons with Physical Disability in Canada**

Katrina A. D'Urzo, Kristiann E. Man, Amy E. Latimer-Cheung, Jennifer R. Tomasone
School of Kinesiology and Health Studies, Queen's University

'Real-world' initiatives represent an important information source for evidence-based physical activity (PA) practice; however, accessing this information is often challenging. Casebooks have emerged as an innovative knowledge translation tool for researchers, practitioners, and program participants to address 'research-to-implementation gaps' in PA programming through sharing 'on-the-ground' experiences. To date, several

casebooks have been published; yet, remain inconsistent in their methodological approach. The purpose of this project is to provide guidance for search methods that can be adopted for the identification of 'real-world' PA initiatives, and thus, the development of future casebooks. Specifically, search methods were developed to identify community-based PA programming for persons with physical disabilities across Canada. Five distinct peer- and grey literature search sources were included: (1) peer-reviewed literature databases; (2) grey-literature databases; (3) customized Google search engines; (4) targeted websites; and (5) content expert consultation. Screening involved two phases: (1) title screening and hand searching for potentially relevant PA programming information; and (2) full record review to assess program eligibility. In total, 474 potentially relevant programs were identified and 67 met study criteria. The most comprehensive search source was targeted websites, which identified 31 (46.3%) unique programs, followed by content experts (n=15; 22.4%). Only six (9%) unique programs were identified via custom Google searching. No programs were uniquely identified through peer- or grey-literature database searches. This study demonstrates a comprehensive search strategy that serves as a basis for identifying, selecting and critically appraising 'real-world' initiatives that are central to the development of evidence-based PA practices and policies.

10. **The Influence of Developmental Pathways on Career Success of Major League Baseball Players: A Preliminary Investigation**

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Athlete development is complex and the pathway to elite levels of performance is rarely straightforward or linear (Gulbin et al., 2013). While performance of Major League Baseball (MLB) players have largely fixated on advanced metrics in recent years, MLB player pathways and their influence on career success remains relatively unexplored. This study examined the influence of developmental pathways on MLB success using two performance indicators: career games played and wins above replacement (WAR; a player's total contributions to their team in wins). Using baseball-reference.com, data on 586 American-born MLB players who began their careers from 1990-1993 were collected. Out of 17 qualitatively different pathways to MLB, five pathways represented approximately 86% of MLB players in this sample: (i) drafted out of high school (turned down) and then attended four-year university (12.3%), (ii) drafted out of high school (20.3%), (iii) drafted out of two-year junior college (9.6%), (iv) drafted out of four-year university (34.8%), and (v) drafted after transferring from two-year junior college to four-year university (8.7%). There were statistically significant differences in career games played between the five pathways ($F(4, 497) = 3.48$, $p < .01$), with athletes drafted from high school averaging 140 to 280 more MLB games played compared to other pathways. However, there were no statistically significant differences between the career WAR metrics respective to developmental pathway. Continued research and an expanded sample size is needed to better understand the variation within and between pathways,

which may have important implications for talent identification and development programs.

11. **Motivation and Eudaimonic Well-Being in Athletes: A Self-Determination Theory Perspective**

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Drawing from self-determination theory (SDT; Deci & Ryan, 1985), the present study examined the relationship between motivation and eudaimonic well-being in the sport context. All the types of motivation were tested individually to examine how they influence athletes' eudaimonic well-being via Structural Equation Modeling (SEM). Three hundred ninety nine athletes (Mage = 25.08, SD = 7.35) from 15 different individual and team sports completed a questionnaire tapping the targeted variables. The analysis partially supported the hypotheses. Integrated and identified regulations positively predicted athletes' eudaimonic well-being. External regulation was also a positive predictor of the eudaimonic well-being, while introjected regulation and amotivation negatively predicted athletes' eudaimonic well-being. Finally, athletes' intrinsic motivation did not significantly predict their eudaimonic well-being. Results highlight the complex link between different types of sport motivation and athletes' well-being.

12. **The Relationship Between Perfectionism and Athlete Engagement: The Moderating Role of Coach Autonomy Support**

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Athlete engagement is a positive state of mind capturing athletes' feelings of enthusiasm, confidence, vigour, and dedication toward their sport (Lonsdale, Hodge, & Jackson, 2007). This study examined whether athletes with different perfectionism profiles differed across these engagement characteristics and tested whether those differences were moderated by coach autonomy support. A sample of 191 male youth club basketball and football players (Mage = 16.59, SD = 0.67) completed measures of athlete engagement, sport perfectionism, and coach autonomy support. Latent profile analysis was used to categorize participants according to their standings across perfectionistic strivings and perfectionistic concerns. A 3-class model was adopted with groups representing non-perfectionistic athletes, moderately perfectionistic athletes, and highly perfectionistic athletes. Multiple regression was then used to test for class differences and moderation effects (see Hayes & Montoya, 2017). Across each engagement characteristic, highly perfectionistic athletes reported higher levels in comparison to moderately perfectionistic athletes regardless of levels of coach autonomy support. On vigour and dedication, though, class differences involving non-perfectionistic athletes were moderated by coach autonomy support. For both characteristics, non-perfectionistic athletes reported lower levels than highly perfectionistic athletes when coach autonomy support was low. However, non-perfectionistic athletes and highly perfectionistic athletes

did not differ across vigour and dedication when coach autonomy support was moderate-to-high. In discussion, we compare the adopted 3-class model with those produced in past research, address issues surrounding perfectionism functionality, and speculate as to why fostering autonomy support may have the greatest impact on engagement among athletes low, but not high, in perfectionism.

13. **Consideration of Future Consequences: Relationships with Self-Regulated Learning, Deliberate Practice and Skill Level in Individual Sports**

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Consideration of Future Consequences (CFC) is the extent that people consider the future outcomes of current behaviours (Joireman et al., 2006). It may differentiate athletes' dispositions to self-regulate and enhance amounts of sport practice (Barone et al., 1997). This study explored whether CFC had a bearing on relationships between self-regulated learning (SRL), deliberate practice (DP), and acquired skill. 272 North American individual sport athletes ranging from local to international level (196 male; Mage = 22.48, range 18-35; MDP = 12.95 weekly hrs, SD = 6.47) completed the SRL-SRS for Sport Training (Bartulovic et al., 2017), the CFC-14 (CFC-Future, CFC-Immediate; Joireman et al., 2012), and reported weekly DP amounts. A MANOVA tested differences in CFC-F and CFC-I between recreationally competitive, less-elite and elite groups. Results showed no differences (ps > .09). Second, correlational analyses showed no associations between CFC-F ($r = -.05$, $p = .39$) or CFC-I ($r = .11$, $p = .06$) with DP. To further explore whether associations between SRL and DP depended on CFC, CFC-I and CFC-F were each tested as a moderator; results showed no moderating effects (ps > .14). There were notable correlations (ps < .01) between CFC-F and overall self-regulation ($r = .35$), and each of six constituent SRL-SRS processes (.21 to .27). CFC-I correlated with four SRL processes (-.14 to -.17). Discussion focuses on CFC-F as an antecedent to SRL-SRS rather than a moderator of associations between SRL and DP, as well as the future role of CFC in sport expertise research.

14. **Is Negative Self-Talk all that Bad? Examining the Motivational Function of Negative Self-Talk**

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The purpose of this study was to investigate the motivational function of negative self-talk (ST). It is suggested that negative ST is motivational when interpreted as a challenge. For example, an athlete may say, "my legs are tired" and make it a challenge by adding "but I can push through it." This study examined the potential motivating functions of negative-challenging ST on a 20-minute cycling task. Participants (n = 93) completed one of four ST interventions: a) positive, b) negative, c) neutral, or d) negative-challenging and their subsequent cycling performance was analyzed. A significant group by time interaction effect was present, where the challenging group outperformed the negative group in the final stage of the task. The findings suggest that time within an endurance

task has implications within the ST-performance relationship, and provide initial support for implementing challenging ST techniques.

15. **Validity of Self-Regulated Learning Measure in Predicting Skill Level Differences**

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Self-regulated learning (SRL) refers to athletes' active engagement in their own practice via planning, monitoring, and adapting processes (Zimmerman, 1986). SRL has been positioned as an individual difference variable impacting expertise development (Tedesqui & Young, 2015). McCardle et al. (2017) validated the structural validity of athletes' SRL self-report survey – the SRL-SRS for Sport Training (Bartulovic et al., 2017). Their measurement model, which also included earlier items from Toering et al.'s (2012) survey, showed acceptable model fit and divergent validity. This investigation aimed to examine the predictive validity of the same SRL-SRS for Sport Training model using skill level as a criterion outcome. Canadian athletes (n = 369; age 13 - 58 years) completed 53 SRL items and reported their highest performance level (local/regional, provincial, national, international). Multivariate analyses of variance tested for skill level differences on the constituent SRL processes (i.e., planning, checking, evaluating-reflecting, effort, self-efficacy) assessed in the survey resulting in significant differences: Wilk's ? = .915, F (15, 947) = 2.07, p = .009, partial ?2 = .029. Follow up discriminant analyses showed differences between the international athletes; self-efficacy and effort were the strongest contributors to the discriminant function, with evaluating-reflecting also contributing. A pattern emerged where local/regional athletes reported more engagement in many SRL processes than provincial athletes, and more SRL on certain processes than national athletes. Results are discussed in terms of remaining steps in SRL-SRS validation, measurement development, and limitations that may constrain effect sizes.

16. **Levels of Mental Distress in a National Sample of Canadian University Student Athletes**

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Mental health concerns for post-secondary students in Canada are well documented. Less well known is the mental health status of student-athletes. A recent study revealed that student athletes in the United States had lower levels of anxiety and depression than their non-athlete counterparts (Davoren & Hwang, 2014). However, there are significant differences between American and Canadian university sport systems that would limit any generalizations from these results. The current study was designed to ascertain the

prevalence of mental distress in Canadian university sport participants. A nation-wide sample of 305 university student athletes (188 female; 117 male) complete the K6, a brief scale for screening of general psychological distress (Kessler et al., 2002). The sample was heterogeneous with respect to sport, region and timing of competitive season. The results showed that student athletes report relatively high levels of mental distress. The average score on the scale for the current sample was 14.3 (out of 24), whereas a comparable national average for the same age range is 4.3 (Cairney et al., 2007); 59% of the sample indicated a score above the optimal cut off for assessing prevalence of severe mental illness. There were no differences by gender or other demographic variables, however, it was found that individuals with a history of concussion showed significantly lower levels of mental distress than those without ($t(270) = -1.99$, $p < .05$, $d = 0.23$). It should be noted that the K6, although valid, is a screening tool, not a diagnostic tool.

17. **Evaluation of Girls Rock: An Intervention Program for Girls in Grades 4, 5 and 6**

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There are many benefits associated with physical activity, such as physical health and improved psychological development. Even with a substantial amount of documented benefits, the majority of youth are not meeting the recommended levels of physical activity, especially girls who are globally less active than boys. One way to improve specific needs of girls is through classroom and activity community-based programs, such as the eight-week program, Girls Rock. Girls Rock consisted of 23 girls in Grades 4, 5 and 6, from four different Boys and Girls Club locations, with the objectives of increasing positive body image, self-esteem, self-efficacy and fundamental movement skills. The present research study conducted an outcome evaluation to assess the effectiveness of Girls Rock in achieving its objectives. Data collected pre- and post-intervention, through questionnaires and observational assessment, revealed that participation in Girls Rock significantly increased positive body image, self-esteem, and self-efficacy, and partially increased fundamental movement skills. This information can be used to attain the future goals of recruiting more participants, retaining those already involved, and expanding to other clubs. It is important that Girls Rock continues to be evaluated to ensure the program's objectives are being met, and to discover ways to improve Girls Rock. Furthermore, Girls Rock, and intervention programs alike, is critical because it provides young girls the education required to increase key variables in their lives, which carry on until adulthood.

18. **Am I Sexy; Do I Know It? Does the Thin Ideal in Pop Music Lyrics affect Body Image in Physically Active Women?**

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Media exposure to the thin ideal has been shown to have a negative impact on body image. Viewing music videos that depict images of the thin ideal is associated with increased body dissatisfaction in women. However, whether these effects are due to the

images in the videos or the lyrics in the songs is unknown. This study aimed to explore the effects of music lyrics on body image in physically active female university students. A repeated measure design was used; participants participated in three sessions, where they listened to a different playlist of current pop music. The playlist consisted of music with positive body image messages, negative body image messages, and no reference to body image. Following listening to each playlist, participants completed measures of body image and affect assessing social physique anxiety, body dissatisfaction, and positive and negative affect. Results showed on average positive affect was higher after listening to the positive music compared to the negative music and control condition, and on average women felt less fat following the positive condition compared to the negative and control condition. Lyrics that promote all body shapes sizes, may lead to more positive psychological outcomes, however further research should be completed to explore the effects music has on body image outcomes in other samples, such as less active women.

19. **Creating a Win-Win: Exploring the Impact of an Active Study Station on Well-Being of University Students**

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Sedentary behavior has increased significantly over the past 25 years and has been associated with declines in overall health. In addition, research has shown that post-secondary students are reporting higher levels of stress as compared to students from previous decades. In response to increasing concerns of student health, post-secondary institutions from across the globe developed and endorsed the Okanagan Charter, an international charter for health promoting universities and colleges. This charter has led to various initiatives to foster the health and well-being of university students. One such initiative was the pilot implementation of an active study station, specifically a treadmill desk, at the UBC Okanagan campus. The purpose of this research was to conduct a pilot study to gain an understanding of the students' experiences of using the treadmill desk and its perceived impact on their well-being. The results showed that the treadmill desk was used 326 times by 80 unique users meaning many of the students were repeat users. In addition, 41 students (31 female) completed an online survey related to their experience with the desk. Survey results indicated that students found the treadmill desk easy to use (M = 4.60; SD=0.50), felt they could focus while being active on the treadmill desk (M = 3.74; SD=0.96) and experienced an improved mood (M = 4.00; SD=0.86) due to using the treadmill desk. Research and practical recommendations are presented.

20. **Outcome Expectations in Exercise: Distinguishing Between Likelihood and Desirability**

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Background: Outcome expectations from Bandura's (1986) social-cognitive theory have been inconsistently conceptualized in the literature. The perceived likelihood of an outcome happening is one aspect, but the extent to which one values that outcome is also important. The relationship between the likelihood and desirability of an outcome to each other and to behavioural intentions and exercise behaviour is not well understood. Objectives: The purpose of this study was to examine the respective factor structures of the likelihood and desirability components of common exercise outcome expectations. This was accomplished by using the Exercise Outcome Expectations Questionnaire (EOEQ), which separately assesses the likelihood and desirability for commonly reported outcomes of exercise. A secondary aspect of the research was a test of the psychometric quality of the questionnaire. Methods: EOEQ data from 459 non-exercisers (69% female, M age = 48.26 years, SD = 8.52) were analyzed using confirmatory factor analysis. Results: Analysis supported a six-factor model for outcome likelihood, including Physical Health, Mental Health/Stress, Appearance, Fitness, Vitality, and Enjoyment. A similar model was supported for outcome desirability, but with Enjoyment replaced by Negative Outcomes. Measurement invariance by gender was established for the desirability factors, but not for the likelihood factors. Conclusions: This study suggests that the likelihood and desirability aspects of outcome expectations are probably independent of each other. It also provides preliminary evidence for the utility of the EOEQ in measuring the perceived likelihood and desirability of exercise outcomes. Future research examining the contributions of these factors to exercise behaviour is needed.

21. **Changing Physical Activity Counselling Outcomes among Future Health Professionals**

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PURPOSE: This study aimed to assess the current attitudes, beliefs, confidence and knowledge of students in health-related fields with regard to physical activity (PA) promotion, and to measure changes in these variables following an evidence-based PA education intervention. METHODS: A single group pre-post test design was used to explore the impact of the intervention on changes in attitudes, beliefs, confidence, and knowledge about PA counselling and beliefs about obesity. The pre-post questionnaires contained measures of barriers to PA counselling and participants' attitudes, beliefs, confidence, and knowledge about PA counselling and obesity. RESULTS: Findings demonstrated that the PA intervention increased participants' attitudes (Mchange = 0.15, $p = .031$), beliefs (Mchange = 0.35, $p = .002$), and knowledge (Mchange = 0.27, $p = .001$) with regard to PA counselling, and negatively impacted obesity-related beliefs (Mchange = -1.92, $p = .029$). Significant increases in participants' confidence to perform counselling based on personal knowledge (Mchange = 7.71, $p = .001$), confidence to

assess a client's readiness for PA (Mchange = 6.96, p = .032), and confidence to refer patients requiring additional clearance or information were also observed (Mchange = 11.25, p = .001). CONCLUSION: These findings suggest that a one-hour PA intervention can be effective in improving the attitudes, beliefs, confidence and knowledge of students in health-related fields with regard to PA promotion, but that more attention needs to be given to how PA is framed within obesity discourse.

22. **Nutritional Supplement use and Achievement Goal Orientations in Sport and Physical Activity**

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The use of nutritional supplements has become an increasingly common practice, especially among university-age athletes (Froiland, Koszewaki, Hingst, & Kopecky, 2004). Categories of nutritional supplements include energy, protein, vitamin, herbal, and mineral supplements, which are most commonly taken with the purpose of increasing overall health or maximizing athletic performance (Froiland et al., 2004). Motivation for performing certain behaviours, including nutritional supplement use, in an athletic and active context may be explained by achievement goal orientations. Five dimensions of achievement goal orientations have been identified as self-enhancing ego-orientation, self-defeating ego-orientation, task-orientation, work avoidant-orientation, and social approval-orientation (Gilson, Chow, & Ewing, 2008). The purpose of this study was to assess relationships between nutritional supplement use in university-age physically active individuals and their achievement goal orientations. Ninety-three participants completed a basic and sport- and physical activity-specific demographic questions, the Multiple Goal Orientation in Sport Questionnaire (MGOSQ; Gilson et al., 2008), and a nutritional supplement inventory. A significant logistic regression, ChiSq (5) = 13.9, p = .016, found individuals high on self-enhancing ego orientation to be 2.01 times more likely to use supplements than those low on self-enhancing ego orientation. Individuals low on social-approval orientation were 7.39 times less likely to take nutritional supplements than those high on social-approval orientation. Findings may have implications for control of supplement use for both teams and individuals in athletic settings to implement a task-oriented environment that encourages self-referenced success and progression of skills.

23. **A Symptom Cluster-Based Approach to Studying the Association Between Physical Activity and Depressive Symptoms**

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Background: Several studies indicate that physical activity (PA) is inversely associated with depressive symptoms across the lifespan. In most of these studies, depressive symptoms were treated as a unidimensional construct; however, depression is a multidimensional construct consisting of affective, somatic, cognitive, and behavioural symptoms. In this cross-sectional study, we examined which clusters – depressed affect,

somatic symptoms, interpersonal problems, and lack of positive affect – are associated with light PA (LPA) and moderate-to-vigorous PA (MVPA) in university students. Methods: Participants were 738 undergraduate students (mean age = 19.6 years; 76.9% female) who completed an online questionnaire. Four depressive symptom cluster scores were computed from responses on the 20-item Center for Epidemiologic Studies Depression Scale, and PA scores were computed from responses on the Leisure Time Exercise Questionnaire. Results: In separate linear regression analyses (controlling for age, sex, number of exams/assignments, and target grade point average), MVPA was significantly associated with lack of positive affect (beta = -.12, $p < .05$), but not somatic symptoms, interpersonal problems, or negative affect. LPA was not significantly associated with any of the four depressive symptoms clusters. Conclusions: Our results suggest that the association between MVPA and overall depressive symptoms among university students may be driven primarily by the positive affect cluster. As such, researchers should seek to tease apart the positive affective symptoms of depression from the cognitive, negative affective, and interpersonal symptoms in future studies.

24. **Do You Believe in Haptics?: Balance and the Placebo Effect**

Kevin Spink, Colin Federow
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Studies reveal that haptic input (touching lightly on a surface) can improve a person's balance (Afzal et al., 2015). However, it has been argued that it is impossible to separate the effects of psychological and social forces from the effect of a treatment itself (Crum et al., 2017). We examined whether a person's mindset could be altered through descriptive norms to create a placebo effect that would enhance the effect of haptic input on balance. Drawing on the placebo literature (Carvalho et al., 2016), we examined whether providing individuals with a normative message about the positive effects of haptic input would improve balance over the effects associated with haptics alone. Adult participants were randomly assigned to either a control ($n = 36$) or message condition ($n = 33$). Participants performed two quiet tandem-stance balance tests on a portable force plate separated by a 60-second rest period. On the first trial, all participants balanced without touch and on the second with touch. Prior to the second trial, those in the message condition were told that many others improved their balance with touch while the control group received no message. The DV was the mean total path traveled by the centre of pressure (COP). Controlling for the COP (first trial), ANCOVA results revealed COP on trial two differed significantly by condition ($p = .004$). Those receiving the message exhibited better balance. These results suggest that creating a placebo effect about the positive effects of haptic input may help improve balance.

25. **You Talkin' To Me: Effects of Descriptive Norms on Muscular Endurance as Moderated by Exercise Identity**

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University of Saskatchewan

Descriptive norms (DN; perception of what is commonly done) have been associated with activity (Crozier & Spink, 2017; Priebe & Spink, 2015), with most studies using

focus theory of normative conduct (Cialdini et al., 1990) as their theoretical underpinning. One of its main postulates states that individuals are more likely to act on descriptive norm information when it is salient to them. The purpose was to examine the impact of descriptive norms on muscular endurance in a plank exercise where salience for the exercise behaviour differed (high exercise identity (HEXID)/low exercise identity (LEXID)). It was hypothesized that only HEXID individuals who received a descriptive norm would hold their plank longer than those who did not receive a message. Undergraduate students were randomly assigned to one of two conditions: descriptive norm (DN, n=31) and control (C, n=32), and then asked to perform two planks to maximum exertion separated by a 3-min rest. After completing the first, DN participants received a norm-specific message that "80% of university students held their second plank 20% longer than their first plank" while C participants received no message. Exercise identity also was assessed. A mean split of the exercise identity item was used to create the HEXID and LEXID groups. ANCOVA results (controlling for time 1 plank) revealed a significant condition/identity group interaction (p=.039). Supporting the hypothesis, significant differences between conditions only emerged for HEXID individuals with those receiving the message holding their second plank longer (M=98.5 sec) than those not receiving the message (M=80.4 sec).

26. **Predictors and Moderators of Cancer Survivors' Response to a Community-Based Exercise Program**

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Background: Exercise reduces cancer-related fatigue and improves functional capacity in cancer survivors; however, who responds most to training remains unclear. We aimed to identify predictors and moderators of cancer survivors' response to a 30-week community-based exercise program. Methods: Participants were 229 adults (Mage=54.9 years, 82.1% female, 44% undergoing treatment) diagnosed with cancer who participated in the Wellspring Cancer Exercise Program. Self-report and objective data were collected at pre- (week 0), mid- (weeks 10 and 20), and post-intervention (week 30), and at follow-up (week 46). Separate generalized estimating equation regression models were tested for each putative predictor/moderator (i.e., age, sex, marital status, ethnicity, body mass index [BMI], vocational status, comorbidity index, treatment status, cancer stage, exercise self-efficacy beliefs, extracurricular exercise). Results: In models with cancer-related fatigue as the outcome, sex, vocational status, and self-efficacy beliefs had significant main effects (Wald ?2?4.62, p<.05), and interaction effects were significant between time and age, ethnicity, and extracurricular exercise (Wald ?2=4.03, p<.05). In models with functional capacity as the outcome, age, marital status, and self-efficacy beliefs had significant main effects (Wald ?2?3.97, p<.05), and interaction effects were significant between time and BMI and cancer stage (Wald ?2?11.61, p<.05). Conclusions: Although cancer survivors responded favourably to a community-based

exercise program, some responded better, namely those who were younger, women, Caucasian, married/cohabiting, more active, had lower BMIs, diagnosed with earlier stage cancer, working/transitioning to work, and had higher self-efficacy beliefs. Research that addresses how to optimize effects among those who are predicted to benefit less is needed.

27. **A Review of Systematic Reviews of Barriers and Facilitators to Physical Activity Experienced by Individuals with Developmental Disabilities**

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Research has confirmed that individuals with disabilities participate in less physical activity than neurotypical individuals; therefore, factors that prevent individuals with disabilities from being active must be investigated. A review of reviews conducted by Martin Ginis et al. (2016) identified several barriers and facilitators to physical activity experienced by individuals with physical disabilities. The researchers suggested that these barriers may be preventing individuals with disabilities from becoming and staying active. To our knowledge, a review of reviews exploring the barriers and facilitators experienced by individuals with disabilities has not been conducted and therefore the purpose of this review of reviews was to identify reviews exploring barriers and facilitators to physical activity among individuals with developmental disabilities. Three systematic reviews met the inclusion criteria for this paper. Information extracted from the reviews included: databases, quality assessments, and barriers and facilitators. It was evident that individuals with developmental disabilities experienced a wide array of factors that influenced physical activity participation. Facilitators included having fun and social support, while barriers included cost and fear of injury. Limitations within the systematic reviews were evident, such as the lack of consistency of terms (e.g., physical activity). Further, researchers merged findings reported by individuals with different disabilities; given the differences between disabilities, this should be avoided. The review of reviews provided a detailed account of research pertaining to physical activity barriers and facilitators experienced by individuals with developmental disabilities, and recommendations that will advance future research in this area.

28. **Exploring Leader Characteristics and Needs Necessary for the Successful Implementation of Project Move, a Group-Based Physical Activity Program for Breast Cancer Survivors**

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Objective: Project MOVE is a group based program with a primary focus of increasing physical activity (PA) among breast cancer (BC) survivors through the use of microgrants (small amount of funding awarded to community groups to support the design and implementation of a PA initiative) and a financial incentive. Each Project MOVE group is facilitated by a group-appointed leader who plays a lead role in the submission of the microgrant application and the implementation of the funded PA initiative. The purpose of this study was to explore group leaders' characteristics and needs necessary for successful implementation of the Project MOVE model (microgrants + financial incentive). Methods: Semi-structured telephone interviews were utilized to gain insight from Project MOVE group leaders (n=9). Group leaders were mainly women (89%) with a mean age of 44.25 ± 17.60. All interviews were recorded and transcribed verbatim. Using thematic content analysis, data were independently coded and categorized by two research team members. Results: Findings that emanated from discussions with the group leaders were coded into five themes: organisation skills, interpersonal communication, importance of social support, fostering motivation, and needs related to education and training for PA. Within these themes, outcomes of group connectedness and enhanced social interaction were evident. Conclusion: Findings from this research provide insight into the development of group-based PA initiatives for BC survivors and the needs of effective leaders.

29. **The Relationship between Motor Competence and Physical Fitness from Early Childhood to Adulthood: A Meta-Analysis**

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Introduction. The dimensionality of the latent trait(s) underlying motor assessments is debated since the 1920s. Two hypothesis about the latent structure exist: (1) the General Motor Ability Hypothesis (Brace, 1927), (2) the Specificity of Motor Ability Hypothesis (Henry, 1968). Burton, and Rodgerson (2001) suggest an increased specificity with increasing age. This study aimed at examining this hypothesis by analyzing a possible decrease in the relationship between motor competence (MC) and physical fitness (PF) from early childhood to adulthood. Methods. A total of 60 studies analyzing the relationship were identified between 1990 and 2016. Thirteen papers provided 27 samples with 73 different data points. Overall 15,101 participants aged 4.5 to 20.4 years (Mage = 12.94, SD = 4.84) were included. A random effects model was used to run the meta-analysis with age as a moderator. Results. After correction for multiple effects for dependent samples and small-sample correction, the association between MC and PF was r = .48. Further, age was not found to moderate the effect size, and, from a descriptive point of view, age even shows a slight positive effect. Discussion. This systematic meta-analytical integration of relations between MC and PF meets the General Motor Ability Hypothesis rather than specificity (cf. Cohen, 1992). The hypothesized differentiation with increasing age was not found. Although it is debatable whether co-linearity between motor domains or between motor tests were necessary in order to measure a general motor ability, results imply that a general motor factor exists in childhood and youth.

30. **Understanding Diversity of Sport Participation in Adolescence and Perceived Variety and Exercise Behaviour in Adulthood**

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Participation in exercise declines from adolescence to adulthood, yet participation in a diversity of sports during adolescence may protect individuals from this decline. However, the mechanisms that explain the relationship between participation in a diversity of sports during adolescence and exercise behaviour in adulthood have not been identified. Perceptions of variety may help explain this relationship. The purpose of this study was to examine the association between diversity of sport participation in adolescence and exercise behaviour in adulthood, and the extent to which this relationship is explained by perceptions of variety in exercise. Using a cross-sectional design, a community sample of 112 adults (Mage = 37.39 years, SD = 11.10; nfemale = 87) recalled their sport participation throughout adolescence and completed measures of perceived variety in exercise and current exercise behaviour. The results showed that diversity of sport participation did not directly predict exercise behaviour in adulthood but did indirectly through the experience of variety in exercise (point estimate = 0.09, 95%CI = 0.03 – 0.18), after controlling for age and gender (Model R2 = .09). These findings support the notion that participation in a diversity of sports during adolescence is associated with exercise behaviour in adulthood, and the extent to which people feel like they experience variety in exercise may explain this relationship. Diversification of sport participation in adolescence may facilitate perceptions of variety and be one strategy for fostering exercise behaviour in adulthood.

31. **Evaluation of the Accuracy and Availability of Cancer-Related Physical Activity and Sedentary Behaviour Information on English-Language Websites**

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Purpose: To assess the quality and accuracy of cancer-related physical activity (PA) and sedentary behaviour (SB) information provided on reputable cancer websites from English speaking countries. Design: Cross-sectional. Sample: Reputable cancer websites from English speaking countries. Methods: A list of reputable cancer websites (N = 11) was generated from countries that speak English primarily (e.g., Canada, Australia). These websites were assessed for quality and accuracy based on a detailed coding framework (e.g., PA guidelines, PA and cancer prevention). Frequencies and descriptive statistics were derived for website characteristics of interest. Findings: Websites offered adequate cancer-related PA information. All sites reviewed within this study offered PA information for cancer prevention and cancer survivorship. However, while 81% of the sites presented information for SB and cancer prevention, very little information was presented for SB and cancer survivorship, with only 18.2% of the information being offered. Conclusions: The quality and accuracy of cancer-related PA and SB information presented on leading cancer websites is variable. Further information is warranted in the

areas of SB, resistance training, and behavior change strategies. Websites have considerable value as knowledge translation tools and, therefore, presenting evidence-based information that is easy to understand may positively impact the health and behaviours of cancer populations, as well as the general population.

32. **Understanding Sci Peer Mentorship Conversations: Development of a Coding Manual**

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Background: Peer mentorship is a promising approach to support participation among individuals with spinal cord injury (SCI). Little research has examined how SCI peer mentorship conversations support participation in mentees with SCI, or the topics discussed and the counselling techniques used in these conversations. Purpose: The purpose of this study is to develop a coding framework of topics discussed and techniques used in real-time SCI peer mentorship conversations. Methods: Peer mentors and mentees completed a baseline demographic survey, were matched, and their telephone conversations were audio recorded and transcribed verbatim. Two researchers inductively coded each transcript independently to identify topics discussed and counselling techniques used. Inductive topics and techniques were then independently coded for overlap with established coding methods (e.g. motivational interviewing, behaviour change techniques). Consensus was reached through discussion. Results: Ten conversations between 10 mentors and 10 mentees were recorded (mean age: 51.6±13.3 years, 40% female) with a mean duration of 43.30±17.24 minutes. Nine topics (e.g., accessibility, recreation) and 21 techniques (e.g., reframing, coping strategies) were inductively identified. Techniques partially overlapped with existing coding methods (67% motivational interviewing; 14% behaviour change techniques). Discussion: Peer mentorship conversations may provide support beyond traditional behavioural counselling techniques. Motivational interviewing relational techniques may be more reflective of peer mentorship conversations as behaviour change techniques account for a small portion of the conversation. Results of this study will allow for in-depth analysis of peer mentorship conversations with the aim of improving peer mentorship programs in the future.

33. **A Day at a Beach with a Starfish Man: Anthropomorphization of a Cartoon Starfish**
Shikha Patel, Aarohi Pathak, Sandra Pacione, Emma Yoxon, Timothy Welsh
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Anthropomorphization is the process by which humans ascribe human form or attributes to non-human animals or objects. A recent study revealed that people anthropomorphized a cartoon starfish more strongly when the starfish had a face, than when the starfish did not have a face. Two experiments were conducted to determine if anthropomorphization of a cartoon, non-human animal (a starfish) occurs when: 1) visual elements associated with humans, such as clothing, were presented on the body, and 2) people read a story about the non-human cartoon character performing human activities. Participants completed body-part compatibility tasks in which they responded (thumb-press or foot-pedal) to a red or blue target (relevant feature) superimposed over the upper or lower limb (irrelevant feature) of a cartoon starfish, respectively. Experiment 1 consisted of two main presentation conditions: a starfish with a shirt and pants, and a starfish without clothing. Experiment 2 presented a starfish figure (without clothing) before and after participants read a story in which the starfish character went to the beach. Analysis of the RTs revealed body-part compatibility effects. Interestingly, the clothing and the story did not significantly modulate (increase) the magnitude of the compatibility effects. A possible explanation for such results could be that the pattern observed in both of the present experiments may be due to spatial compatibility rather than body-part compatibility effects. Alternatively, because the starfish did not have a face, the data from the series of experiments suggests that facial feature might be the key factor in facilitating anthropomorphization.

34. **The "Eyes" Have It: Restricting Eye Movements During Imagination Decreases the Accuracy of Action Imagination**
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Not only can we perform a wide variety of actions, but we can also simulate or imagine ourselves performing those actions. When we perform actions, our eyes and hands typically move in a coordinated way. Research on the role that the execution of eye movements plays during imagination has led to contradicting results. Interestingly, several studies have demonstrated a positive influence of eye movements on performance in motor imagery tasks. Recent work from our lab has revealed that the movement times of imagined actions are similar to those of executed movements (i.e., conform to Fitts' Law). Although hand movements are restricted in these studies, eye movements have not been restricted which opens the possibility that unrestricted eye movements might be supporting the generation of the Fitts' relationship during the imagination of hand movements. The present study was conducted to investigate if Fitts' relationship in a motor imagery task emerges while controlling for eye movements. Participants imagined reciprocal aiming movements in two conditions: 1) no instructions regarding eye movements and 2) instructions to fixate on a central circle. Participants also executed the

movements. Although the movement times in the fixation-imagination condition were higher than in no fixation-imagination and in execution, the Fitts' relationship emerged in each condition. These findings suggest that the imagination of action can occur without eye movements, but that the associated eye movements might assist with maintaining the accuracy of the imagination process.

35. **Not Feeling It? The Influence of Proprioception on Impulse Regulation Processes**

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Accurate reaching movements can theoretically benefit from multisensory feedback. Both vision and proprioception should be useful when performing early online limb trajectory amendments (i.e., impulse regulation; see Elliott et al., 2010). However, the notion of impulse regulation was developed with limb trajectory perturbations (i.e., altered movement demands but unaltered proprioception: Grierson & Elliott, 2008, 2009). The current study aimed to test the roles of movement demands versus proprioception on impulse regulation processes. Participants displaced one of two visually-identical aluminum cubes (i.e., 505 g and 480 g) towards a visual target (30 cm amplitude). The heavier cube was covertly switched to the lighter cube on one third of the trials, altering movement demands, and eliciting impulse regulation processes. Furthermore, to perturb proprioception, between-trial muscle tendon vibration was employed (Goodman & Tremblay, 2017). Finally, visual feedback was available on 50% of trials in a randomized fashion, to alter reliance on proprioception. Results confirmed that online vision led to more accurate and precise endpoint distributions. However, no variables analyzed yielded an interaction involving vision, suggesting that the effects of tendon vibration and cube weight were stable across vision conditions. In contrast, the lighter cube weight yielded higher peak velocities but no significant differences in endpoint distributions (i.e., effective impulse regulation). Finally, although vibration led to shifts in the average endpoint position, no measures associated with online control yielded any effects of tendon vibration. Even if methodological differences from previous work should be investigated, impulse regulation appears to be predominantly based on visual feedback.

36. **The Role of Visual Feedback on Reach Kinematics in a Rapid Decision Making Task**

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When participants are presented with a target and overlapping penalty region, participants initially aim closer to the penalty region than optimal before shifting their endpoint to a more optimal location. Previously we divided participants into three groups, to explore the effect of different types of visual feedback. In the No Feedback group, the target/penalty configuration would disappear when participants initiated the movement. In the Terminal Feedback group, the configuration would disappear and then reappear upon screen contact. Finally, a Full Feedback group saw the configuration for the entire

duration of the movement. We showed no difference in endpoint adaptation away from the penalty region over the course of exposure between the groups, but the Terminal/Full Feedback groups showed greater undershooting of the target, even once full feedback was given in a transfer task. Our results may be related to the finding that individuals have two distinct phases of movement: an initial increase in velocity to reach peak, followed by a decrease presumably to fine-tune the movement using visual feedback. The purpose of this study was to compare the kinematics of the reaches made to the target/penalty configurations under different feedback conditions to determine how visual feedback may have impacted endpoint selection. Results indicate that movement kinematics, including time after peak velocity, changed across exposure to the task in all groups. Other feedback mechanisms, aside from visual feedback, may have helped participants in all conditions select a more optimal endpoint over the course of task exposure.

37. **A Visual Perceptual Sweet Spot for Endpoint Accuracy Judgments during Slower Actions?**

Animesh Singh Kumawat, Valentin A. Crainic, Luc Tremblay
Faculty of Kinesiology & Physical Education, University of Toronto

When performing rapid voluntary actions (i.e., < 375 ms), brief visual samples provided at approximately 1.0 m/s, prior to peak limb velocity (PV), can yield more accurate endpoint accuracy judgments and online corrections than when provided earlier or later during the limb trajectory (Tremblay et al., 2017). However, it is not known if the optimal window to gather online visual feedback extends to slower actions (cf. sweet spot due to a limited opportunity to utilize online vision during rapid actions). The current study tested for the presence of a perceptual visual sweet spot for slower movements (i.e., 550-650 ms). One of three visual windows of 20 ms was provided when real-time limb velocity reached 0.3, 0.54, or 0.7 m/s, before PV, which were intended to corresponded to comparable proportions of PV than in Tremblay et al. (2017: i.e., approx. 30, 60 and 80% of PV). The results of a forced-choice endpoint judgment task (i.e., undershoot or overshoot) that followed each trial were contrasted with the actual endpoint locations. Using a correlational rank analysis, 55.56% of the participants exhibited their best endpoint bias judgments in the 0.3 m/s (cf. 22.22% participants in each 0.54 and 0.7 m/s window). The results provided some evidence for the generalizability of the sweet spot for slower movements. Also, gathering online visual feedback may take place at an optimal velocity prior to PV (i.e., 30% of PV) during slower movements, at least when making predictions about endpoint accuracy.

38. **Can Active Proprioceptive Training Improve Proprioception in Freezing of Gait?**

Rebecca Chow, Quincy Almeida
Wilfrid Laurier University

Freezing of gait (FOG) is arguably the most debilitating symptom in Parkinson’s disease (PD). Impairments specifically in proprioception have been argued to underlie FOG behaviour, therefore, proprioceptive training could be beneficial for FOG. Currently, only one study has demonstrated the potential for proprioception to be improved with training

but not in patients with FOG. In the current study, individuals with PD and FOG (n=13) completed proprioceptive training involving a target-matching task utilizing active and self-defined movements with the upper and lower limbs. Training sessions were one hour long, occurring twice weekly for a period of four weeks. Proprioceptive accuracy was assessed pre- and post-intervention using a passive upper limb joint-angle matching task at three positions (10, 30, and 60 degrees away from the starting position). Absolute, constant, and variable error were calculated for the limb most affected by disease. No improvements in constant or absolute error were found, however, a significant improvement was found in variable error at the 60 degree position. A subsequent analysis was conducted to compare participants divided into LOW and HIGH proprioceptive error groups (using a median split), and found significant time x group interactions in constant error at the 30 and 60 degree positions, and in variable error at the 60 degree condition. These findings suggest that improvements in joint-position matching are possible with proprioceptive training in FOG. It appears that the greatest benefit is in larger angles. This may be a viable treatment option for FOG behaviour, although further investigation quantifying FOG is required.

39. **The Effects of a Spatial Tonal Relationship on Keyboard Typing Proficiency**

Stevie D. Foglia, Jessica K. Skultety, Dr. James L. Lyons
Kinesiology, McMaster University

The role of vision when operating a keyboard is critical, affecting both hand placement and button searching processes. As a result, individuals with visual impairments may have difficulties with these tasks, ultimately affecting their ability and proficiency to type. Technological advances often make it harder for those with visual impairments to successfully and efficiently use modern-day communication devices. The concurrent presentation of auditory and visual feedback can have an augmentative effect on the performance of motor skills (Lewiston, 2009). This study examines the role of auditory feedback on learning a novel keyboard. Using the spatial tonal compatibility relationships thought to be inherent in humans (e.g., Pratt, 1930; Mudd, 1963; Hansen et al., 2013), auditory tones were assigned to all alphabetical keys of a DVORAK keyboard. Participants were assigned to a Compatible (COMP) or Incompatible (INCOMP) condition, such that higher tones were associated with keys either higher and rightwards, or lower and leftwards, respectively. Results suggest that, on average, participants commit fewer errors overall and are faster at performing the task 48-hours post-task acquisition. This is consistent with a learning effect, such that throughout the study, participants are able to type letter sequences at a faster and more accurate rate. Results will be discussed in the context of a spatial tonal relationship and the relative strength of learning these relationships as a function of practice.

40. **The Effects of Single and Dual Obstacles on On-Line Processes during a Manual Obstacle Avoidance Task**

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Perturbations to the upper limb in aiming tasks act to force individuals to modify their movements using on-line control processes. Studies show that individuals are able to successfully counteract these mechanical (e.g. Nashed et al., 2014) and perceptual perturbations (e.g. Elliott et al., 1995) to accurately acquire a specific target goal. A series of two studies were conducted to better understand the effects of a perceptual perturbation when performing two-dimensional sliding movements during a manual obstacle avoidance task when a second obstacle appeared unexpectedly within a preferred aiming path. On each trial, an obstacle appeared at 25%, 50% or 75% of the movement amplitude. On some trials, a second set of obstacles appeared early or later in the movement that forced participants to make on-line corrections or adapt their preferred trajectory to successfully reach the specified target. Results revealed that the possibility of the unexpected second obstacle influenced the overall trajectory and movement kinematics (i.e., whether that second obstacle appeared or not). Specifically, participants executed a more lateral avoidance trajectory and reached higher peak velocities and accelerations.. When the onset of the secondary set of obstacles occurred later into the movement, it resulted in individuals reaching peak velocities later in their movement which indicated that the possibility of a secondary perturbation resulted in more cautious movements. Results will be further discussed in the context of obstacle avoidance and movement planning behaviours as well as possible modifications to these behaviours in individuals with an Autism Spectrum Disorder.

41. **Peer-Controlled Feedback Schedules during Motor Skill Acquisition: Does Peer Experience Matter?**

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We examined whether or not task experience of a peer would differentially impact their frequency and preference for providing feedback to a novice during skill acquisition. McRae, Patterson, and Hansen (2015) showed that learners provided feedback from a peer without previous task experience learned the task similarly to learners controlling their own feedback. To extend McRae et al. (2015), a group of participants completed the experimental protocol as a self-controlled feedback participant, then determined the feedback schedule for a novice during their acquisition period. Similar to McRae et al. (2015), a group of participants without previous task experience determined the feedback schedule for a novice learner during their acquisition period. Participants completed a serial-timing task with a goal time of 2500ms. Participants completed 80 acquisition trials, then returned 24-hours later for a 10-trial no-feedback retention test. For the retention test, no statistical differences between-the groups of learners receiving feedback from an experienced or inexperienced peer for motor performance measures were

identified. This finding replicated and extended McRae et al. (2015). Based on a self-report questionnaire, peers with and without task experience reported a preference for providing feedback after poor trials. Analysis of absolute error on feedback compared to no-feedback trials showed the inexperienced peers were consistent with their preferred choice, whereas the peers with experience peers were not. These results further support the learning advantages of a peer-controlled practice context, and offer an alternative theoretical perspective to preserving a learner's autonomy during motor skill learning.

42. **Do Mistakes at the End of Practice Impair the Ability to Learn a Skill?**

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Physical practice often causes fatigue that can temporarily decrease motor skill execution and increase errors at the end of a training session. Whether these erroneous last movements impair the ability to remember successful movements performed earlier is unknown. To answer this question, participants performed a visuomotor adaptation task in which they adapted their reaching movements to a 25° counterclockwise rotation of the visual representation of their hand. Unknown to the participants, the rotation was gradually ramped up to 37° over the last 64 trials of the training session and a ±7.5° variation was introduced pseudo-randomly on 38% of these trials (VariedRamp group). This resulted in participants gradually drifting away from 25° while perceiving frequent and large errors. A second group was exposed only to a 25° rotation during the first session (Steady25 group) and a third group was exposed to the ramp up but without the pseudo-random variation (thus drifting away from 25° but without perceiving large errors; GradualRamp group). Adaptation was assessed by measuring movement direction 100ms after movement onset. Results revealed that both the VariedRamp and GradualRamp groups demonstrated a more pronounced clockwise bias at the end of the training session compared to the Steady25 group ($p < .05$). A similar bias was also apparent for both groups in a no-vision retention test performed 24h later. Our results therefore suggest that erroneous and successful movements performed at the end of a practice session have similar effects on the retention of the movements performed earlier.

43. **In a Pinch: Are Pinch Forces Mediated by Vision of the Task Hand?**

Jessica Cappelletto, James L Lyons
McMaster University

The absence of visual feedback leads to inaccurate representations of one's self-produced force, through an "overcompensation" effect wherein central predictive mechanisms related to reafference result in self-generated forces being perceived as weaker than they are (Therrien et al., 2010; 2012; 2013). These findings hold significant safety implications in situations where repetitive force productions are a requirement of a work environment (e.g., assembly lines). Thus, the goal of this study was to explore this force salience effect in an applied setting to determine if full vision (FV), no vision (NV), or augmented vision (AV) in a motor task involving pinch grips would result in differential force productions. We hypothesized that, consistent with Therrien et al, performing such

a task with FV would lead to the lowest pinch grip forces, while NV of the task would lead to compensatory force production. Furthermore, we introduced the concept of AV, through a closed-circuit camera, to determine whether this overcompensation could be mediated by means other than direct visual perception. Twelve participants used a pinch grip to complete a buckle-fastening task in 2 force directions (down and forward) and 3 vision conditions (FV, NV, AV). Impulse measures supported our hypothesis with AV and NV showing a 34.9% and 59.0% increase from FV. Results for the primary variable of interest however, did not (i.e., FV resulted in pinch forces that were not different from NV). Results are discussed in the context of attentional distribution, multi-digit manipulation and task type in the attenuation of self-produced force feedback.

44. **They Still Got It: Motor Acquisition Via Physical Guidance in a Healthy Aging Population**

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Proprioception is important for both movement planning and online control (e.g., Sarlegna et al., 2004; Bagesterio et al, 2006; Elliott et al., 2010). Although the sense of proprioception is reduced in older adults (Skinner et al., 1984), physical activity is hypothesized to maintain the ability to use proprioceptive feedback in aging populations (Ribeiro & Oliveira, 2007). Studies in young adults have found that exposure to physical guidance leads to altered use of proprioception in motor tasks (Manson et al., 2014). The present study investigated the effects of physical guidance on proprioception and sensorimotor integration processes in older adults. In a pre-test, fourteen healthy older adults (age: 73.1+/-5.6) actively performed an upper-limb reaching task to a visual target, with and without visual feedback of the environment. After the pre-test, all participants underwent an acquisition protocol that included both robot-assisted (80% of trials) and unassisted aiming movements (20% of trials). Acquisition was immediately followed by a post-test that was the same as the pre-test. The analyses revealed that movement endpoint variability for the pre-test was significantly higher in full vision than in no vision. However, performance for both vision conditions was not different in the post-test. Furthermore, analyses of movement trajectories indicated that the latter portions of participants' trajectories were more stereotyped in the post- compared to the pre-test. These results suggest that, comparable to young adult behavior, older adults can acutely benefit from physical guidance to enhance their use of proprioception to improve sensorimotor processes for the completion of voluntary action.

45. **Optimal Practice Schedule for Visually Occluded Task Learning**

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A current transformation within surgery is the development of minimally invasive techniques, particularly laparoscopy. Practice is required to reach competency in laparoscopic skills and, because the level of surgical skill is directly related to the outcome of the operation, highlights the importance of competence, which in turn is acquired through skill acquisition and retention. There is an advantage if skill acquisition

is hastened and re-training time for surgeons is reduced. Laparoscopic surgery requires the surgeon to function with their vision occluded and observe their work on a monitor above the patient and off to one side. As depth perception is removed and instruments have a limited range of motion that means reduced degrees-of-freedom. Training laparoscopic techniques using a simulator such as the 3-Dmed® laparoscopic training device can shorten operating times, increase operative skills, and reduce the risk of complications. The objective of this study is to determine an optimal practice schedule for surgeons learning laparoscopic surgical techniques through a re-examination of the findings of both Shea & Morgan (1979) and Hynes-Dusel (2002) who found conflicting results when it came to the efficacy blocked as opposed to random practice as it relates to skill acquisition and retention. Research will assess random versus blocked training using a 3-Dmed® device. Participants will be taught three motor tasks under blocked (low contextual interference) or random (high contextual interference) sequence of presentation. Retention tests will be conducted after 10 min. (short-term retention) and 10 days (long-term retention).

46. **The Impact of Cervical Radiculopathy on Upper Extremity Motor Preparation**

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Cervical radiculopathy is a common clinical description for patients with upper extremity sensorimotor dysfunction originating at the spine. Clinically, outcome measures for assessment are often based on subjective patient reported outcome measures. Such subjective measures have limitations including language and cognitive barriers. Reaction time can be used as a measure of motor preparation. The purpose of the present experiment was to determine if a reaction time task could be useful to discern differences in motor preparation between participants with cervical radiculopathy (n=9) from healthy controls (n=11). Using a between groups, cross sectional design, an upper extremity aiming task with variable levels of difficulty was performed. Participants recruited from a hospital based pre-surgical spine assessment clinic or the general community performed vertically oriented aiming movements in the sagittal plane to targets at three different heights, using two different target sizes. Participants with cervical radiculopathy demonstrated significantly longer reaction times than healthy control participants. The results of the present study provide preliminary evidence that reaction time measures may be appropriate to consider in the performance based assessment of patients with cervical radiculopathy. The exploration of further performance-based measures of the upper extremity are warranted.

47. **Choice RT and Corticospinal Excitability Differences Following Bi-Hemispheric TDCS**

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Transcranial direct current stimulation (tDCS) uses a weak electrical current applied to the scalp to alter neural excitability, whereby anodal stimulation increases and cathodal stimulation decreases the excitability of underlying structures. Excitability changes to the motor cortex have also been linked to changes in motor performance (e.g., reaction time; RT). A previous study used tDCS with electrodes placed over both motor cortices in a choice RT task involving left or right wrist extension. They predicted that RT would be faster contralateral to the anode and slower contralateral to the cathode. However, RT was decreased for both limbs, irrespective of electrode placement. This unexpected finding may have been due to a reversal in the effect of cathodal stimulation resulting in increased excitability under both electrodes. To investigate this possibility, neural excitability was monitored using transcranial magnetic stimulation (TMS) over left motor cortex during a choice RT task following bi-hemispheric tDCS. In seven participants, three tDCS protocols were applied (anode left-cathode right, anode right-cathode left, and sham; counterbalanced), with excitability and choice RT measured at 6-minute intervals for 36 minutes. Preliminary analyses indicate that choice RT was marginally reduced ($p=.25$) in each hand following only bi-hemispheric tDCS with anode-left. Although non-significant ($p=.16$), excitability was also largest following tDCS in the anode-left protocol compared to sham. While further data collection is required to confirm these results, they suggest that bi-hemispheric tDCS with the anode over left motor cortex can reduce RT bilaterally through changes in cortical excitability.

48. **The Impact of Recreational Dance on the Performance of Upper Limb and Functional Mobility Tasks for Adults with Physical and/or Intellectual Disabilities**

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Beyond traditional therapy, adults living with disability have limited access to specialized physical activity (PA) programming. The present study explored the motor performance of adults diagnosed with physical and/or intellectual disability in an existing specialized dance program. The program uses rhythmic movement and dance techniques to train balance, coordination, kinesthetic awareness, strength and flexibility. Six adults with disability (Mean age = 33) participated in 30 weekly sessions. Changes in functional mobility and balance were assessed using the Berg balance scale (BBS) and Timed Up and Go (TUG) tests at three time points: pre, mid, and post-training. Changes in upper limb performance were assessed using a reciprocal Fitts task (IDs 3 and 4) at the mid and final assessment sessions. Fitts' task outcome measures were reaction time (RT) and movement time (MT). No meaningful differences in the BBS were observed. TUG performance improved an average of 39% (6.6 s) at mid-training; performance was

maintained at the post-training assessment. Fitts' task performance improved with RT decreasing by 34% for ID3 (mid-training =302ms±172; post-training=214ms±89) and 46% for ID4 (mid-training=400ms±373; post-training=250ms±87). MT for ID3 demonstrated a 31% decrease (mid-training=700ms±685; post-training=512ms±125) and ID4 a 24% decrease (mid-training=824ms±685 and post-training=646ms±220). These findings indicate improved mobility/balance and upper limb performance. The results of this pilot study suggest that individuals living with motor and/or cognitive disability may benefit from the dance training. Future work will consider the specific effects of rhythm as it relates to diagnosis and changes in motor performance.

49. **Anti-Pointing Requires Conscious Visual Percept to Support Motor Output**

Marlowe Pecora, Matthew Heath
Western University

The ability to reach and grasp an object is accompanied by an innate experience of conscious access to the visual information supporting the response. However, actions can be performed in the absence of conscious visual awareness – a phenomenon attributed to the separate pathways supporting perceptions (i.e., ventral pathway) and actions (i.e., dorsal pathway). For example, reaching responses performed in a backward masking paradigm demonstrate speed-accuracy relations regardless of whether participants are 'aware' or 'unaware' of target size, whereas perceptual judgments require access to a conscious visual percept (Binsted et al. 2008: Proc Natal Acad Sci USA). The present study sought to determine whether a response requiring decoupled spatial relations between stimulus and response is mediated via the same 'unconscious' visual information as their target-directed counterparts. To that end, participants: (1) reported the size of target objects in 'no-mask' and 'mask' conditions (i.e., perceptual task), and (2) reached directly to (i.e., pro-pointing) and mirror-symmetrical (i.e., anti-pointing) to the same 'no-mask' and 'mask' targets. Results for the perceptual task showed that participants could accurately report the size of a target object in 'no mask' but not 'mask' trials. For the reaching task, results indicated that 'no mask' pro-pointing trials elicited reliable speed-accuracy relations, whereas 'mask' pro-pointing as well as anti-pointing (i.e., 'no-mask' and 'mask') did not. These results demonstrate that anti-pointing renders the structuring of a response via a conscious visual percept and that the top-down demands associated with response mediation influence the nature of the visual information supporting motor output.

50. **Multisensory Integration of Target and Distractor Information Within a Common Retinotopic Motor Map**

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The presentation of a remote - but not proximal – visual distractor concurrent with the onset of a visual target increases saccade reaction times (RT) (i.e., the remote distractor effect: RDE). The competitive integration model asserts that the RDE represents the time required to resolve the conflict for a common saccade threshold between target- and

distractor-related saccade generating commands in the superior colliculus (SC). Notably, the SC serves as a sensorimotor interface supporting the uni- and multidimensional (i.e., visual and auditory) integration of task-relevant information. As such, an extension of the RDE is that the conflict related to saccade generation signals is sensory-independent and manifests via visual and/or auditory target/distractor spatial information. To address this issue, the present work employed experiments wherein a visual target was paired with an auditory distractor (proximal and remote) (Experiment 1), and when an auditory target was paired with a visual distractor (Experiment 2). Further, responses were directed to the veridical (i.e., prosaccade) and mirror-symmetrical (i.e., antisaccade) location of visual/auditory targets. The basis for including antisaccades was to determine whether the sensory- or motor-related properties of a distractor influence saccade planning. Experiment 1 showed that pro- and antisaccade distractor trials produced RTs that were longer than their no-distractor counterparts – a result independent of distractor location. Experiment 2 showed that prosaccades were refractory to our distractor manipulation, whereas proximal and remote distractors respectively shortened and iengthened antisaccade RTs. Thus, the RDE is a sensory-specific phenomenon relating to conflicting 'visual' signals within a common retinotopic motor map.

SATURDAY – October 14

Free Communications - 9:00-10:30am

Motor Control
Coordination & Control of Movement in Special Populations

How Effective are Wearable Sensors in Motor Symptom Assessment in Parkinson's Disease?

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With almost 100,000 Canadians currently afflicted by Parkinson's disease (PD), assessment and care for these individuals is a constant concern. Currently, clinician assessment is the gold standard for assessing motor symptoms in PD, however this is met with limitations such as subjectivity and potential for biases of knowing when patients receive treatment. With the development of wearable technologies, a unique approach to patient assessment is possible for patients battling PD. These wearable technologies provide objective and convenient means for patients to assess and monitor their clinical symptoms at home, but the accuracy of these technologies for monitoring motor symptoms in patients with PD is unknown. This being the overarching limitation to wearable technology, the purpose of this study was to compare clinician motor assessment scores using both the Unified Parkinson's Disease Rating Scale (UPDRS) and the Movement Disorders Society-UPDRS (MDS-UPDRS) to scores obtained by a wearable sensor. 131 patients were assessed by clinician on the UPDRS (N=136) and MDS-UPDRS (N=68), and simultaneously with the wearable sensor. Overall correlations between the UPDRS/MDS-UPDRS and sensor were good (0.71, 0.74 respectively), however when breaking the correlations down into freezers (FOG) and non-freezers (NFOG) the correlation between both UPDRS/MDS-UPDRS and sensor for FOG improved (0.82, 0.76 respectively), but worsened for NFOG (0.57, 0.12 respectively). These findings suggest that wearable sensors may be adequate for assessment of motor symptoms when symptom presentation is primarily gait related (ie. FOG), however may lack accuracy when assessing NFOG patients (ie. tremor dominant).

The Effect of Symptoms of Inattention/Hyperactivity on Physical Activity across Different Levels of Motor Coordination in Young Children

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Developmental Coordination Disorder (DCD) is a neurodevelopmental disorder that affects approximately 5-6% of children (American Psychiatric Association, 2013). DCD is characterized by deficits in fine and gross motor skills resulting in decreased motor performance. Studies have

shown that DCD is associated with other developmental disorders, the most common being attention deficit hyperactivity disorder (ADHD). While children with DCD have been shown to be less physically active than their typically developing peers (Rivilis et al., 2011), the literature pertaining to how ADHD affects the relationship between physical activity (PA) and motor coordination is limited. Participants (N = 494, 218 girls, Mage = 4.47±0.50 years) in the current study are part of a larger cohort study with 261 (155 boys) children classified as at risk for DCD. Overall, inattention/hyperactivity was shown to be positively associated with MVPA (min/day) among all children ($r = .12$, $p = .009$). However, the strongest associations were found in children with DCD scoring in the 6-16th percentile range ($r = .20$, $p = .015$), and were non-significant for children below the 6th percentile ($r = .16$, $p = .14$). One possible explanation might be that the children with the most severe motor impairments that are inattentive/hyperactive may lack the confidence in their ability to engage in PA and, in turn, choose non-active pursuits to cope with their hyperactivity. These findings warrant further investigation into these constructs, and other potential psychological factors (e.g., self-perception) that may be impacting the relationship between PA and ADHD across the motor spectrum.

A Six-Month Exercise Program Improves Executive Control in Persons in the Prodromal Stages of Alzheimer's Disease: Short- and Long-Term Benefits

Matthew Heath, Erin Shellington, Dawn Gill, Robert Petrella
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Older adults with memory complaints and/or objective cognitive deficits exhibit milestones for progression to dementia – a finding drawing attention to the need to develop intervention strategies that ameliorate further cognitive decline. The present work involved a large sample of individuals meeting the definition of a subjective cognitive complaint (Scc) who participated in a 24-week aerobic/resistance training (multi-modality group: M2) and aerobic/resistance with cognitive training (multi-modality, mind-motor group: M4) program. Each group completed three one-hour exercise sessions per week over the course of the training program and it is notable that the mind-motor group’s training included a cognitively challenging task (i.e., square-stepping program) – a manipulation used to determine whether exercise in addition to cognitive training imparts an enhanced benefit to brain health than aerobic/resistance training alone. To determine whether the aforementioned programs improved executive control we contrasted pre-exercise antisaccade performance (i.e., saccade mirror-symmetrical to a target) with an immediate post-exercise time point, and again at a 28-week washout evaluation (i.e., without study-based intervention). Results showed that immediate and six-month post-exercise antisaccade reaction times for M2 and M4 groups were shorter than their respective pre-exercise performance, and that the magnitude of the executive benefit did not vary across groups. Thus, multi-modality exercise training improved executive control in persons with Scc regardless of the inclusion of cognitive training and this benefit persisted up to 28-weeks post-exercise. The washout results may reflect carryover benefits of the training program or an unanticipated increase in leisure time recreation activities.

Assessment of Visuomotor Function and Dynamic Balance Control in Youth Hockey Players with or without Previous Sport-Related Concussion over a 70-Day Period

Katelyn Mitchell, Michael Cinelli
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Introduction: Balance is now recognized as a clinical domain of sport-related concussion (SRC). Currently, the Return-to-Sport (RTS) protocol does not include assessment of dynamic stability or sensorimotor integration. Our recent findings have objectively identified youth athletes with from those without a previous SRC during a dynamic visuomotor balance task. Rationale: To determine whether a visuomotor dynamic balance task can identify differences between youth hockey players with and without previous SRC over time. Methods: Youth hockey players (n=31; age=12-17 years), who reported previous SRC (CONC= 13) and no history of SRC (CONT= 18) were tested twice over 70 days. Participants stood in single support on a Nintendo Wii Balance board sampled at 100Hz and performed three Go/No-Go tasks with each non-stance foot. Five FitLights were arranged on the floor anteriorly at +60°, +30°, and 0° and were used as the Go (GREEN)/No-Go (RED) stimulus. Balance control was assessed using RMS velocity of COP (vCOP) in anterior-posterior (A/P) and medial-lateral (M/L) planes. A repeated measures mixed-ANOVA was conducted to measure differences between groups. Results: The results indicate a significant group effect for both A/P vCOP (CONC= 8.18; CONT= 11.33, F= 18.97, p <.001) and M/L vCOP (CONC= 6.21; CONT= 7.70, F= 19.73, p <.001). The results suggest that CONC consistently performed the visuomotor task more conservatively compared to CONT over time. Importance: Incorporating a visuomotor dynamic balance task can objectively identify youth athletes with previous SRC over the course of a season and can determine true readiness for return to play.

Can the Gender Gap in Object Manipulation Skills (OMS) be reduced in Third Graders?

Dwayne Sheehan
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In general, boys are more proficient at OMS in childhood and adolescence (Barnett et al., 2010; Butterfield et al., 2012). Although it is recognized that girls often fall behind in terms of OMS development and participation in recreational activities (Sport for Life for Women and Girls, 2016), it is too often attributed to physiology and anatomy rather than educational support and developmentally appropriate programming. A 6 week intervention/program was designed specifically for girls to combine an inclusive, supportive and encouraging learning environment with multiple opportunities to develop, practice and refine OMS. This project used a ‘pre-post test’ methodology to evaluate change with the girls participating (within subject design), as well as the relative change compared to the boys in the same grade (between subjects design). The research team measured the acute impact of the all-girls OMS program as well as the retention levels by doing follow up measures 2 months after the intervention concluded. Validated product and process orientated motor proficiency measurement tools such as the Test of Gross Motor Development (TGMD-3) and the Bruininks-Oseretsky Test of Motor Proficiency (BOT-2) were utilized to ensure that any change was reliably measured. There were no significant differences between the genders at baseline. The girls showed a 21.4% improvement in OMS using the BOT2 and a 4.3% improvement when measured using the TGMD3. This study demonstrates that

the gender gap in OMS can be reduced with an intentionally designed all-girls PE program taught by an elementary specialist.

Balance Control in Individuals with Post-Concussion Syndrome during a Go/No-Go Lower Limb Reaching Task

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Post-Concussion Syndrome (PCS) is the persistence of concussion symptoms (i.e., somatic, psychological and cognitive) beyond the normal 7-14 days of recovery. Balance control impairments have been revealed in recently concussed symptomatic and asymptomatic athletes. However, it is unknown whether individuals with PCS also express balance control impairments. The purpose of this study was to examine the effects of PCS on balance control during a single-support lower-limb reaching task. Ten individuals with PCS and 10 age-, gender- and activity-matched non-concussed individuals (CONT) participated in the study. Participants stood in single support for approximately 40s in front of three FitLights positioned at 0? or 30? on either side of the midline. The reaching task required participants to reach their free limb out to deactivate any Green light (Go) and inhibit movement when any Red light (No-Go) illuminated. Participants performed 10 trials (5 times for each limb), each trial consisted of each light illuminating 10 times in random order and colour. PCS displayed increased medial-lateral (M/L) COP displacement (M=0.94 0.21cm) than CONT (M=0.77 0.07cm), t(17)=-2.44, p=.03, d=1.09). As well, PCS demonstrated increased trunk pitch RMS (M=2.71 0.73?) compared to CONT (M=1.98 0.51?), t(17)=-2.56, p=0.02, d=1.16). These results suggest that individuals with PCS have poor balance control orthogonal to the direction of movement suggesting deficits in the somatosensory system, which resulted in compensatory adjustments at the trunk to complete the forward reaching task. Overall, the findings suggest that individuals with PCS demonstrate persistent balance impairments in challenging situations.

Sport Psychology - *Youth*

Organized Sport and Physical Activity Participation and Free Play in Children and Youth: A Test of the Over-Scheduling Hypothesis using Longitudinal Data

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The relationship between organized sport participation and positive youth development is well established in current literature. However, too much involvement in sport has been identified as having a potentially negative impact. Over-scheduling and its impact on free play is one concern, given the importance of the latter to overall health and development. At present, it is not known if higher participation in organized sport has a positive or negative effect on discretionary play in youth. The Physical Health and Activity Study Team (PHAST) study is a six-year, longitudinal cohort study investigating organized and discretionary physical activity, motor competence, aerobic fitness and anthropometry in 2278 consented fourth grade children (ages 9 to 10) enrolled in public school in Southern Ontario. Using mixed effects modeling, we found that

higher participation in organized sport was associated with increased participation in free play over time (Coef = 0.16, p<.001). This effect was independent of gender and socioeconomic status. Possible explanations for this are related to the role sport might play in supporting physical literacy and the development of fundamental movement skills, allowing children to participate in more active free play pursuits. It might also be the case that active children simply seek out both organized and unorganized play opportunities during this developmental period. Limitations and implications for further research and policy will be discussed.

Examining How Learning Contexts Influence Youth's Perceptions of Life Skills Development in Recreational and Competitive Sport

Sara Kramers, Corliss Bean, Martin Camiré
School of Human Kinetics, University of Ottawa

Recently, Pierce, Gould, and Camiré (2017) developed a definition and model detailing individuals' process of learning and subsequent application of life skills (i.e., transfer). Given that the model is new, no empirical research has yet been conducted to test it. As such, the purpose of the present study was to test the Pierce et al. (2017) model, particularly the 'Learning Contexts' component. Fifty-five youth (Mage=14.5, SD=1.74; 17 male, 38 female; 38 competitive, 17 recreational) participated in individual semi-structured interviews to understand their perceptions on life skill development. A deductively oriented thematic analysis (Braun, Clarke, & Weate, 2016) was employed to analyze the data using Pierce et al.'s (2017) model. Findings indicated that the 'Sport Learning Context' and 'Family Learning Context' were the two most prominent settings where life skills development occurred. Differences between the 'Inherent Demands of Sport' and 'Program Design' were acknowledged by the youth. Further, differences were identified in the perceived importance of 'Coaches' Characteristics and Coaching Strategies' across youth from recreational and competitive programs. Practical implications of the study for coaches and program developers are explored. Limitations and future directions are discussed.

Toward a Conceptualization of Good Parenting in Youth Sport

Shannon Pynn, Nicholas Holt
University of Alberta

The purpose of this study was to conceptualize good parenting in youth sport. We addressed two research questions: 1) What do coaches perceive as good parenting in youth sport? 2) How do 'exemplary' parents support their children in youth sport? First, individual semi-structured interviews were conducted with 8 coaches (3 females, 5 males, M age= 40.1 years, SD = 15.1 years) who coached hockey (n = 4), volleyball (n = 2), basketball (n = 1), and soccer (n = 1). Coaches were asked to describe what they perceived to be good parenting in youth sport and to nominate exemplary parents they had dealt with who personified good parenting. Second, individual semi-structured interviews were conducted with 10 exemplary parents (7 mothers, 3 fathers, M age= 48.5 years, SD= 4.0 years). Parents were asked about their involvement in their child's sport, their general parenting style, and the specific parenting practices in which they engage. Interpretive description methodology was used. In this study, parents were attentive to their children's emotional experiences. They expressed this through three main categories: Shared goals, principles of an understanding emotional climate, and enhancing practices

surrounding competition. Thus, we conceptualized that good sport parents are emotionally intelligent and understand their children, themselves, and the sporting context. They understand what to do, and when and how to do it, within a complex sporting milieu. From an applied perspective, these findings may be useful for informing future policies and programs to help parents support their children in sport.

Exploring Competitive Anxiety and Personality in Early Specializing and Sampling PeeWee Boys Hockey Players

Alexandra Mosher, Jessica Fraser-Thomas, Joseph Baker
York University

In recent years there has been a growing trend towards early specialization in youth sport (Feeley et al., 2016). Athletes who specialize early often invest more heavily from a younger age, thus it has been suggested they may feel greater pressures to perform, and have higher anxiety levels (Baker et al., 2009). Personality has also been linked to anxiety (e.g. Malouff, Thorstiensson & Schutte, 2004), but no research has focused specifically on the relationship between anxiety, personality, and sport. Using the Developmental Model of Sport Participation (DMSP; Côté & Fraser -Thomas, 2016) as a guiding framework, this study examined the relationship between competitive anxiety and personality, in relation to sport trajectory (i.e., early specializer versus sampler). Seventy-seven male hockey players aged 11-12 completed tools to measure competitive anxiety and personality, while their parents completed a screening tool on boys' sport development history. Hierarchal regression analyses revealed an interaction between agreeableness and early specialization, indicating that samplers who had low agreeableness reported significantly higher levels of competitive state anxiety. Findings provide preliminary information about who early specialization may be best suited for; however, further research in different sport contexts is needed to offer insight to programmers, parents, and youths regarding decisions about children's sport pathways.

Is Life Skill Development a By-Product of Sport Participation? Perceptions of Youth Sport Coaches

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Researchers have questioned whether life skill development is an automatic outcome of youth sport participation. However, studies have shown that youth perceive that they develop life skills through their sport experiences even when coaches do not set aside time to discuss life skills. In contrast, recent research has shown that intentionally teaching life skills in sport is associated with greater developmental outcomes in youth. Nevertheless, the majority of research in this area has explored model coaches' perceptions of life skill development and no research has examined experiences of coaches who do not intentionally teach life skills into their coaching practice. As such, the purpose of this study was to understand the perceptions of life skill development from youth sport coaches who did not intentionally teach life skills. Semi-structured interviews were conducted with 23 youth sport coaches (16 male, 7 female; Mage = 38.61, SD = 13.44; Mexperience = 6.04, SD = 6.38). Thematic analyses revealed four themes based on coaches' perceptions: (a) life skills are a by-product of sport participation and transfer just happens; (b) if

intentionally addressed, it is reactive; (c) coaches recognize the value of intentionally teaching life skills; and (d) challenges associated with using an intentional approach to teaching life skills. Results provide evidence for the state of the current sport context and highlight areas for coach education related to life skills integration, including outlining the importance of intentionally teaching life skills to help bridge the gap between implicit and explicit approaches of life skill development.

Perceptions of Inclusivity: The Canadian 24-hour Movement Guidelines for Children and Youth

Emily Tennant, Lauren Handler, Dr. Guy Faulkner, Dr. Amy Latimer-Cheung
Queen's University

The Canadian 24-Hour Movement Guidelines for Children and Youth (ages 5-17) integrate the evidence-based daily requirements for physical activity, sedentary behaviour, and sleep into one comprehensive resource. Children and youth with disabilities (CYWD) are less active and more sedentary than able-bodied children. It is thus important that health resources are developed and marketed to be inclusive and accessible to CYWD. The primary objective of this study is to explore whether parents of CYWD consider the movement recommendations presented in the guidelines as inclusive for CYWD. The secondary objective of this study is to explore whether parents consider the visual identity (concept brand) of the guidelines inclusive for CYWD. 15 mothers of CYWD participated in the study, which consisted of one 60-minute semi-structured in-person or telephone interview. The diffusion of innovation theory provided a theoretical basis for the interview questions and a thematic analysis was conducted. Seven themes were identified. The results indicate that participants perceived the integrated concept favorably because it is simple to understand and visually appealing. The results, however, also indicate that the guideline recommendations and the brand messaging strategy are not inclusive or compatible with the abilities, needs, and previous experiences of CYWD. Revisions may be necessary to promote inclusion and uptake of the guidelines recommendations amongst CYWD. For example, the guidelines may need to acknowledge inter-individual differences and include examples (lists and images) of inclusive and adaptable activities for CYWD.

Exercise Psychology - *Cancer*

Acceptability and Satisfaction of Project Move: A Pragmatic Feasibility Trial Aimed at Increasing Physical Activity in Female Breast Cancer Survivors

Cristina M. Caperchione[1], Tanya Pullen[1], Paul Sharp[1], Catherine M. Sabiston[2], Joan L. Bottorff[1], Kristin Campbell[1], Carolyn Gotay[1], Susan L. Ellard[3], Kayla Fitzpatrick[1]
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Objective: Despite the physical and psychological health benefits associated with physical activity (PA) for breast cancer (BC) survivors, up to 70% of female BC survivors are not meeting minimum recommended PA guidelines. The objective of this study was to evaluate the acceptability and satisfaction with Project MOVE, an innovative approach to increase PA among

BC survivors through the combination of microgrants and financial incentives. Methods: A mixed-methods design was used. Participants were BC survivors with a mean age of 58.5 years. At 6 month follow-up, participants (n=72) completed a program evaluation questionnaire and participated in focus groups (n=10) to explore their experience with Project MOVE. Results: Participants reported that they were satisfied with Project MOVE (88%) and that the program was appropriate for BC survivors (92%). Four main themes emerged from the focus groups: 1) Acceptability and satisfaction of Project MOVE, detailing the value of the model in developing tailored group-based PA programs; 2) The importance of Project MOVE leaders, highlighting the importance of a leader with knowledge and experience concerning PA for BC survivors, 3) Breaking down barriers with Project MOVE, describing how the program helped to address common BC related barriers (i.e., body image) as well as practical barriers (i.e.,cost), and 4) Motivation to MOVE, outlining how the microgrants enabled survivors to be active, while the financial incentive motivated them to increase and maintain their PA. Conclusion: The findings provide support for the acceptability of Project MOVE as a strategy for increasing PA among BC survivors.

Taking Control: Health Engagement Control Strategies, Physical Activity, and the Mediating Effects of Psychological Needs among Breast Cancer Survivors

Anika Gentile, Benjamin Sylvester, Catherine Sabiston
Kinesiology & Physical Education, University of Toronto

Women diagnosed with breast cancer face an abundance of health challenges related to the disease and related treatments. Physical activity can help mitigate those challenges by improving health and well-being, and restoring a sense of control over one's health that is often lost. Survivors are aware of these benefits yet remain inactive. Health engagement control strategies (HECS), or a propensity to address health needs, are associated with increased motivation for health behaviors and may help in the satisfaction of basic psychological needs. Based on theoretical tenets and empirical evidence, basic psychological needs are antecedents of physical activity behavior, yet are rarely tested prospectively in this population. The purpose of this study was to examine satisfaction of basic psychological needs for physical activity as mediators of the relationship between HECS and physical activity in a sample of recently treated breast cancer survivors. Women (N=149; Mage=55, SD=11 years) completed questionnaires immediately post-primary treatment (HECS), three months later (basic psychological needs satisfaction), and wore an accelerometer for a 7-day period 9-months post-treatment to assess moderate-to-vigorous physical activity. Controlling for relevant personal and cancer specific variables, the relationship between HECS and physical activity was mediated by the satisfaction of autonomy (point estimate=1.18(83); 95% CI=.11 to 3.65), but not competence or relatedness. Findings remained consistent when controlling for baseline physical activity. These findings highlight the importance of engaging in one's healthcare and building a sense of autonomy for physical activity to support physical activity levels in the early post-treatment period following a breast cancer diagnosis.

Posttraumatic Growth in Breast Cancer Survivors: The Roles of Physical Activity and Social Support

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Posttraumatic growth (PTG) is the experience of positive psychological growth following adversity, such as a breast cancer diagnosis. There is preliminary theoretical evidence to suggest that physical activity may promote PTG in breast cancer survivors (BCS); however, causal mechanisms are not well defined. Social support is a theoretical predictor of PTG and may mediate the physical activity-PTG relationship, as physical activity contexts can create opportunities for social support. The aims of this study were to (i) test physical activity as a predictor of PTG and (ii) examine the mediating role of social support on this relationship. BCS (N=153, Mage=55, SD=11) completed self-reported measures assessing physical activity, social support and PTG at one-year post-primary treatment completion. Mediation models, controlling for ethnic background, body mass index, and marital status were estimated. There was a direct effect of physical activity on PTG (beta= .01, BCa CI=.002, .018) and an indirect effect through social support (beta= .001, BCa CI=.001, .004). Physical activity accounted for 9% of the variance in social support. Both physical activity and social support accounted for 15% of the variance in PTG. These findings demonstrate that obtaining social support and engaging in physical activity are associated with PTG in BCS, and that social support may be a mechanism by which physical activity fosters PTG. Further research is warranted to determine temporal causality through longitudinal and experimental designs. Improved understanding of the relationship between social support, physical activity and PTG will inform interventions to help BCS better cope with cancer.

Randomized Controlled Trial of a Behaviour Change Intervention to Increase Aerobic and Resistance Exercise and Quality of Life in Older Prostate and Breast Cancer Survivors: The OutPace Trial

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[1]Community Health and Humanities, Memorial University of Newfoundland
[2]Eastern Health
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Background: Physical activity (PA) has been shown to provide numerous benefits for breast and prostate cancer survivors. Regardless of the potential benefits, many survivors are not active enough to receive benefits of PA. Purpose: To pilot test the feasibility and efficacy of an implementation intention intervention on aerobic and resistance training and improving QoL in older (55+) prostate and breast cancer survivors in St John's, NL. Methods: Survivors (N=41) were randomly assigned to one of three groups: (1) two-time implementation intention, (2) one-time implementation intention, or (3) control group following baseline assessments. PA, both self-reported and objectively measured, and QoL measures were assessed at baseline, one, and three months post-randomization. Results: Analyses of covariance did not find significant differences in PA behaviours between groups at follow-ups irrespective of PA measure. Breast cancer survivors in the two-time intervention group reported significant improvements on breast cancer subscale at both follow-ups. Conclusion: Although significant differences in PA

behaviours were not found, breast cancer survivors reported QoL improvements. Low enrolment indicates the challenge of recruiting cancer survivor in St John's. This pilot study was underpowered to detect significant changes, but more research is warranted to determine how best to improve PA behaviours among older breast and prostate cancer survivors in NL.

The Effect of Social Support in Physical Activity Interventions on Physical Activity and Quality of Life among Cancer Survivors: A Systematic Review of Randomized Control Trials and Quasi-Experimental Studies

Michelle E. Klaben, Meghan H. McDonough, Julia T. Daun, L. Jayne Beselt, S. Nicole Culos-Reed, Liam J. Kronlund, William Bridel
Faculty of Kinesiology, University of Calgary

Social support is associated with physical activity and quality of life among cancer survivors. However, it is conceptualized and operationalized in a variety of ways. This makes it challenging to understand how it contributes to exercise intervention outcomes. This systematic review examined the role of social support in physical activity and quality of life outcomes of cancer survivors participating in exercise interventions. Using PRISMA guidelines (Moher et al. 2009) we searched multiple databases for studies addressing social support, and physical activity and/or quality of life in adult cancer survivors. N=38 RCTs and quasi-experimental studies were retrieved. Interventions that included components intended to enhance support for exercise and/or coping with cancer (psychosocial education, peer support, behavior change education, group exercise) often increased physical activity and quality of life. However, most research assessed multi-component interventions, making it difficult to discern the contribution of each supportive component. There was also some evidence that interventions including a supportive component increased self-reported social support. Intervention effects on physical activity were enhanced for participants who had a larger social network. Evidence on whether marital status moderated the effects of interventions on quality of life was equivocal. Increased social support from family, online peers, other participants, and one's social network during interventions was associated with greater increases in physical activity, suggesting social support may mediate intervention effects. Future research is needed addressing how interventions contribute to the development of different forms of social support, and identifying the mediating and moderating supportive mechanism in this context.

Identifying Effective Physical Activity Guideline Dissemination and Implementation Strategies on Health Care Professionals in a Cancer Care Context: A Systematic Review

Kaitlyn Kauffeldt[1], Jennifer Tomasone[1], Rushil Chaudhary[2], Melissa Brouwers[3]
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[3]McMaster University

Newly-developed physical activity guidelines for people with cancer were released to assist health care professionals (HCPs) in providing evidence-based physical activity recommendations to patients. Given the paucity of research examining effective strategies for physical activity guideline dissemination and implementation for HCPs, reviewing the literature for effective strategies for clinical practice guidelines (CPGs), broadly defined, is required. The purpose of this systematic review was to determine the effectiveness of CPG dissemination and

implementation strategies among HCPs in the cancer care context. A comprehensive search of five electronic databases was conducted. Studies were limited to the dissemination and/or implementation of a CPG targeting cancer care HCPs. Two reviewers independently assessed study quality and coded intervention strategies using the Mazza taxonomy in the 28 included studies. Interventions used 22 of a possible 49 strategies, with a mean number of 3 strategies per intervention (SD=1.45). Educational strategies (n=19), providing reminders (n=10), and distributing the guideline (n=9) were the most utilized strategies targeting HCP behaviour. Organizational and group education strategies used as part of multi-component interventions were found to correspond with positive changes in HCP behaviour and/or patient outcomes. When used as independent intervention strategies, providing reminders and feedback on compliance corresponded with positive changes in HCP behaviour and/or patient outcomes. Future physical activity guideline dissemination and implementation interventions for cancer care HCPs may benefit from utilizing the above intervention strategies. However, exploring currently unused strategies may identify additional suitable physical activity guideline dissemination and implementation intervention strategies in the cancer care context.

Poster Session II - 1:00-2:00 pm

1. **Exploring Coach Perceptions of Social Identity, and its Implications for Teammate Moral Behaviour in Youth Sport**

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Experiencing a strong sense of social identity can result in a variety of beneficial outcomes (e.g., morale, self-esteem; Haslam et al., 2009), and research highlights the significant role that leadership plays in facilitating identity perceptions (Slater et al., 2014). Whereas studies with youth athletes' have demonstrated relations between social identity and moral behaviour (Bruner et al., 2014, 2017), coach perceptions and experiences pertaining to this association remain unclear. As such, the current study sought to examine coaches' perceptions of the identification derived from team membership in youth sport and whether these social identities influence athletes' moral behaviour. Semi-structured interviews were conducted with seven head coaches (Mage = 48.29 years; SD = 6.73 years; Mexper. = 11.57 years; SD = 5.35 years) of male (n = 3) and female (n = 4) elite youth ice hockey teams. Thematic analysis (Braun et al., 2017) facilitated the identification of five themes (Ts). Generally, coaches discussed how athletes (and parents) joined elite hockey teams with a preconceived meaning and value attributed to team membership (i.e., cognitive centrality) (T1), and that the coaches' role in social identity development lies in ensuring athletes' enjoyment (i.e., in-group affect)(T2) and establishing connections with teammates (i.e., in-group ties) (T3). Interestingly, coaches identified parents who prioritize their child's individual performance as a barrier to the adoption of social identity (T4). Finally, whereas coaches highlighted several examples of moral behaviours, explicit links to identity perceptions were not made (T5). Both practical implications and future directions will be discussed.

2. **Canadian Major Junior Ice Hockey Coaches' Perceptions Regarding the Identification, Management, and Transformation of Difficult Athletes**

William J. Heelis, Gordon A. Bloom, Jeffrey G. Caron
McGill University

Difficult athletes withhold effort, possess negative emotions, mistreat teammates, defy coaches, and break team rules (Cope, Eys, Schinke, & Bosselut, 2010). These difficult behaviours will disrupt team functioning if they are not identified and managed properly. Given that most coaches will encounter difficult athletes during their careers, it is surprising that little empirical attention has examined their role(s) in managing these individuals. The purpose of this study was to explore this topic from the perspective of expert Canadian Hockey League (CHL) coaches. Using a transcendental phenomenological approach (cf. Moustakas, 1994), we interviewed eight CHL head coaches and inductively analyzed the interview data. The results indicated that the management of difficult athletes involved a 6-step process: (1) early identification, (2) addressing concerns, (3) providing clear expectations and roles, (4) enforcing consequences, (5) making progress through process goals, and (6) transforming difficult behaviours. This presentation will explain how coaches can effectively manage difficult athletes, including the importance for coaches to develop their emotional intelligence to recognize and then manage difficult athletes—sooner rather than later. Moreover, these results point to the importance of coaches reaching out to athlete leaders, teammates, trainers, and billets to help transform difficult athlete behaviours. These findings have practical application for all coaches as well as other members of the sport environment, such as assistant coaches, general managers, and athletic directors so they can support head coaches in the management of difficult athletes.

3. **Heart Rate Variability Analysis and Mental Health Outcomes in University Female Hockey Players**

Kaitlyn G. Jacobs[1], Emilie Woerhle[1], Stephen Klassen[1], Sarah Deck[1], Despina Kouali[1], Dave Humphreys[1], Craig Hall[1], J. Kevin Shoemaker[2]
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Exercise improves anxiety and depression, both of which are associated with impaired autonomic regulation of heart rate. Measuring heart rate variability (HRV) provides a means to measure physiologic consequences of external stressors and has a primary application in clinical settings. The influence of mental health on HRV remains understudied in university student athletes who experience stresses to perform both academically and athletically. The current study evaluated HRV as an indicator of psychological resilience in female varsity hockey players. Seventeen healthy female hockey players at Western University aged 17-23 (M = 21, SD = 1.5, BMI: 26.3 ± 1.9kg/m2) participated in this study at three time points throughout the 7-month season. Five minutes of steady-state R-R recordings (Bodyguard-2 device; Firstbeat Technologies Ltd.) were collected 30 minutes following the participants' recorded onset of sleep. Surveys of general anxiety (GAD-7) Brief Resilience Scale (BRS), and Mental

Health Inventory (MHI) were completed prior to games. Measures of HRV, specifically the root mean square of successive differences (RMSSD) were calculated from continuous R-R data. Throughout the season, BRS scores significantly increased from time one to time three (3.64 ± 0.28 vs. 4.18 ± 0.36, $p < 0.05$, respectively), and RMSSD correspondingly increased from time one to time three (59 ± 18 ms vs. 72 ± 28 ms, $p < 0.01$, respectively). Despite the demanding 7-month hockey season both RMSSD and BRS improved. However, they showed no correlation signifying the proposed relationship between RMSSD and resilience is not supported by the current data.

4. **Is Imagery Enough? Do the Effects of Imagery Practice Provide Substantial Results to Replace Physical Practice**

Shelby Rodden-Aubut
Wilfred Laurier University

Objectives: It has been proven that there is a possibility to improve the strength of a muscle through the use of imagery. The aim of this study is to determine whether or not, if the increase in strength is possible, the use of imagery can provide significant increases in a skill related task – in this case, kicking. The purpose of the experiment is to determine if imagery alone can be sufficient in the acquisition and or improvement of a soccer kick for accuracy. Design: A quantitative comparison to explore the link between imagery practice and kicking practice on skill maintenance, acquisition, and improvement. Method: A comparison of participant scores from control, physical practice, and imagery practice interventions to determine improvement from baseline kicking scores to final kicking scores. Baseline scores and final scores were compared between groups, and the differences between baseline and final scores were compared within each group. Results: The study demonstrated that imagery practice can provide significant increases in the performance of a skill related task when compared against the use of physical practice and no practice. The imagery practice group was the sole group to experience a significant increase at the .05 level. Conclusions: With the results a window has been opened into the uses of imagery for the benefit of skill improvement, and the possibility to apply imagery to the field of physiotherapy and rehabilitation to maintain and improve skill capacity.

5. **Relative Age Effects in Female Sport Contexts: A Systematic Review and Meta-Analysis of Data (1984-2016)**

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Subtle age differences can lead to immediate participation and long-term attainment influences in sport; commonly known as Relative Age Effects (RAEs; Barnsley et al., 1985). The prevalence of the RAE remains relatively undetermined for female sport contexts. Accordingly, the objective of this study was to examine female participation trends with respect to relative age in the published literature by evaluating the birth

quartile distribution of athlete samples. Following PROSPERO (Reg. no. 42016053497) and PRISMA systematic search guidelines, 57 studies spanning 1984–2016 were identified and contained 308 independent samples across 25 sports. The overall prevalence and strength of the RAE across and within female sports contexts was determined, and moderator variables were assessed using odds ratio (OR; events vs. non-events) meta-analyses, applying an invariance random-effects model. The overall pooled estimate comparing the relatively oldest (Q1) v relatively youngest (Q4) suggested a small, but significant RAE (OR 1.25; 95% CI = 1.21-1.30; p = 0.01). Sub-group analyses revealed RAE magnitude was greater at pre-adolescent and adolescent age groups (<14 years) suggesting growth and maturation accounts for RAEs in females. However, RAEs persisted at elite levels indicating talent selection procedures may perpetuate the effect. RAEs were also observed in team-based sports (e.g., ice hockey) and individual activities associated with high physical demands (e.g., alpine skiing). Findings suggest interactions between athlete developmental stages, competition level and sport context demands moderate RAE existence and magnitude across and within female contexts. To reduce and eliminate RAE-related inequalities, direct policy, organizational and practitioner intervention are required.

6. **Modifying the Treatment Self-Regulation Questionnaire to Measure Motives for Rehabilitating from an Athletic Injury: Project Motar**

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Objective: Grounded in Self-Determination Theory (SDT; Deci & Ryan, 2002), the main aim of this study was to evaluate a modified version of the Treatment Self-Regulation Questionnaire (m-TSRQ; Levesque et al., 2007) for assessing motives held by athletes for entry into rehabilitation following a sport injury. Methods: Using an experimental (post-test only) design, participants (N = 94) were randomly assigned to one of four conditions that used a series of unique, hypothetical vignettes as the independent variable. The vignettes differed in terms of the intrinsic/extrinsic approach to entering athletic therapy following an injury to the anterior cruciate ligament adopted by an athlete. Participants completed the m-TSRQ after reading the vignette. Results: Item-level analyses yielded evidence of potential floor/ceiling effects exhibited by 4 (26.67%) of the m-TSRQ items. Score reliability estimates were heterogenous within the sample per experimental condition (M? = 0.64; SD? = 0.20; Range = 0.12 to 0.88). Almost one-fifth (18.74%) of the reliability estimates were below 0.50 whereas only 31.25% of the reliability coefficient exceeded 0.80 in this sample. Multivariate differences were evident across groups (Wilk's Lambda = 0.21, F(12, 233) = 15.52, p < .01, partial eta-squared = 0.41) with between-groups effects indicating that the m-TSRQ subscales were responsive to the experimental stimulus deployed in the hypothesized directions. Discussion: Modifying the m-TSRQ may be a plausible approach for assessing the motivational basis for sports

injury rehabilitation exhibited by athletes. Nevertheless, issues pertaining to score reliability warrant further instrument development and evaluation studies.

7. **"I Think That Unless You're In It, You Don't Understand": A Case Study of an Elite Sport School Academy**

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Purpose: Elite student-athletes in Canada report issues balancing their dual careers. Eighty percent of student-athletes in British Columbia indicated having difficulties balancing school and sport commitments (Way et al., 2010). Canadian university student-athletes' lives were found to revolve around three competing pillars: social, academic, and athletic (Miller & Kerr, 2002). Student-athletes often had to make compromises among these pillars leading to failings in academics, social isolation, or diminished athletic pursuits (Miller & Kerr, 2002). This research examined the experience of elite student-athletes participating in an elite sport school academy in Ontario, specifically focusing on the impact of the program on athletic, academic, and psychosocial development. Method: A qualitative case study design employed in-depth, semi-structured interviews with female student-athletes participating in the academy's basketball stream (n=9; mean age=16). Interpretive thematic analysis was used to analyze the data. Results: Results indicate that the elite sport school academy had a significant impact on the lives of the student-athletes; participants discussed many factors that impact their dual careers. Specifically, four themes include: perceptions of living up to the standards of an ideal athlete, the unique requirements of an elite sports academy (e.g. structure, holistic training), reconciliation of competing pillars, and what constitutes successful social support. Conclusion: Participation in the elite sport school academy played a critical role in the well-being of student-athletes as well as their performance in both athletics and academics. These results have implications for Canadian student-athlete development and more specifically in terms of the future of this academy.

8. **Exploring the Effect of Simulated Crowd Noise on Multiple Object Tracking Performance in Usport Football Athletes**

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Background noise is present in most daily activities. For some individuals, this noise can be dismissed; for others however, background noise can have a negative effect on an individual's ability to perform (e.g., Söderlund et al., 2010). Little work has been conducted on how attentionally-based performance (i.e., multiple object tracking, MOT) is affected when audio stimuli is present in athletic populations. The objective of this study was to examine if and how noise impacted MOT performance in university level

football players. Twenty USPORT level football athletes (M age = 20.45 yrs, SD = 1.65 yrs) participated in a 6-session (18 trials) 3D-MOT training experience using the NeurotrackerTM (Cognisens Inc.). Ten athletes completed the training in a dark room with no external noise (had noise cancelling headphones); while the other ten athletes completed the training in the same room but were exposed to a consistent simulated crowd noise. No significant differences in baseline visual tracking speed (VTS) scores between the two groups ($p > 0.05$) were found. After the 18 training sessions, the mean VTS score for the noise group was 2.07, SD = 0.24. The no noise group averaged significantly slower, $t(1, 18) = 2.4$, $p < 0.028$ at M = 1.77, SD = 0.32. Athletes typically perform in loud stadiums and these findings could be explained by the ability to block out external distractions. Indeed, the presence of the simulated crowd noise may actually enhance the ecological validity of the training sessions. Limitations and future directions will be discussed.

9. **Stop Your Passion! The Role of Passion Dimensions and Activity Control in Responses to Passion-Threatening Messages among Passionate Runners**

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People devote a substantial amount of time and energy toward the pursuit of their passions in life. But what happens when people learn new information arguing that they need to stop pursuing their passion altogether? Relying on the dualistic model of passion (Vallerand, 2015), we tested if evaluations of these types of passion-threatening messages depended on the extent to which a passion was harmonious, which entails a self-concordant relationship with an activity that is integrated with the rest of one's life, or obsessive, which emerges when an activity overwhelms the self and is pursued even at the expense of other life domains. We also tested if the relationship between passion dimensions and message evaluation was affected by one's sense of control over activity engagement. We recruited passionate runners (n = 349) to complete an experimental study in which they reported levels of harmonious and obsessive passion for running, were randomly assigned to either read or not read a message emphasizing that people do not have control over the passions they pursue, and then read and evaluated several novel arguments for why they should stop running. We found that harmonious passion, but not obsessive passion, predicted more negative evaluations of the arguments, and that this effect was significantly attenuated in the no activity-control condition. Although previous research has linked obsessive passion with defensive behaviour, these results identify a context in which harmonious passion predicts defensive responses, and highlight the role of activity choice in explaining this relationship.

10. **Trajectories of Performance and Motivation for Competitive Swimmers**

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This study investigated the longitudinal trajectories of swimmers' competitive performance results, as well as the motivational predictors of the emerging trajectories. XXX swimmers were followed for seven swimming seasons (2010 – 2016). In 2010, athletes provided background characteristics (age, gender, years of experience) and completed self-determination theory-based measures of sport and general motivation. Their top score from each season (2011 – 2016) were then used to track their performance trajectories. The data were analyzed using latent growth mixture modeling to determine the best-fitting model of performance trajectories and the motivational and background characteristics were explored as predictors using multinomial logistic regression. The analyses revealed five similar latent classes: Dropout, Delayed Dropout, Stable, Improvement, and Greatest Improvement. Analyses indicated that the background characteristics did not differ between trajectories; however, members of the dropout and delayed dropout groups reported higher controlled motivation and amotivation for sport at baseline, where the dropout group displayed higher levels than the delayed dropout group. Autonomous motivation towards sport was not associated with any trajectories; however, general autonomous motivation was positively associated with the improvement and large improvement groups, where athletes in both trajectories reported more autonomous general motivation than the other trajectories. The results found support for trajectories for athletes' where some dropped out immediately, or within a couple of years. The remaining athletes kept swimming, but some demonstrated consistent performances, and others improved somewhat or a lot. These results support that motivation not only predicts athletes' persistence within their sport, but also their potential improvement.

11. **Group-Based Guilt, Shame, Pride, Envy, and Embarrassment, and Sport Identity Predict Sport Enjoyment and Commitment in Young Female Athletes**

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Objectives This study examines (i) how group-based emotions are related to sport enjoyment and commitment, and (ii) whether sport identity moderates these associations. Methods Group-based self-conscious emotions, sport identity, sport enjoyment and commitment were assessed in 256 young female athletes that ranged from 11 to 17 years of age (Mage= 14.11 years, SD = 1.38 years). Participants were involved in recreational or competitive sport in the Greater Toronto Area. Data were analyzed using multivariate linear regression analyses. Results Group-based guilt, shame, envy, and embarrassment were negatively associated with sport enjoyment (? ranging from -.09 to -.20, all $p < .05$) and guilt, shame, and embarrassment were related to sport commitment (? ranging from -.11 to -.14, all $p < .05$). Group-based authentic pride was positively associated with both sport enjoyment (? = .23, $p < .01$) and commitment (? = .16, $p < .01$), while hubristic pride was unrelated to both enjoyment and commitment. Social identity in sport was

independently associated with enjoyment and commitment in all models (? ranging from .23 to .28, all $p < .05$). A significant interaction was found for group-based guilt and social identity, suggesting that the relationship of guilt with enjoyment and commitment increases among individuals with stronger social identity. Conclusion Group-based emotions—and in parallel social identity—may be worthwhile targets for interventions that aim to improve sport outcomes and mitigate high rates of sport dropout currently observed among young female athletes.

12. **Global Social Support and Social Relatedness in Physical Activity are Independent Predictors of Increased Mental Health and Reduced Anxiety Symptoms Among Young Adults**

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INTRODUCTION: Social support and social relatedness are widely recognized to have a powerful effect on physical as well as mental health. Many interventions including physical activity (PA) can improve social determinants of mental health. This research aimed to investigate if general social support and social relatedness specific to the physical activity context impacts positively on mental health and negatively on anxiety and depression among youth. METHODS: A total of 1527 students (58% female; mean age = 18.4 years, SD = 2.4) completed questionnaires at baseline; 460 completed follow-up questionnaires 6 months later (Quebec, Canada). Multivariate linear regressions were performed to model the associations between global social support and social relatedness in PA at baseline and mental health, anxiety and depressive symptoms at follow-up controlling for sex, age, perceived socioeconomic status, PA volume and mental health/disorders symptoms at baseline. RESULTS: Global social support and social relatedness in PA were independent predictors of increased mental health (respectively ? (95%CI)= .18 (.04, .33) and ? (95%CI)=. 25 (.06, .44)), and decreased anxiety symptoms (respectively ? (95%CI)= -.06 (-.11, -.02) and ? (95%CI)= -.07 (-.13, -.02)). Only global social support was a significant predictor of decreased depressive symptoms (? (95%CI)= -.09 (-.14, -.04)) CONCLUSION: These results suggest that both global social support and social relatedness in PA are predictors of mental health an anxiety symptoms. Interventions aiming at promoting mental health and preventing anxiety disorders among youth should not only target social support but also focus on enhancing social relatedness in the specific context of PA.

13. **Should Preschoolers Participate in Organized Sport? A Systematic Review of Psychosocial Outcomes of Young Children's Sport Participation**

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Organized sport is being offered to children at increasingly younger ages, with many programs now geared towards preschoolers, toddlers, and even infants (AAP, 2001). While sport is promoted as an amendable context to advance the healthy development of school-age children (Côté & Fraser-Thomas, 2016; Holt et al., 2017), little is empirically

known about the potential benefits or risks associated with organized sport participation in early childhood. A systematic review of nine electronic databases was conducted to identify English-language, peer-reviewed, original research articles which address psychological, social, and cognitive developmental outcomes of organized sport involvement of children between 2 and 5 years of age. Studies included in the review were appraised for quality. Results suggest only limited research has been conducted in this area, with all study designs including parent or teacher proxy-report or assessment. Findings of these studies offer some evidence that early sport participation is related to positive outcomes such as self-regulation, pro-social behavior, social cooperation, and classroom engagement. This review reinforces the notion that little is known about preschooler organized sport participation as a distinct form of physical activity, despite the pervasive availability of preschooler organized sport programming, and positive parental perceptions of early sport enrollment (Nonis, 2015). Additional research with stronger methodological design and rigor is needed; it is suggested that a greater understanding of this context could be gleaned through interview and observational data collection techniques. Further recommendations to enhance the quality of future studies with young children in sport are discussed.

14. **Passion and Psychological Commitment in Competitive Collegiate Sport**

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Introduction Enduring participation in sport is partly driven by psychological commitment. Athletes' preferences and attitudes are important to predicting their participation (Ajzen, 1991). Drawing from the literature regarding passion and goal-directed behaviours (Vallerand & Miquelon, 2007) and passion and involvement (Wilson & Potwarka, 2014), this study explores the connection between passion and collegiate athletes' psychological commitment to sport. Method and Results Collegiate athletes participating in team sports at four Canadian universities (n = 587) completed measures of passion (Vallerand et al., 2003) and psychological commitment to their sport (Kyle et al., 2007). Cluster analysis produced four equally-sized passion profiles comprised of combinations of high and low harmonious and obsessive passion. A one-way ANOVA suggested that commitment to sport differed between the segments, $F(3, 574) = 52.14$, $p < .001$. Commitment was highest when both types of passion were high ($M = 5.75$) and lowest when both types of passion were low ($M = 3.07$). However, those with high levels of harmonious passion and low levels of obsessive passion ($M = 4.57$) were no more committed to participation than those with low levels of harmonious passion and high levels of obsessive passion ($M = 4.67$). Discussion Both harmonious and obsessive passion play important roles in collegiate athletes' commitment to sport. This finding challenges previous research that has shed a negative light on obsessive passion (Wilson & Potwarka, 2015). Participatory attitudes such as commitment are linked with positive and negative aspects of passion.

15. **Applying Self-Compassion to Address the Negative Factors Related to Early Retirement among South Korean Student Athletes**

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Self-compassion is relatively a new psychological construct that could help elite athletes to positively deal/cope with negative experiences. To evaluate the construct of self-compassion as a means to address negative factors related to South Korean student athletes' early retirement, the current study narratively reviewed self-compassion, which has been shown to be an effective means to positively influence individuals' psychological well-being. This study critically analyzed and narratively reviewed self-compassion in order to apply the construct to help Korean student athletes cope with the negative factors of early retirement. In addition, the study conducted an unsystematic narrative review (see Green, Johnson, & Adam, 2006) to summarize the contents of previously published data. Self-compassion consists of three elements that include self-kindness, common humanity, and mindfulness. Self-compassion involves being open and touched by one's own suffering and offering non-judgmental understanding, patient, and kindness, recognizing that all humans are imperfect, can fail, and make mistakes. Previous studies have commonly utilized the construct as a tool for addressing elite athletes' injuries, setback, emotional pains, and eudaimonic well-being. However, self-compassion has never been discussed by Korean researchers (in the elite sports context). The Major reasons for Korean student athletes' early retirement are injuries, stresses of training, competition, future career aspiration, pressures to succeed, or/and loss of enjoyment(interest). Self-compassion could be one of the means by elite athletes that positively deal or cope with the negative factors of their early retirement. The current study would introduce the new psychological concept to Korean research and contribute to promoting research on self-compassion related to Korean student and elite athletes.

16. **Applying Developmental Model of Sport Participation to South Korea's Sport Context: Student Athletes' Early Retirement Approach**

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Over 90 percent of basketball student athletes in South Korea retire early due to physical, social, or psychological challenges. After they do so, they may struggle to adapt to their school lives and to live the rest of their lives as non-student athletes. In light of these challenges, elite and recreational sports organizations which had operated separately for several decades were merged in 2015 in order to create a more supportive environment for young athletes. The purpose of this study was to explore students' experience with early retirement and to assess the initiatives planned by Korea's newly integrated sports organizations using a psychological-based model, the Developmental Model of Sport Participation (Côté, Baker, & Abernethy, 2007). Four early-retired student athletes and two employees at sports organizations dedicated to student basketball were recruited to participate in semi-structured interviews. To increase credibility, this study utilized techniques including member checking, investigator triangulation, and data source

triangulation. Early-retired student basketball athletes stated that they felt negative emotions such as sorrow, anger, and regret about their early retirement at the time they left basketball. In addition, the DMSP is closely related to the new integrated organizations' objectives, it could therefore positively influence students' experiences of early retirement. The Korean sports system has provided only one model for athlete development: early specialization, which may cause physical, social, or psychological harm. Therefore, the DMSP could be an effective guideline for Korea's new sports organization and may help it to create a new pathway for students to become elite basketball athletes. It could thus alleviate the negative implications of early retirement among Korean student athletes.

17. **Fast or Slow? Investigating Player Approach Speed in National Hockey League Shootouts and its Effect on Performance**

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Evidence from professional soccer suggests that time spent preparing for shootouts predicts shootout performance. Using a liberal alpha level, Jordet and Hartman (2008) found players who prepared their shots slowly were 73% more likely to have scored in soccer shootouts than players who prepared quickly ($p = .098$). The authors surmised that, to get the stressful shootout "over with," some players rushed their shots, resulting in poor performance. Building on research examining shootouts in the National Hockey League (NHL; e.g., McEwan et al., 2012), the main objective of the present study was to explore whether player approach speed predicted performance in NHL shootouts. Based on Jordet and Hartman's findings, we hypothesized that players with slow or moderate approach speeds would be more likely to score than players with a fast approach speed. We conducted frame-by-frame video analyses of 2,551 shootouts (357 games) from the 2013-2014 through 2015-2016 seasons. We then created groups representing different player approach speeds: slow, moderate, and fast. Logistic regression analyses indicated player approach speed did not predict shootout performance. Additional analyses indicated neither shot type (i.e., shot or deke) nor approach tactic (i.e., direct or indirect) predicted shootout performance. However, shooter quality was related to performance (OR = 1.06, 95% CI [1.05-1.06]), suggesting players with higher average shootout scoring percentages had slightly greater odds of scoring. Our findings concerning player approach speed do not align with those concerning preparation time in soccer. The dynamic nature of hockey shootouts relative to soccer shootouts might explain this discrepancy.

18. **"Hard Work, Sacrifice and Focus will Never Show up in Tests": Varsity and Club Athletes' Attitudes towards Performance Enhancing Drugs and Nutritional Supplements - Do Gender and Sport Type Make a Difference?**

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Emerging evidence suggests that athletes' attitudes towards performance enhancing drugs (PEDs) may differ depending on gender of the athlete and the sport they play (contact vs. non-contact). Further, while there is research regarding the attitudes towards PED use in sport, there is minimal research regarding the use of supplements. The purpose of the present study was to examine the attitudes of varsity student-athletes towards PEDs and nutritional supplements; identify personal perceptions associated with these attitudes; and test for differences in attitudes across gender and sport type. Varsity and university club athletes (n=92) completed measures of athletic identity, social norms, self-efficacy, personal standards, pressure from coaches and parents, and attitudes toward supplements and banned PEDs as well as open-ended items on perceptions of, and access to PEDs and supplements. Athletes reported more liberal attitudes towards supplements than PEDs ($p<.05$). Hierarchical regression revealed that attitudes towards PEDs (B=.22), social norms (B=.28) and self-efficacy (B=.21) were significant predictors of attitudes towards nutritional supplements. Differences in attitudes towards PEDs and supplements were tested separately. A main effect was found for gender, with male athletes reporting more liberal attitudes towards nutritional supplements than female athletes (3.74 vs 3.20, $p<.001$). Responses to the open-ended questions highlighted the perceived ease of access to both supplements and PEDs, the normalization of supplements in sport, the perceived pressure on young athletes to perform, and distaste for those who take banned substances. These findings align with and extend existing evidence and may inform educational interventions for varsity sport programs.

19. **Who I Am Depends on What You Do: Parents' Form Athletic-Identities through their Child's Sport Participation which has Consequences for Parent Expectations and Social Control**

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Identity theory states that our sense of self is composed of multiple roles or identities (IDs) that we hold (parent, teacher, athlete). It has been suggested that enrolling children in sport has become a means through which parents define themselves, and that this is fueled by the increasing social value placed on athletic achievement. The present investigation assessed to what degree parents reported athletic-ID centering around their child's sport participation; examined potential differences in expectations and social control as a function of parents' ID; and determined the association between parents' ID and social networks, and behaviour defined as the pursuit of specialized sport opportunities. Parents of children aged 8-12 in recreational sport participated in this prospective, observational study. Data was collected at three time points. Parents' athletic-IDs ranged from 1.00-6.67/7. MANOVA ($p=.002$) revealed that those with stronger athletic-IDs reported exercising more social control over their child's sport engagement (Low=2.04, High=2.68) and had higher outcome expectations for their children to build a strong social group (Low=5.76, High=6.62) and achieve a high level in sport (Low=4.15, H=5.44, $ps<.05$). Athletic-ID at baseline was not associated with the importance of connecting with other parents, and was negatively associated with plans for pursuing specialized sport ($r=-.23$), nor did it predict who chose to enroll their children in specialized sport opportunities. These findings provide evidence that parents

do indeed form IDs based on their child's sport participation. The influence these IDs have on parents' perceptions may contribute to how they shape the sport experience for their kids.

20. **Training Histories and Sporting Backgrounds of Athletes with Acquired Disabilities: Does an Athlete's Experience Prior to Injury Influence their Sporting Selection and Performance in Parasport?**

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There is some evidence that participating in a broad range of sporting activities can reduce the number of hours of sport-specific training required to reach elite level performance in sport (Baker, Côté, & Abernethy, 2003). However, research investigating the influence of mainstream sport experience on parasport athletes' development is scarce. Therefore, we examined the training and sporting histories of 36 wheelchair basketball players with acquired disabilities to better understand the relationship between sporting experiences in mainstream sport and eventual success in parasport (i.e., competing nationally or internationally). Athletes completed a modified version of the Developmental History of Athletes Questionnaire (Hopwood, 2013). Nineteen athletes participated in organized sports prior to disability acquisition, 13 of which were mainstream sport high-performance athletes (HPA; national=8, international=5). The most common sports reported were basketball (n=7), volleyball (n=7), and soccer (n=7). Further, 12 of the 13 HPA were competing in team sports at the elite level prior to disability acquisition. The 13 HPA continued their success in wheelchair basketball, competing at the national or international level. Compared to athletes competing provincially or lower, HPA did not invest significantly more hours to training at the initial stages of their wheelchair basketball career, however, they currently devote significantly more hours to deliberate training. Although additional research is needed, preliminary findings from this study suggest a relationship between athletes' previous training and sporting experiences in mainstream sport and athlete development in parasport, which may have implications for talent identification and development programs.

21. **What Physical Activity Messages do People Attend to, Prefer, and Evaluate More Favourably?**

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Physical activity promotion messages have received increasing empirical attention over the last decade, and despite contributions to the literature, researchers have advocated a need to utilize a more complex approach. The Comprehensive Messaging Strategy for Sustained Behavior Change (CMSSBC) is a recently conceptualized approach to messaging that may be a promising alternative to understanding how to effectively deliver physical activity promotion messages. This approach recommends that messages

be tailored to the recipients stage of change (detection, decision, implementation, or maintenance stage), yet framed intrinsically, following a Self-Determination Theory conceptualization. This research served as a preliminary study designed to test participants' preferences for, attention to, and evaluation of physical activity promotion messages guided by the CMSSBC. Participants included 81 male, 211 female, and 1 transgender adult(s), aged 19 – 65 (Mage = 29.06), with BMI's that ranged from 17.22 to 52.45 (M = 25.53), and on average reported engaging in 37.02 METs of moderate to vigorous leisure-time physical activity. This cross-sectional study required participants to complete a demographic section, questions about their stage of change, motives, and goals for physical activity, and to evaluate eight physical activity promotion messages that were tailored to one of the stages of change and framed either intrinsically or extrinsically. The results of the study findings indicated that participants in general preferred the intrinsically framed messages as opposed to the extrinsically framed equivalent messages, and reported notable aversive reactions to the extrinsic messages, in particular the images.

22. **Testing a Mediational Model: The Relationship Between Support Styles, Relationship-Inferred Self-Efficacy, Self-Efficacy, and Exercise in Cardiac Rehabilitation**

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Including supportive partners as part of cardiac rehabilitation programs (CRP) is important, as couple-oriented intervention programs are more successful than individually-oriented ones. However, relatively little is known about how partners can best support patients in making the necessary lifestyle changes recommended for optimal recovery. Further, while relationship-inferred self-efficacy (RISE) has been shown to be an important predictor of patients' self-efficacy in CRP, it is unclear as to how types of support from a partner may influence these perceptions. The current study examined the relationship between support styles and exercise in CRP patients, and whether this relationship was mediated by RISE beliefs and self-efficacy. To test this model, patients (N = 49, Mage = 63) and their support partners completed questionnaires containing items assessing these constructs at week 1 and week 9 of a 10-week CRP. To carry out the mediational analyses, PROCESS, an SPSS macro was used. Significant two-step mediation between support style and lifestyle changes was not found; however, analyses suggested that an autonomous support style was associated with an increase in patients' RISE beliefs ($p<.001$), which in turn predicted patients' self-efficacy in their own exercise abilities ($p =.04$). Conversely, an overprotective support style was correlated with a decrease in patients' self-efficacy for exercise ($r = -.40$, $p<.01$). While hampered by a small sample size, the findings of this preliminary analysis inform our understanding of the relationships between support processes, and relational perceptions in chronic disease management and highlight the need for further study in the area.

23. **Examining ParticipACTION'S Brand Equity: A Test of The Brand Equity Pyramid**

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The brand of organizations (i.e., our associations linked to organizations) promoting more physical activity (PA) may predict important PA variables. The Brand Equity Pyramid (Keller, 2003), a theory which describes the process of brand development (i.e., salience, beliefs, judgements and feelings, and relationship), may predict development of a PA-promotion brand. Relationship with the brand may also predict important determinants such as intentions to be more physically active. One objective of this study was to examine brand development of ParticipACTION--a Canadian not-for-profit organization that promotes PA. A secondary objective was to investigate whether relationship with the brand can predict intentions to be more physically active. A nationally representative sample of Canadian adults who were aware of ParticipACTION (n=1,191) completed an online survey. Confirmatory factor analysis (CFA) was used to verify the factor structure and structural equation modeling (SEM) was used to test relationships between variables. CFA revealed the hypothesized five-factor solution with good model fit, RMSEA=.065, GFI=.964 (factor loadings=.57-.94). SEM, RMSEA=.078, GFI=.945, also confirmed the hypothesized relationships between variables. Salience predicted beliefs ($p<.001$, standardized beta=.39), beliefs predicted judgements and feelings ($p<.001$, standardized beta=.40), judgements and feelings predicted relationship ($p<.001$, standardized beta=.59), and relationship predicted intentions ($p<.001$, standardized beta=.31). Although this study used a non-experimental design, it provides the first evidence that the Brand Equity Pyramid can explain brand development in this domain, and that the Brand Equity Pyramid can predict important PA determinants such as intentions.

24. **A Review of 10 Years of Self-Regulatory Efficacy for Exercise in Cardiac Rehabilitation: Do we need to Rehabilitate its Quality?**

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Supervised exercise therapy in cardiac rehabilitation (CR) is a key factor in reducing the risk of a future event. Self-regulatory efficacy (SRE) is critical in motivating physical activity adherence in CR (Bandura, 1997; Ewart, 1991). Berkhuysen et al (1999) argued that self-efficacy stimulates changes in CR and is itself an important outcome. A 2008 review of CR exercise self-efficacy noted most studies assess task efficacy. Only nine

assessed SRE for actions facilitating exercise adherence (e.g. overcoming barriers; scheduling). We conducted a follow-up review between 2008-17, and identified 22 eligible SRE and CR exercise studies. Four coders examined each to identify if they a) represented a link between exercise and SRE, b) whether they addressed 2008 review recommendations, and c) study quality. Despite previous recommendations, our critical evaluation suggests the evidence is of mixed quality. Specifically, only 10/22 studies were of high measurement quality; 15/22 were concept valid; 13/22 stated a timeframe for relating SRE to behaviour; only 9/22 used SRE correspondent with the dependent variable. Only 6 studies tested mediation, yet 3/6 had design problems and only 3 were significant. Only 4 studies examined SRE as a CR outcome. The strength of the relationships between SRE and CR outcomes varied greatly ($-.02 < |r| < .85$). Numerous 2008 review recommendations were overlooked. This literature remains problematic despite published suggestions for multiple improvements. Advocates for heart disease prevention and rehabilitation promotion need to "rehabilitate" the SRE - exercise research to examine motivated post CR exercise change and adherence.

25. **A Qualitative Study Exploring Unique Considerations for Conducting Research With LGBTQ+ Persons in Physical Activity Contexts**

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LGBTQ+ individuals face an array of unique challenges to physical activity participation that are related to the diverse minority experience. Research in this area may be challenged because many potential participants have experienced instances of discrimination, exclusion, and homophobia within physical activity settings. The purpose of this study was to explore the unique challenges involved in conducting research on physical activity within the LGBTQ+ communities. As part of a larger project, a qualitative sub-study was devised involving a series of four semi-structured focus groups comprised of adult, self-identifying members of the LGBTQ+ communities. Participants pilot-tested a survey intended for use in the second phase of this larger study, and were then solicited for their feedback on the material. Broad discussions about personal physical activity experiences, as prompted by the survey questions, were encouraged. All focus groups were audio-recorded, transcribed verbatim, and subject to thematic analysis. Three main themes emerged: (1) complicated intersecting minority identities can uniquely influence experiences with physical activity, (2) preconceived images and notions associated with the word "athlete" make athletics seem like an exclusive, non-accessible context, and (3) macro and micro-aggressions outside of a physical activity context can impact past and current experiences within physical activity. These findings suggest that if these factors are not considered in studies involving LGBTQ+ persons, a homogenous identity may emerge where it does not exist, the typical language used to describe physical activity may alienate participants, and the rich minority context may be ignored.

26. **Does Being Perceived as an Athlete with a Physical Disability affect Non-Verbal Behaviours of Abled-Bodied Individuals?**

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Individuals with a physical disability may experience less favourable non-verbal communication when interacting with able-bodied people. However, this effect may be mitigated if the person with a disability is an athlete. Previous studies primarily use vignettes to convey disability and athlete status rather than direct in-person interactions. The purpose of this study was to compare the non-verbal communication of able-bodied individuals when they were interacting with a person with a physical disability who is either an athlete or non-athlete. Adult participants (n=56; Mage=22.2; SD=3.46) were ostensibly recruited for a marketing competition, whereby interviewing potential team members was the task. Participants interviewed a confederate with a physical disability who was portrayed as either an athlete or non-athlete through the use of a resume that participants read prior to the interview. Non-verbal behaviours (head nods, forward lean, physical distance and positive and negative facial expressions) were video recorded through one-way glass. The videos were independently coded by two research assistants who were blind to the condition. Separate one-way ANCOVA with age as a covariate were conducted for each behaviour. Participants in the non-athlete condition had a higher number of head nods – a positive non-verbal behaviour – than participants in the athlete condition. (F(1,53)=4.99, p=.03, ?p2=.066). No other significant effects emerged. Contrary to hypotheses, athlete status of the confederate with a disability did not positively impact the non-verbal behaviours of able-bodied participants' during an interaction. Participants' non-verbal behaviours may have been biased by the knowledge of being evaluated in a mock marketing competition.

27. **Participation and Quality of Life in Individuals Living with Chronic Obstructive Pulmonary Disease**

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Chronic obstructive pulmonary disease (COPD) is a debilitating lung disease that decreases individuals' quality of life. The purpose of this study was to examine the relationship between individuals' participation in physical activity and movement related activities (PAM; e.g., climbing up two or more flights of stairs), home related activities (AH; e.g., carrying heavy objects on a flat surface), overall burden of disease, and overall life satisfaction. Individuals living with COPD (N= 131, Mage= 68.49, SD= 8.54) responded to an online questionnaire. They reported their participation in six PAM activities and four AH activities. Participants reported their life satisfaction by responding to the Satisfaction with Life Scale, their overall disease burden with the COPD Assessment Test and the burden of breathlessness with the Medical Research Council Questionnaire on Breathlessness. Three multiple regressions were run to predict to life satisfaction, overall burden of disease and breathlessness from individuals self-reported participation in both activity categories, controlling for sex. PAM (B= .71, CI 95%: [.02,

1.40]) and AH (B= .76, CI 95%: [.26, 1.27]) significantly and positively predicted life satisfaction (R^2=.46). Both activities negatively predicted overall burden of disease (R^2=.61, BPAM= -5.54, CI 95%: [-8.35, -2.73], BAH= -3.49, CI 95%: [-5.50, -1.47]), and breathlessness (R^2= .61, BPAM= -1.16, CI 95%: [-1.58, -.74], BAH= -.30, CI 95%: [-.60, -.004]). Interventions must target functionally appropriate physical activity as enhancing participation in these activities should result in higher life satisfaction and lower burden of disease in individuals living with COPD.

28. **Social Isolation and Physical Activity in Individuals with Spinal Cord Injury**

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Social isolation is related to poor lifestyle choices, such as reduced physical activity (PA) in able-bodied adults and children. Although preliminary evidence suggests indices of social isolation, such as social connectedness (e.g., small social network) and perceived isolation (loneliness), might be problematic for people with spinal cord injury (SCI), these issues have not been well-explored in relation to PA post-SCI. The purpose of this study was to examine the relationship between social isolation and PA behaviours in adults with SCI. One hundred and eleven adults with SCI (Mage=60.7; 78.4% male) participated in a cross-sectional telephone study. Data were collected regarding social networks (i.e., size, frequency of interaction proximity, proportion of network members living in a household), perceived loneliness (i.e., Revised UCLA Loneliness Scale), and leisure time physical activity (LTPA-SCI Questionnaire). Loneliness was correlated with moderate LTPA days, heavy LTPA days and heavy LTPA total (days x minutes; r = -.21, r = -.22, and r=-.22, respectively; p <.05). Participants who were less lonely (score < 6 on UCLA; M=2.64, SE=.32) participated in more mild LTPA days than those were more lonely (M=1.57, SE=.40; t(109)=2.04, p<.05). Furthermore, social network structure including size, r = -.25, p < .01, and proportion of network members living in a household, r = .23, p < .05, were correlated with PA. These findings suggest that a relationship exists between social isolation and PA among people with SCI, however future research is needed to further understand these relationships.

29. **Kinesiology Student Attitudes and Mental Health**

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In recent years there has been an effort to normalize mental health and to encourage individuals to seek support for mental health issues. This effort has been particularly evident on university campuses. Participants in this study were 239 male and 290 female students enrolled in kinesiology courses. Students completed the Questionnaire of Student Attitudes toward Schizophrenia. The questionnaire is comprised of two topics: stereotypes of schizophrenia and social distance, i.e. the students' readiness to enter different types of social relationships with someone who has schizophrenia. In the stigma

process undesirable characteristics are stereotypically linked to a condition and serve to justify negative social reactions, i.e. stereotypes form the basis of behavioural intentions. There were significant differences between female (4.77 ± 3.42) and male (6.24 ± 4.18) students in total stigma toward schizophrenia. Males reported more stereotyped beliefs (2.51 ± 1.66) and sought to maintain greater social distance to people with schizophrenia (3.73 ± 3.06) compared to females (1.90 ± 1.46 for stereotype; 2.86 ± 2.51 for social distance). Overall stigma scores were relatively low, however gender differences do exist and these differences should be addressed in attempts at increasing awareness and acceptance of mental health issues. Many kinesiology graduates will be employed in health and physical activity related fields and this will inevitably result in contact with individuals with mental health issues, students should be made aware of their own biases and seek to address them.

30. **"I'm Inactive, But I'm Still a Good Person": The Effect of Self-Affirmation on Responses to Gain and Loss Framed Physical Activity Messages**

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Physical activity (PA) information may threaten self-integrity for inactive people because it calls into question their ability to control their health. When threatened, people's ability to process information may be compromised. Further, they may downplay threats to restore self-integrity. Self-affirmation (SA) is the process of affirming oneself on core values. Research shows that pairing SA with health information can improve responses to health messages. Few researchers have examined SA in a PA context, and none have examined SA and the nature of PA messages, nor implicit responses. This research examined whether SA influenced reactions to gain and loss framed PA messages among 155 (Mage = 22.51, SD = 7.23) inactive people. Participants were randomized to receive either a SA or control activity and to read a gain or loss framed PA message. They completed measures of attentional bias, psychological responding and, one week later, recalled PA. A MANCOVA showed that the gain-framed message was associated with attentional bias away from health threat words; the loss frame message was associated with attentional bias toward health threat words, $F = 5.36$, $p = .02$. There was no main SA effect nor interaction. Another MANCOVA showed that SA was associated with lower perceived threat $F = 3.75$, $p = .050$ and higher self-efficacy $F = 4.28$, $p = .041$. The loss-framed message was associated with greater perceived threat $F = 7.92$, $p = .003$. There was no interactive or main effect for follow-up PA. SA showed modest benefits independent of message frame.

31. **Reacting to News of Being At-Risk for Type-2 Diabetes: An Exploratory Study of Risk Reactions**

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Prediabetes afflicts more than five million Canadians (Public Health Agency of Canada, 2014) and is characterized by impaired glucose regulation that increases the risk of developing type 2 diabetes (T2D). People with chronic conditions, including T2D, often experience negative reactions about their condition. These experiences can compromise self-regulatory efforts to manage illness through lifestyle behaviours. Although research surrounding people's experiences of living with T2D has been conducted, less is known about how individuals respond when they learn they are at-risk for T2D. Receptivity of prediabetes status is of relevance to managing lifestyle behaviours, as behavioural modification at this stage can prevent disease progression to T2D. The purpose of this study was to explore how people who learn that they are at-risk for T2D (prediabetic) process, react to and experience this information. Seven adults (Mage= 58.57, SD = 2.64; 6 female, 1 male) engaged in an in-depth, semi-structured interview (M = 56 min). Interpretative phenomenological analysis (Smith & Osborn, 2007) was used to analyze the data using an inductive approach. Five themes emerged from the data related to the study purpose: (a) distress and concern, (b) downplay and lack of knowledge of T2D risks, (c) attributions to and guilt for past behaviour, (d) self-criticism, and (e) common humanity. Findings suggest that people experience negative reactions related to their T2D risk but also exhibit self-compassionate responses. These findings can inform lifestyle behaviour change programs for individuals living with pre-diabetes by providing a better understanding of the patient's perspectives of disease diagnosis.

32. **Understanding Burnout and Vitality in Crossfit: Does Perceived Variety Explain Variance Above and Beyond Satisfaction of the Basic Psychological Needs?**

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Perceived variety in exercise complements satisfaction of the basic psychological needs embedded within self-determination theory (namely competence, autonomy, and relatedness; Deci & Ryan, 2002) in relation to exercise-related well-being (Sylvester et al., 2014), and ill-being (Sylvester et al., 2016). The purpose of the present study was to examine the extent to which perceived variety in CrossFit (a contemporary strength and conditioning program) predicts variance in subjective vitality and burnout above and beyond satisfaction of the needs for competence, autonomy, and relatedness. CrossFit is a relatively new exercise regime that is both popular and controversial. Researchers have yet to empirically investigate psychological factors that may lead to well-being (e.g., vitality) or ill-being (e.g., burnout) outcomes in this context. Using a prospective observational design, participants (n = 97) completed measures of psychological needs satisfaction and perceived variety in CrossFit at Time 1, and measures of subjective

vitality and burnout one month later (Time 2). Results of two hierarchical linear regression analyses predicting subjective vitality and burnout, showed that above and beyond the variance explained by satisfaction of the needs for competence, autonomy, and relatedness ($R2 = .23$, $p < .001$; and $R2 = .17$, $p < .01$; respectively), perceived variety in CrossFit explained additional variance in subjective vitality ($R2change= .05$, $p = .01$) and burnout ($R2change= .11$; $p < .001$). Overall, perceived variety in CrossFit explains additional variance in subjective vitality and burnout above and beyond that explained by basic psychological needs satisfaction.

33. **Engagement in a Summer Physical Activity-Based Positive Youth Development Program Predicts Improvement in Life Skills among Youth from Low-Income Families**

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Physical activity-based positive youth development (PYD) programs integrate social, personal, and life skill lessons into recreation to facilitate growth and reduce health risk behaviors (Snyder, 2014). Evidence regarding the mechanisms of these changes is emerging. One potential mechanism is engagement, the degree to which youth find meaningful emotional and behavioral connections to the program. We examined whether engagement in a 20-day daytime summer physical activity-based PYD program for youth from low-income families predicted improved character (social conscience and personal values), caring, and reasoning skills (decision making, and critical thinking) over the course of the program. N = 298 youth (42% girls, 58% boys) aged 7–15 (M = 10.37 SD = 1.84) were surveyed on day 2 and 17 of the program. Youth self-reported social conscience, personal values, caring, decision-making, and critical thinking at both time points, and behavioral and emotional engagement at the conclusion of the program. Multiple regression was used to test whether engagement predicted change in each life skill variable. Greater behavioral engagement predicted increased social conscience (ß = .21, $p = .02$, $R2 = .07$) and decision-making (ß = .20, $p = .02$, $R2 = .09$) skills. Greater emotional engagement predicted improved personal values (ß = .22, $p = .01$, $R2 = .10$). Neither engagement measure predicted changes in caring or critical thinking ($p > .05$) skills. While the effects of engagement on life skills are small in magnitude, they show that even brief programs can support youth development if they are engaging to youth.

34. **A Prepulse Stimulus does not Attenuate Sternocleidomastoid Activity Elicited by a Mechanical Perturbation**

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Perturbations of the arm produce short (M1; 25-50 ms) and long-latency (M2; 50-100 ms) responses in stretched muscle. In tasks requiring an intended movement, the

voluntary response is also elicited at a short enough latency (<100 ms) to overlap onto the M2 response and contribute to goal-dependent M2 modulation. It has also been proposed that mechanical perturbations elicit a startle response (Ravichandran et al. 2013). During situations in which advance preparation can occur, the presentation of a startling stimulus not only activates startle circuitry, which can be observed in the sternocleidomastoid (SCM), but also results in a hastened onset of the preprogrammed response (termed the StartReact effect). The implication is that if a perturbation is startling, the StartReact effect could be responsible for the fast voluntary response and subsequent goal-dependent M2 modulation. However, it has also been suggested that the observed SCM activation following a perturbation may not be startle-related but instead be a result of a postural response (Forgaard et al. 2016). In order to differentiate between these alternatives, the current study employed a PPI stimulus, which is known to attenuate the startle response but would not be expected to affect postural SCM activation. Participants performed a compensate task against a perturbation and on random trials, a PPI stimulus was delivered 100 ms before the perturbation. Rather than attenuating SCM activity, the SCM responses following the perturbation were advanced on trials with a PPI stimulus. Our findings confirm that perturbation SCM activity is the result of a postural response and not the startle response.

35. **Mechanical Perturbations can Elicit Triggered Reactions in the Absence of a Startle Response**

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Mechanical perturbations delivered to the upper limbs elicit reflexive responses in stretched muscle at short- (M1:25-50 ms) and long- (M2:50-100 ms) latencies. When presented in a simple reaction time (RT) task, the perturbation can also elicit a preprogrammed voluntary response at a latency (premotor RT values ~70 ms) that overlaps the M2 response. This early elicitation of the voluntary response by a perturbation has been called a triggered reaction (Houk 1978). Recent work has proposed that unexpected mechanical perturbations may also elicit a reflexive startle response and therefore the StartReact effect underlies initiation of triggered reactions (Ravichandran et al. 2013). The present study investigated whether triggered reactions can also be elicited at short-latency in the absence of a startle response. Twelve participants performed ballistic wrist extension movements following an expected wrist extension perturbation imperative signal. The perturbation elicited stretch responses (M1/M2) in wrist flexors and the preprogrammed voluntary response in wrist extensors. To make comparisons with the StartReact effect, a startling auditory stimulus (SAS) was also presented on random trials. While the SAS consistently elicited a startle response in orbicularis oculi and sternocleidomastoid on 68.2% of trials, the perturbation did not reliably elicit a startle response. Despite this, two-thirds of perturbation-only trials had premotor RTs of less than 100 ms and the earliest responses began at ~70 ms. These findings suggest that an overt startle response is not required for the early elicitation of a triggered reaction via a mechanical perturbation.

36. **Stomp Your Hands and Clap Your Feet: Exploring the Behavioural Links Between Motor and Language Systems**

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The results of previous research suggest that language and motor areas may share overlapping or interconnected representations associated with limb-specific action verbs. For example, reaction times (RTs) for hand responses are shorter when people respond to action words that are compatible with the responding limb (e.g., pinch or punch) than for words that are incompatible with the responding limb (e.g., kick or step). The purpose of the present study was to determine if the motor system is activated by limb-specific nouns in the absence of an action context. If the language/motor system overlaps extend to nouns, then similar compatibility effects should be observed for both verbs and nouns. If these associations are limited to verbs, then compatibility effects will only be seen for the verbs and not nouns. Participants (n=12) completed a choice response task in which responses were made to hand and foot-related nouns (e.g., glove, boots) and verbs (e.g., clap, stomp). The preliminary findings indicate a word meaning-response compatibility effect for foot-related verbs and not for hand-related verbs. When responding to nouns, a word meaning-response compatibility effect was found for hand-related nouns only. Overall, the patterns of effects in the present data presented are mixed, with limb-specific compatibility effects emerging with foot-related verbs and hand-related nouns.

37. **A Test of Offline and Online Motor Control Processes under Heightened State Anxiety in a Fast Target-Directed Aiming Task**

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Objectives: Two core components of movement execution are offline (i.e. planning) and online (i.e. detection and correction of errors) motor control. There is some ambivalence in the literature as to whether observed reductions in online motor control, under heightened pressure, are caused by a shift to offline-based motor control strategies, or because of impaired online motor control. The present study aimed to provide clarification by directly testing online motor control via cursor perturbations under heightened pressure. Methods: Participants (n=14) performed a target-directed aiming task. Following familiarisation and acquisition phases, participants were transferred to heightened pressure. Pressure was manipulated using a combination of monitoring and outcome pressure. To directly test online motor control, 20% of trials in all phases contained cursor perturbations, which necessitated online corrections to maintain outcome performance. Acquisition (low pressure) and transfer (heightened pressure) phase data were compared. In non-perturbation trials, offline and online motor control performance was inferred from variability profiles. In perturbation trials, correction magnitudes were used to test online motor control. Results and Discussion: In non-perturbation trials, offline motor control performance remained stable from acquisition to pressure transfer, whilst online motor control reduced. However, necessitated online motor control was not impaired by heightened pressure. Conclusion: The above suggests

that, when online motor control is not necessitated, heightened pressure may lead individuals to shift to an offline-based motor control strategy. This may be to compensate for potentially impaired online motor control. Conversely, necessitated online motor control may not be impacted by the same impairments under pressure.

38. **Dissociation Between Temporal and Spatial Precueing in the Neural Dynamics of Action Preparation**

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The time necessary to initiate a goal-directed reaching movement depends on knowing where and when to move. It is well documented that providing advanced information regarding either the spatial location of a target stimulus or its timing of occurrence reduces reaction times (RT). Yet, it remains unclear whether the RT gains attributable to spatial or temporal precueing are subtended by common preparatory dynamics at the neural level. An experiment was designed in which participants (n=21) reached toward appearing visual targets while electroencephalography (EEG) was recorded. In the FullPrecue condition, participants were precued regarding the location (i.e. straight-ahead) and the timing of target onset (TTO) (i.e. 2s post-Precue). In the SpatialPrecue condition, they were precued regarding the location of the target, but its TTO was uncertain (i.e. 1.25, 2 or 2.75s post-Precue). In the TemporalPrecue condition, they were precued regarding the TTO, but its location was uncertain (i.e. left, straight-ahead, right). Results revealed that RTs were significantly faster in the FullPrecue condition (304ms) as compared to the SpatialPrecue (342ms) and TemporalPrecue (334ms) conditions*. Spectral analysis of EEG activity late in the preparatory period showed that spatial precueing was associated with greater synchronization in the theta (3-7 Hz) and alpha (8-13 Hz) frequency bands over midcentral and parietal regions, respectively*. However, temporal precueing was associated with greater desynchronization in the beta-band (20-35 Hz) over contralateral parietal regions*. These results demonstrate that although the RT gains incurred by spatial and temporal precueing are similar, they are subtended by different preparatory dynamics. *p-values <0.05.

39. **EMG-EMG Coherence Shows Increased Reticulospinal Contributions to Proximal Effectors**

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Voluntary muscle commands underlying human movements are traditionally thought to primarily involve corticospinal pathways, although some movements (e.g. proximal effectors) also utilize brainstem (reticulospinal) pathways. Additionally, studies using a startling acoustic stimulus (SAS) have implicated involvement of subcortical structures in the production of substantially shortened reaction time (RT). The present experiment aimed to determine whether proximal and startle-triggered movements show increased

contributions of reticulospinal drive. EMG-EMG coherence analysis was used to elucidate reticular contributions to movement production based on the strength of correlated oscillations in the 10-20 Hz band, which has been shown to be associated with these neural inputs. Participants completed a simple RT task involving either a bilateral shoulder (proximal) or index finger (distal) abduction movement following an auditory go-signal or a SAS. As expected, RT was significantly shorter on startle trials for both movements. On control trials EMG-EMG coherence was significantly greater in the reticulospinal range for the proximal movement. Startle trials resulted in a further significant increase in 10-20 Hz coherence for the proximal movement, while this difference was absent for the distal movement. In other words, reticulospinal input is greater for proximal than distal movements and a SAS further increases reticulospinal activation for proximal effectors. These results provide novel evidence for differential contributions of brainstem structures to movement production that are dependent upon effector location and role.

40. **The Relationship Between Withdrawn Symptoms and Participation in Physical Activity in Children with and without Developmental Coordination Disorder**

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Developmental Coordination Disorder (DCD) is a neurodevelopmental disorder that impairs a child's fine and gross motor coordination (American Psychiatric Association, 2013). Consequently, children with DCD have difficulties carrying out daily activities of life such as self-care, active play, and household chores, and tend to withdraw from social engagements where motor competence is required (Ruckser-Scherb et al., 2013). Social interaction, however, is particularly important for children with DCD, yet research investigating the link between withdrawn behaviours and social interactions in very young children with DCD is limited. Participants (N = 494, 218 girls, Mage = 4.47±0.50 years) in the current study are part of a larger cohort study with 261 (155 boys) children classified as at risk for DCD, scoring below the 16th percentile on the MABC-2 (Barnett et al., 2007). Analysis showed between group differences for withdrawn behaviours ($p < .001$). In comparison to typically developing children (M = 1.00), children scoring in the 1st–5th percentile (M = 2.06, $p < .001$, $d = 0.63$) and the 6-16th percentile (M = 1.59, $p < .001$, $d = 0.38$) in motor coordination reported more withdrawn symptoms. No differences in moderate-to-vigorous physical activity (PA) were found between groups. Children's active play at this age often requires less complex motor skills and thus, may explain this lack of differences in PA. Because the gap in PA in children with DCD may widen with age, the role of withdrawn behaviours as a contributing factor should be further explored.

41. **Visual Feedback During a Goal-Directed Movement Decreases Performance on an Inspection Time Task**

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Performing goal-directed movements has been shown to increase resistance to visual illusions, possibly due to enhanced visual processing. An inspection time (IT) task can be used to measure visual processing ability by having participants identify the longer leg of an asymmetric "pi" figure that is presented for various times (15-105ms), and then immediately backward masked for 400 ms to prevent further processing. A previous experiment used an IT paradigm during production of a goal-directed movement, and contrary to predictions, found degraded visual ability. However, online visual feedback of the limb was not provided, which may account for this finding. Thus, the purpose of the present experiment was to examine whether provision of visual feedback during movement production would enhance performance in an IT task. Participants (n=12) performed an IT task under three conditions: no-movement, during production of a 30-deg targeted right arm extension movement without visual feedback, and during production of the same movement with online visual feedback. Results revealed a main effect for condition, $F(2, 22) = 4.71$, $p = .02$, whereby IT performance was significantly poorer in the movement with visual feedback condition compared to the no-movement condition. These results suggest that adding online visual feedback during movement execution while also completing an IT task may exceed the capacity of the visual system, and degrade IT task performance.

42. **Individual Limb Contributions to Mediolateral Stability during Perturbation-Evoked Stepping Responses: A Preliminary Study**

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Mediolateral stability control during compensatory stepping responses is challenging for older adults but is critically important since lateral falls carry an increased probability of hip fracture. Previous work has found the orientation (eccentricity) and timing of the net ground reaction force (GRF) relative to the centre of mass (COM) to be important determinants of mediolateral stability recovery during the restabilization phase of the stepping response, following foot-contact. The present work sought to understand the individual limb contributions to stability recovery, by examining the eccentricity of the GRF generated by each limb during the restabilization phase of the stepping response. A lean-and-release paradigm was used to evoke stepping responses amongst 5 younger females (18-25 years) and 5 older females (>65 years) participants. Whole-body COM kinematics and GRFs beneath both limbs were quantified using motion analysis and four force platforms. Kinematic instability was quantified as the difference between the peak lateral COM position and the final stable COM position. Spearman's correlations were used to understand whether the magnitude and timing of GRF eccentricity from both the

stance and stepping limb were related to kinematic instability during restabilization. Greater kinematic instability was related to a reduced peak and longer time-to-peak eccentricity of the stepping limb GRF immediately (<100 ms) following foot-contact. Greater instability was also related to a reduction in the secondary peak GRF eccentricity from the stepping limb, approximately 250 ms following foot-contact. These results suggest a principal role for the stepping limb in mediolateral stability control during restabilization following balance perturbation.

43. **Testosterone Administration Impairs Temporal Retention of a Motor-Timing Task**

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Our study was designed to examine the relationship between testosterone (T) levels and the retention of a movement-timing task for participants who self-controlled their feedback schedule during the acquisition period. Ten males completed an acquisition and retention phase in a double-blind and placebo controlled repeated measures protocol. Each week, participants received either 11mg of placebo or testosterone (NatestoTM). The tasks required participants to accurately click the left mouse button over five targets in exactly 3000ms. Each target had an index of difficulty of 5bits. Participants completed 5 blocks of 12 trials during acquisition and self-controlled their feedback after each trial. An hour after acquisition, participants completed 12 trials without feedback. A week later, participants performed the task in a mirror-reversed order and in the opposite drug condition. The amount of feedback requested decreased from the first to the third block of acquisition, $F(4,36)=3.75, p<0.012$. However, there were no main effects or significant interactions involving testosterone for the number of feedback requests or the absolute error on trials with and without feedback. Constant error, $F(4,32)=4.48, p<0.006$, and absolute error, $F(4,32)=4.28, p<0.007$, decreased significantly from block one to block four and five during acquisition. Absolute error in retention was significantly shorter on placebo (880ms) than on T (1479ms), $F(1,9)=5.34, p<0.046$. However, the correlation between absolute error and number of errors was non-significant under placebo, $r=-0.416, p=0.23$, but significant while on T, $r=-0.755, p<0.012$, indicating that participants lengthened their time in order to enhance accuracy while on T. Results are discussed in the context of instructional settings for typical and special populations.

44. **Motor Control and Learning Theories in the Study of Balance: A Scoping Review**

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Balance control is an essential skill in stance and gait. Gaining a better understanding of balance will aid in developing new rehabilitation techniques and decrease the risk of falls. The field of motor behavior has many well-established theories that have influenced clinical practice and can be applied to study balance control. The purpose of our study is to conduct a scoping review of studies related to balance control that have used the

following concepts: Fitts' law, focus of attention and challenge point framework (CPF). A comprehensive search of databases was performed to identify studies related to our purpose. Results show 47 studies that are related to our scope: 2 studies related to CPF, 12 studies related to Fitts' law; and 33 studies related to focus of attention. The majority of studies involved young adult participants (n=38), with a minority of studies (~19%) involving special populations who have standing balance impairments. Our review provides evidence that motor behavior theories can be applied to better understand balance control. Fitts' law was used repeatedly to design alterable levels of task difficulty and was found to have a relationship with anticipatory postural adjustments. The CPF was utilized effectively to design balance rehabilitation programs. Evidence related to focus of attention showed that adopting an external focus of attention yields better performance and learning of balance-related tasks. The majority of studies reviewed involved non-disabled healthy populations. Future research should focus on implementing motor behavior concepts in clinical settings to examine balance control among people with balance impairments.

45. **Shoulder Muscle Fatigue does not Influence Hand Proprioception**

Christin M. Sadler, Erin K. Cressman
University of Ottawa

Muscle fatigue is a complex phenomenon that can alter afferent feedback from muscles. It is unclear how proximal muscle fatigue can affect proprioceptive acuity of the distal limb. The goal of the present study was to assess the effects of shoulder muscle fatigue on participants' ability to judge the location of their hand using only proprioceptive cues. Participants' (N = 16) limbs were passively moved outwards by a robot manipulandum and they were instructed to estimate the position of their limb relative to one of four visual targets (two near targets at 10 cm, and two far targets at 20 cm). This estimation task was completed before and after a repetitive pointing task to fatigue (mean performance time: 6 minutes). To assess central and peripheral effects of fatigue, the right arm was fatigued and proprioceptive biases of the left and right hands were determined on different days. Proprioceptive biases and the variability of participants' responses did not change following the fatiguing protocol for either the right or left hand. Similar to previous research (Jones et al, 2010), the results showed that proprioceptive biases differed between hands but not with changes in target distance. Thus, results suggest that proximal muscle fatigue does not affect hand proprioceptive acuity.

46. **A Statistical Summary Representation in Oculomotor Control: (Some) Evidence from the Antisaccade Task**

Andrea FM Petrella, Jonathan Blazevic, Marlowe Pecora, Jennifer Campbell, Matthew Heath
School of Kinesiology, The University of Western Ontario

Prosaccades are stimulus-driven eye movements that bring the fovea onto an area of interest. In contrast, antisaccades involve inhibiting a stimulus-driven prosaccade (i.e., response suppression) and inverting a target's spatial location (i.e., vector inversion) to mirror-symmetrical space. Previous work indicates that prosaccades are mediated via

absolute visual information; however, it is possible that the top-down nature of antisaccades renders responses supported via a statistical summary representation (SSR) akin to that supporting perceptual judgments (Gillen and Heath, 2014: Vis Res). To that end, we examined whether pro- and antisaccades are differentially influenced by the weighting of target eccentricities within a stimulus-set. Participants completed pro- and antisaccades to visual targets (eccentricities of 10.5°, 15.5° and 20.5°) with and without a delay (i.e. 2,000 ms). Importantly, responses were completed in blocks wherein target eccentricities were presented with equal frequency (i.e., the control condition), and when the 10.5° (proximal weighting condition) and 20.5° (distal weighting) targets were presented five times as often as the other eccentricities. If a SSR is used to support motor output then saccade amplitude should be biased in the direction of the most frequently presented target within a stimulus-set. Results showed that prosaccades were refractory to the weighting condition manipulations, whereas no-delay antisaccades (but not their delay counterparts) showed amplitudes biased in the direction of the most frequently presented target. Accordingly, our results provide some evidence that the top-down nature of antisaccade renders endpoints specified via a SSR – visual information that is functionally distinct from prosaccades.

Free Communications & Symposia - 2:30-4:00 pm

Motor Control
Sensorimotor Control Processes in Simple and Complex Movements

State Anxiety, Reinvestment Propensity and Motor Control Strategies: A Test of Offline and Online Motor Control Processes under Heightened State Anxiety

Robin Owen, Gavin Lawrence, Vicky Gottwald
Bangor University: School of Sport, Health and Exercise Sciences

Objectives: Developing a deeper understanding of performance under pressure can be attained by investigating offline and online motor control processes. This study examined the effects of pressured environments on offline and online control and considered how reinvestment propensity may lead to the adoption of different motor control strategies within such environments. Methods: Participants (n=60), completed the movement specific reinvestment scale before performing a target-directed aiming task. Following familiarisation, participants completed both acquisition (low pressure) and transfer (either heightened pressure or low pressure) phases. In all phases, 20% of trials contained a cursor perturbation that necessitated corrections via online control processes to maintain outcome performance. Data from heightened pressure and low pressure conditions were compared. In non-perturbed trials, variability profiles were used to infer offline and online control. In perturbation trials, correction magnitudes were used to test online motor control. Results and Discussion: Analysis of non-perturbed trials revealed that online motor control was reduced under pressure. However, individuals used compensatory resources to shift from an online, to an offline-dependent motor control strategy in order to maintain outcome performance. Furthermore, greater reinvestment propensity correlated with greater strategy shifts. In the perturbed trials, necessitated online motor control was neither impaired by the presence of pressure nor correlated with reinvestment propensity. Conclusion:

Non-necessitated online control may be impaired under pressure, but can be compensated for via deliberate changes in the distribution of motor control strategies. Furthermore, this strategy shift is positively correlated with reinvestment propensity.

Goal-Directed Reaching: Allocentric Target Representations Result in an Offline Mode of Control

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Everyday activities such as copying, drawing, and imitative gestures require allocentric representations of space for successful movement completion. Notably, the top-down nature of allocentric spatial representations is thought to render motor output via a slow and offline mode of cognitive control mediated via visuoperceptual networks. The present investigation sought to test this hypothesis by providing detailed trajectory analyses of allocentric and target-directed reaching tasks performed with and without concomitant limb vision. Allocentric tasks required reaches to a location defined by the distance between a target and reference stimulus, whereas target-directed tasks required reaches to a target's veridical location. To examine the extent to which tasks were controlled via feedback-based trajectory amendments (i.e., online) or central planning mechanisms (i.e., offline), we computed the proportion of variance explained (i.e., R2) by the spatial position of the limb at 75% of movement time relative to each response's ultimate movement endpoint for distance and direction axes. Results showed that target-directed limb visible trials produced smaller R2 values and decreased endpoint variability compared to their limb occluded counterparts. In turn, the latter trial-type exhibited R2 values and endpoint variability commensurate with allocentric limb visible and occluded trials (which did not differ). Accordingly, we propose that the presence of limb vision in a target-directed task affords an online mode of control supported via 'fast' visuomotor networks. In contrast, the absence of limb vision or presence of allocentrically defined endpoints is proposed to render a primarily slow and offline mode of cognitive control mediated via visuoperceptual networks.

Online and Offline Contributions to Recently Acquired Reaching Movements

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The use of sensory feedback for online and offline movement corrections has been widely studied for well learned actions, but not for actions in a novel visuomotor environment. We asked if the contributions of online and offline motor control differ between recently acquired reaching movements from well learned reaching. Eight participants were divided into 2 groups, one receiving continuous visual feedback during all reaches (CF), and another receiving terminal feedback regarding movement endpoint (TF). Participants then trained in a visuomotor environment by reaching to 3 targets when (1) a cursor accurately represented their hand motion and (2) a cursor was rotated 45 degrees clockwise relative to their hand motion. After training in each visuomotor environment, contributions were then probed by having participants complete 4 blocks of reaches with constrained reaction time (RT) and movement time (MT) (SlowRT-SlowMT, SlowRT-FastMT, FastRT-SlowMT and FastRT-FastMT). Participants demonstrated

similar performance (i.e. MT and angular errors) regardless of feedback or reaching environment during training. Once constraints were imposed, offline control measures (i.e., squared Fisher z) indicated that early movement positions were more predictive of movement end point when reaching with a rotated cursor compared to an aligned cursor for both groups. Alternatively, online control measures (i.e., time to peak velocity and jerk score) did not differ for reaches completed with aligned or rotated feedback for either group. Together, these results suggest a greater contribution of offline control processes when reaching in a novel visuomotor environment compared to when reaching in a well learned environment.

The Effect of Covert Auditory Attention in Multiple Targets Aiming: Kinematic Evidence

Bayonle M. Oladokun, Cheryl M. Glazebrook
Faculty of Kinesiology and Recreation Management

A central issue in selective attention for action concerns the nature of covert attention. While this issue has been extensively investigated with what we can see, much less is known with respect to auditory stimuli and the possible influences on selective attention for action. The present experiment examined the effect of covert auditory attention in multiple target aiming. Eleven participants initiated goal-directed reaching movements within 320ms to one of four targets, of which the actual target was unknown until 200ms following movement initiation. Auditory cues were presented at movement initiation and attention was manipulated by informing participants of the probability of auditory cues predicting the target side (left or right). The task was completed under three conditions: Neutral-sound, 80/20, and 50/50. Movement trajectories were recorded using Optotrak 3D Investigator at 500Hz. Dependent variables were analyzed using a 3 (condition) x 2(Target location) and trajectories, using a 3 (condition) x 2(Target location) x 6 (MT points) ANOVAs. The present findings indicate that the auditory cue did not have any effect on RT. There was a significant MT advantage to the right compared to left targets regardless of cueing. In addition, a larger proportion of time was spent before PV when aiming to the right compared to left side. Of particular interest, the effect of the valid auditory manifested in the early stages of movement execution as was evident by the reaching trajectories. Therefore, regardless of cue validity the presence of a valid covert auditory attention impacted subsequent goal-directed action.

Gaze Behaviour Reveals the Specification of Competing Reach Movements under Conditions of Target Uncertainty

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Recent influential theory suggests that when confronted with multiple potential reach targets, we maintain competing motor plans in parallel before deciding which one to execute (Cisek & Kalaska 2010). Although neurophysiological recordings from non-human primates have revealed results consistent with this controversial hypothesis (Cisek & Kalaska, 2005), unambiguous behavioural evidence remains sparse. Here we show, by exploiting the tendency of individuals to fixate an internal aimpoint when reaching to a single target under a visuomotor rotation (Rand &

Rentsch, 2015), that gaze behaviour conveys details about the actions specified, but not necessarily executed, prior to target selection. Following a fixed preview period (2 or 4 s), either a single target or one of the two potential targets was filled in, signifying participants to initiate their reach. Targets were displayed on a visible ring and visuomotor rotations were applied to the targets, requiring participants to reach towards a location rotated away from the target to move the cursor from a central start position to the cued target. As expected, when only one target was presented, participants, in addition to fixating the visible target, reliably fixated an internal aimpoint during the preview period, indicative of movement planning. Critically, in two-target trials participants also fixated the aimpoints of the potential targets, as well as the visible targets during the preview period, indicating that they prepared competing reach movements prior to target selection. These findings provide compelling evidence for the influential, yet controversial idea that individuals specify, in advance of movement, competing motor plans under target uncertainty.

From Discrete to Continuous Online Limb-Target Regulation Processes: A Matter of Time?

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A pseudo-continuous model of online sensorimotor control suggests that visual information is gathered from peak acceleration until the end of an upper-limb movement (see Elliott et al., 2010). Although seminal evidence for the model employed relatively slow movements, Tremblay et al. (2013; 2017) have provided evidence for optimal online visual information utilization during early stages of fast reaching movements (i.e., ~350 ms). The current study examined the generalizability of these results to faster and slower reaching movements (i.e., 350 ms or 700 ms). Participants initially saw the target (30 cm) for 50 ms, while fixating on their finger (located on the home position). During movement, visual feedback was provided in 20 ms windows at one of three proportions of the expected peak limb velocity (i.e., 35%, 60% & 85%). During the windows, the original target or a new 27 cm target was illuminated. The target-jump condition attempted to elicit limb-target regulation processes. For faster movements, endpoint accuracy results indicated that corrections only occurred in the earliest window condition (i.e., 35%). For the slower movements, participants corrected in all window conditions. Overall, the strategy to implement a single correction (i.e., time from movement end, Beggs & Howarth, 1970) was supported for faster movements, whereas the pseudo-continuous model (Elliott et al., 2010) was supported for slower movements. An overarching explanation of the time from movement end can explain both online visual feedback utilization strategies. Theoretically, online visual uptake strategies could be merely dependent on the time available for utilization, to implement amendments.

Sport Psychology - *Coach*

The Development of Leadership in Model Youth Football Coaches

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The purpose of this study was to examine the development of leadership among model youth football coaches. Six award-winning model youth football coaches (M age = 46.0 years, SD = 5.8), and one athlete from each stage of the coaches' careers (early, middle, recent; n = 18, M age = 24.4 years, SD = 4.3) were purposefully sampled and completed semi-structured interviews. Interviews included questions on leadership behaviours and factors that have influenced the development of the coaches' leadership. Deductive and inductive analyses were completed. First, data regarding the coaches' leadership behaviours from the coaches' and athletes' interviews were deductively coded into categories from the charismatic, ideological, and pragmatic (CIP) model of outstanding leadership (Mumford, 2006). The majority of reported behaviours the coaches used aligned with a pragmatic leadership style. However, none of the coaches' behaviours exclusively aligned with a single style. Second, data from the coaches' interviews were inductively analysed to identify factors that contributed to the development of their leadership. The following factors were identified: role models; networks of coaches; experience and reflection; and formal, non-formal, and informal learning. These factors were consistent, regardless of the coaches' leadership styles. Overall, the results of this study indicated that there may be benefit to considering broader models of leadership in coach education and in the study of leadership in sport, and establishing alternative coach education pathways for leadership development.

The Impact of Transformational, Transactional and Laissez-Faire Leadership on the Personal and Psychosocial Development of University Student Athletes: A Profile Analysis

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Calls have been made (Turnnidge & Côté, 2016) for research on athletes' positive development related to coach leadership behaviours defined by the Full Range Leadership Model (FRLM; Avolio, 2011). Studies assessing FRLM behaviours have taken a variable-centered approach and have focused almost exclusively on one FRLM leadership behaviour (i.e., transformational coaching), with no research examining how combinations of leadership behaviours influence development. According to the FRLM, optimal development occurs when coaches use high transformational, moderate transactional, and low laissez faire leadership behaviours (Avolio, 2011). This study explored the relationship between FRLM coaching profiles (i.e., different combinations of transformational, transactional, and laissez faire) and athletes' positive developmental outcomes and negative experiences in university sport. A total of 605 Canadian university student-athletes (237 male, 368 female, Mage = 20.09) completed the Multifactor Leadership Questionnaire (Avolio & Bass, 2004) and the University Sport Experience Survey (Rathwell & Young, 2016) to assess coaches' leadership behaviours and athletes' development, respectively. Coaching profiles were compared on effectiveness using analysis of variance tests. Consistent with the FRLM, when athletes' perceived their coaches used high transformational, moderate transactional, and low laissez faire behaviours, they reported the lowest levels of negative experiences. Contrary to expectations, athletes experienced the highest levels of positive development when coaches used high transformational, moderate transactional, and moderate laissez faire leadership. The results support the use of high levels of transformational and medium levels of transactional leadership, but suggest laissez-faire leadership may associate with certain developmental outcomes when paired with transformational leadership.

Coaches' Perceptions and Recommendations for a Future Transformational Coaching Program Using the Re-Aim Framework

Chantal A. Rochon, Jennifer Turnnidge, Jean Côté
Queen's University

Recent reviews of Coach Development Programs (CDPs) have revealed that the uptake and relevance of CDPs may be enhanced by focusing on coaches' interpersonal knowledge and behaviours (Lefebvre et al., 2016) and using theoretical frameworks to plan and evaluate these programs (Evans et al., 2016). One framework that may hold significant potential for planning and evaluating CDPs is the Reach Effectiveness Adoption Implementation and Maintenance (RE-AIM) Framework (Klesges et al., 2005). As such, the purpose of this study was to gain an understanding of coaches' perceptions of their experiences with CDPs and recommendations for designing an interpersonal focused CDP grounded in transformational leadership theory. Semi-structured interviews were conducted with 20 youth sport coaches from a variety of contexts. Interview data were analyzed using an inductive-deductive thematic analysis (Braun & Clarke, 2006), with RE-AIM as the deductive guiding framework. Results revealed 8 themes that would optimize the domains of the RE-AIM framework for planning and evaluating a transformational coaching CDP. Findings indicated that (a) using reputable sources (Reach), (b) adopting a person-centered approach and (c) facilitating participant engagement (Effectiveness), (d) establishing credibility and (e) providing incentives (Adoption), (f) enhancing accessibility and (g) using qualified educators (Implementation), and (h) creating sustainable connections (Maintenance). These findings provide theoretical insight in regard to using the RE-AIM framework as a planning and evaluation tool for CDPs. Practical recommendations for researchers and practitioners who wish to integrate RE-AIM into the design, implementation, or evaluation of CDPs, as well as potential avenues for future research are discussed.

Do Nice Coaches Finish Last? Exploring Parental Perceptions of a Prospective Coach

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Competence and warmth are two key dimensions in which we judge others. Although coaches and athletes perceive competence to be linked with coaching effectiveness (Kavussanu et al., 2008; Santos et al., 2010), some athletes' value coaches who are caring and warm (Fry & Gano-Overway, 2010). Despite the importance of competence and warmth characteristics in coaches, research on the value that parents ascribe to these attributes in coaches remains scarce. In the current study, we investigated the underlying reasons behind parents' judgments of suitability for inclusion of a new coach. Parents of competitive youth hockey players read a vignette describing a potential new coach, which either emphasized warmth, competence, or generally positive (control) characteristics. Parents then answered an open-ended question assessing why or why not the prospective new coach was suitable for their child's team (N = 179 written responses). A content analysis of parents' writings revealed that competence characteristics were a salient reason for including the potential new coach across conditions (20%), as opposed to the 15% who expressed importance for warmth, and 13% who wrote about both dimensions. Interestingly, of those who read a competence-only description, there were very few participants

who expressed support for warmth (6%), inferring that competence may be more salient than warmth in competitive youth hockey. The current findings support the notion that competitive hockey parents seek the most qualified individual to coach their child.

Investigating the Process by Which National Hockey League Players Development Coaches 'Develop' Athletes

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From grassroots participation to elite competition, athletes' personal development is fundamentally shaped by coaches (Bloom, 2016). Interestingly, whereas an extensive body of literature pertaining to coaching effectiveness exists (Côté & Gilbert, 2009), these efforts seldom extend beyond the head coach. However, an emerging trend in professional sport is the designation of Player Development Coaches (PDC). While this signifies recognition of the importance of properly developing athletes, the processes by which PDC's go about enabling athletes' development are largely unknown. Therefore, the purpose of this study was to explore the perceptions, experiences, roles, and responsibilities of current and former National Hockey League (NHL) PDC's. Semi-structured interviews were conducted with eight NHL PDC's (Mage = 50.5, SD = 9.65), with a combined 57 years of experience (M = 7.13, SD = 7.1). Generally, it was discovered that PDC's worked closely with athletes to oversee their development, which involved frequent meetings/discussions, traveling to evaluate performances, and being available to provide support. The PDC's also described the necessity of establishing trust and ensuring complete transparency with their athletes. Finally, the specific strategies or behaviours implemented to facilitate development were contingent on various outcomes ranging from tangible (e.g., performance objectives) to more process-based (e.g., maturity). Interestingly, the findings indicate that PDC's act in ways that bare similarities to the mentoring process. For instance, the pillars of the mentoring relationship are trust and respect (Bloom, 2013), which were reportedly crucial for PDC's to effectively form bonds with their players, thus allowing greater impact on player development.

The Importance of Coach-Athlete Relationships in Creating Positive University Sport Experiences

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University of Prince Edward Island

Although there has been growing interest in the positive development of youth participating in organized sport (Holt, 2016), less attention has been devoted to the impact of university sport on positive development. As in youth sport, coaches continue to play an important role in the development of university level athletes. Following the development of the University Sport Experience Survey (USES; Rathwell & Young, 2016), this study aimed to predict USES subscales from coach-athlete relationships (CART-Q; Jowett & Ntoumanis, 2004) and player demographics (age, sex, year of eligibility, starter/non-starter). A sample of 126 male (46%) and female (54%) university aged athletes (M = 20.3 years, SD = 1.7) from multiple team sports participated in the study. Stepwise multiple regression analyses were used to identify significant

predictors for each subscale of the USES. Results show that eight of the nine subscales were predicted by at least one independent variable. For positive subscales of the USES, commitment was the strongest predictor, followed by year of eligibility. The total amount of variance explained in across the positive subscales ranged between 10.9% and 22.3%. For negatives subscales, complementarity was the lone predictor of three subscales while sex predicted the other. Variance accounted for in these models ranged between 3.7% and 17.4%. Results suggest that coaches who wish to promote positive experiences in university athletes should focus on commitment and complementarity.

Exercise Psychology - *Disabilities*

Physical Activity Self-Management Interventions for Adults with Spinal Cord Injury: Part 1-Use and Effectiveness of Behavior Change Techniques

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[4]Parkwood Institute

Leisure time physical activity (LTPA) participation for individuals with spinal cord injury (SCI) is low, highlighting the need for behavior change interventions that target self-management skills. In accordance with PRISMA guidelines, this systematic review aimed to determine which behavior change techniques (BCTs) have been used within LTPA self-management interventions for persons with SCI, and which BCTs were effective for improving LTPA behavior and its antecedents. A comprehensive literature search was conducted using five databases. Study characteristics were extracted from included articles and intervention descriptions were coded using the BCT Taxonomy V.1. Effectiveness of BCTs and the level of behavior change theory use in the design of interventions were examined within studies using an experimental design. Twenty-six unique studies were included, 14 of which had an experimental design. The most commonly used BCTs across the 26 studies related to the core components of self-management (i.e., education, training/rehearsal of psychological strategies, and social support). Examination of the 14 experimental studies revealed that the use of BCTs corresponding to core self-management components, and the use of theories and/or constructs of behavior change in the design of interventions, were related to significant improvements and maintenance of LTPA outcomes, regardless of the number of BCTs used. This review offers a glimpse into the mechanisms by which self-management interventions lead to behavior change; however, more research is needed to explore and evaluate other elements (e.g., dose, mode of delivery, provider, and tailoring) that comprise effective LTPA self-management interventions for persons with SCI.

Physical Activity Self-Management Interventions for Adults with Spinal Cord Injury: Part 2-Exploring the Generalizability of Findings from Research to Practice

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Leisure time physical activity (LTPA) participation for individuals with spinal cord injury (SCI) is low, highlighting the need for behavior change interventions that target self-management skills. In accordance with PRISMA guidelines, this systematic review aimed to determine which behavior change techniques (BCTs) have been used within LTPA self-management interventions for persons with SCI, and which BCTs were effective for improving LTPA behavior and its antecedents. A comprehensive literature search was conducted using five databases. Study characteristics were extracted from included articles and intervention descriptions were coded using the BCT Taxonomy V.1. Effectiveness of BCTs and the level of behavior change theory use in the design of interventions were examined within studies using an experimental design. Twenty-six unique studies were included, 14 of which had an experimental design. The most commonly used BCTs across the 26 studies related to the core components of self-management (i.e., education, training/rehearsal of psychological strategies, and social support). Examination of the 14 experimental studies revealed that the use of BCTs corresponding to core self-management components, and the use of theories and/or constructs of behavior change in the design of interventions, were related to significant improvements and maintenance of LTPA outcomes, regardless of the number of BCTs used. This review offers a glimpse into the mechanisms by which self-management interventions lead to behavior change; however, more research is needed to explore and evaluate other elements (e.g., dose, mode of delivery, provider, and tailoring) that comprise effective LTPA self-management interventions for persons with SCI.

An Exploration of the Strategies used to Foster Quality Participation in Community-Based Physical Activity Programs for Persons with Physical Disabilities

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Within the context of disability, quality participation (QP) refers to being involved in a role or activity that extends beyond what a person does and takes into account a person’s meaningful, subjective experiences. A QP experience encompasses feelings of autonomy, belongingness, challenge, engagement, mastery, and meaning. The operationalization of QP in community-based physical activity programming has been minimally examined for persons with physical disabilities. This study explored the fundamental practices and strategies utilized to foster key experiential indicators of QP within community-based physical activity programs for persons with physical disability in Ontario. Programs identified by a grey literature search were invited to participate. Program administrators from nine of fifteen eligible programs completed an online survey and a semi-structured interview. Thematic analysis of interview transcripts revealed the QP domains of belongingness and engagement, and a novel domain of validation, as the most common aspects that programs attempted to foster. Other emergent themes included strategies for establishing optimal conditions to achieve QP and outcomes of QP. A list of 66 strategies that programs may implement to achieve a quality experience for participants was generated. The prevalence of strategies focusing on belongingness, engagement, and validation in current

programs suggest that the development of socially-related aspects of QP may be more valuable in this setting. These findings also allude to the importance of social experience in the development of participation-enhancing services and policies at community-based physical activity programs. A series of follow-up studies are being undertaken to validate the list of QP strategies.

The S.M.I.L.E. Program: Socialization and Parent Reflections on a Community-University Collaborative Program

K Orr[1], R O'Rourke[1], KP Arbour-Nicitopoulos[2]
[1]University of Toronto
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In 2016, the University of Toronto adopted the Sensory Motor Instructional Leadership Experience (S.M.I.L.E.), an adapted physical activity program from Acadia University. This 12-week (60-minutes/week) physical literacy program partners a child with a disability with a Masters of Professional Kinesiology student. Each child is provided an individualized routine of one-to-one and group-based activities. The current study was a two-phased evaluation. Phase one qualitatively explored parental/caregiver experiences of S.M.I.L.E.; phase two observationally captured social interactions between the children and their S.M.I.L.E. instructors. Two focus groups with eight parents/caregivers explored familial experiences with S.M.I.L.E. An observational checklist administered during weeks 2/3 and 6/7 was used to gather data on the in-session social interactions and instructional strategies. Focus group data were analyzed using deductive thematic analysis, while the observational data were analyzed using change scores (Week 2/3 to 6/7) and their associated effects (Cohen's d). Pearson correlations were run to examine the relationships between changes in child and instructor behaviours. Findings highlight the unique one-on-one opportunities provided through S.M.I.L.E. (e.g., parental pride and child self-exploration). Large improvements in child behaviours were observed for engagement (d=1.14), social bullying (d=-1.23), activity (d=1.15) and general (d=1.62) communication, and participation in mandatory activities (d=1.12), with small decreases in non-engaged behaviours (d=-.33). For instructor behaviour, moderate improvements were shown for activity feedback (.47). Large-sized relationships were shown between changes in child's and instructor's behaviours (rs=-.66 to .95). This work suggests that the individualized, one-to-one instructional-style of S.M.I.L.E. is associated with behavioural improvements among children with disabilities.

Exploring Staring Behaviours towards Images of Physically Active Individuals with a Physical Disability

Shannon Weissman, Alexander Lithopoulos, Jennifer R. Tomasone, Amy E. Latimer-Cheung
School of Kinesiology and Health Studies, Queen's University

Having a disability is a stigmatized trait that may elicit negative behavioural reactions, such as staring, from able-bodied individuals. These behaviours often cause feelings of ostracization and social discomfort. Portraying individuals with physical disabilities as physically active may improve how able-bodied individuals perceive them. Thus, it is of interest to evaluate whether portraying oneself as physically active is an effective strategy for reducing staring behaviour towards people with physical disabilities. This study aims to characterize able-bodied adults'

staring behaviour when viewing images of people with and without physical disabilities. It also aims to evaluate whether portraying a person with a disability as physically active reduces staring. Sixty-three university students (mean age=21.2±2.5;81.5% women) viewed 40 images of people with and without physical disabilities engaging or not engaging in physical activity (10 images/condition). Eye movements were recorded during each trial. A multivariate repeated-measures ANOVA was significant for dwell time, number of fixations, time until first fixation, and number of runs, $F(15,48)=37.73$, $p<.001$. Follow-up univariate repeated-measures ANOVA revealed significant main effects for image condition for each outcome $ps<.001$. Participants were quicker to begin staring at images of people with physical disability and examined them for longer than able-bodied images. These findings were more pronounced in the inactive/disability condition than the active/disability condition. The results indicate that there are differences in how able-bodied adults view images of people with and without physical disabilities who are active versus inactive. Staring behaviours may be mitigated by portraying people with a physical disability engaging in physical activity.

Quality Peer Mentorship in Spinal Cord Injury: A Thought-Listing Technique to Understand Characteristics of High-Quality and Low-Quality Peer Mentors

Emily E. Giroux[1], Robert B. Shaw[1], Shane N. Sweet[2], Sheila Casemore[3], Teren Y. Clarke[4], Christopher B. McBride[5], Heather L. Gainforth[1]
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Background: Peer mentorship is a promising approach to support full participation in individuals living with spinal cord injury (SCI). Peer mentorship occurs when a peer mentor with lived experience of SCI provides knowledge, counsel and/or guidance to a mentee living with SCI. Little is known about strategies peer mentors use to support mentees. Understanding characteristics that differentiate high-quality from low-quality peer mentors may provide insight into the mechanisms that underlie quality peer mentorship. Objective: The aim of this study is to understand characteristics that differentiate high-quality and low-quality peer mentors in hospital and community settings. Methods: A thought-listing technique was completed by 25 peer mentors and 18 mentees (mean age: 46.7 years +/- 11.84; 48% female). Participants were asked to visualize quality peer mentors in hospital and community settings. Participants were then prompted to freely list any characteristics thought of during visualization. Final lists of characteristics were screened for duplicates and synonyms. Refined lists were thematically analyzed inductively to create distinct categories. Results: After screening, 276 characteristics (50% hospital-setting) were listed. The most frequently identified themes of effective peer mentors were similar in hospital and community settings which included: "knowledgeable", "listening ability" and "empathetic". Identified themes of ineffective peer mentors in hospital settings included "poor listening ability" and "judgmental"; and "rude" and "aggressive" in community settings. Implications: Ensuring all peer mentors are knowledgeable, empathetic and have strong listening skills may improve their ability to provide quality peer mentorship. Findings from this study will inform future training for peer mentorship programs.

SYMPOSIUM – 2:30-4:00 pm

The Development of Sport Expertise: Current Issues and Different Perspectives

The Development of Sport Expertise: Current Issues and Different Perspectives
Nick Wattie
Faculty of Health Sciences, University of Ontario Institute of Technology

The Great British Medalist Project (see Rees et al., 2016; Hardy et al., 2017) exemplifies the efforts to understand the development of sport expertise, as well as the complexity and multidimensional nature of athlete development. In the same spirit, this symposium focuses on the multidisciplinary constraints involved in the development of sport expertise. The first three presentations in this symposium explore popular secondary factors that constraint athlete development. Schorer et al. explore the influence of different types of relative age effects (age within participation cohorts) on indicators of performance in football players (i.e., monetary value), while Smith and Weir examine the influence of relative age and level of competition on dropout from female developmental soccer in Ontario over a 7 year period. Farah et al examine the influence of geographic factors related to early athlete development environments (i.e., community population density and proximity to major developmental programs) on the development of Canadian National Hockey League draftees. In the fourth presentation, Wilson and colleagues also examine early developmental environments in their study of the relationship between an athlete's skill level and their family's (parent and sibling) physical activity and sport participation patterns. In the fifth presentation, Tedesqui and Young examine practice behaviour. Specifically, they describe the longitudinal influence of psychological grit (perseverance of effort and consistency of interests) on athlete's level of practice engagement. To conclude, our discussant, Joseph Baker, will discuss the implications of these presentations for future research, theoretical models athlete development, and talent identification and development programs.

Symposium Presenters:
Jörg Schorer
Kristy Smith
Lojain Farah
Stuart Wilson
Rafael A.B. Tedesqui

Discussant:
Joseph Baker

The Association of Two Relative Age Effects and Estimated Money Value in Elite Soccer

Jörg Schorer[1], Jannis Deja[1], Christina SteingrÃ¶ver[1], Joseph Baker[2], Florian Loffing[1], Werner Helsen[3], Nick Wattie[4]
[1]Institute of Sport Science, University of Oldenburg
[2]School of Kinesiology and health Sciences, York University
[3]Department of Kinesiology, KU Leuven

[4]Faculty of Health Sciences, University of Ontario Institute of Technology

Relative age effects, which arise from age differences within youth sport cohorts, seem to influence later monetary values of soccer players (Ashworth & Heyndels, 2007). Additionally, Schorer and colleagues (2013) showed that there are different types of RAEs (i.e., within and between year effects), and that they can interact to influence athlete development. The aim of this study was to investigate whether within and between year effects influence long-term monetary values of male soccer players. Birth dates of male Under-17 2007 and 2009 soccer World Championships participants were obtained via official FIFA websites. Estimated monetary values for 822 were retrieved from the website www.transfermarkt.de. When players with no estimated market value were excluded from non-parametric tests, within year effects became significant, $H(3, n = 547) = 8.79$, $p = .03$. Quartile 4 had the highest rankings with 312.64, followed by similar rankings for quartile 1 (MR = 278.03) and quartile 3 (MR = 279.97). Quartile 2 had the lowest mean ranking with 246.13. For between year effects the same pattern was revealed, $H(1, n = 806) = 17.66$, $p < .01$. The mean ranks for older cohorts (MR = 278.96) were higher than the younger cohorts (MR = 232.22). While the results of this study show that the within year effect has an association with the estimated money value of players, the between year effect seems to have a stronger association. Future relative age studies need to consider both effects for a better understanding of the consequences of relative age.

An Examination of Relative age and Athlete Dropout in Female Developmental Soccer

Kristy L. Smith, Patricia L. Weir
Department of Kinesiology, University of Windsor

Historically, the relative age effect (RAE) was thought to be driven by level of competition and talent identification processes. More recent investigations show the effect is present at early levels of competition. Given the presence of the RAE at introductory levels, it is necessary to evaluate dropout from sport across competition levels as the development of expertise is predicated by ongoing participation. The objective of this study was to examine dropout in a female cohort retrospectively across seven years (i.e., pre-adolescent to post-adolescent transition years), with respect to relative age and level of competition (i.e., competitive versus recreational). A chi-square analysis was conducted to ascertain whether a RAE was present in the initial year of registration entries; followed by a survival analysis to assess the impact of relative age on dropout from female developmental soccer in Ontario (n = 9,908). An over-representation of players born in the second quartile was observed in the initial year (age 10 years). Preliminary findings suggested relatively older players were statistically more likely to remain engaged in soccer ($p < .001$) over the seven-year period, however the trend was not practically significant ($w = 0.05$). When competition level was considered, the cumulative survival for recreational and competitive level players was 20.7% and 55.9%, respectively; indicating a greater rate of decline at the recreational level. This suggests that participation trends may depend on sport context and further analysis is warranted.

This research was supported through a Social Sciences and Humanities Research Council Doctoral Fellowship (K. Smith).

Effects of Community Population Density and Distance to Canadian Hockey League Teams on the Production of National Hockey League Draftees in Canadian Provinces

Lojain Farah[1], Jörg Schorer[2], Joseph Baker[3], Nick Wattie[1]
[1]Faculty of Health Sciences, University of Ontario Institute of Technology
[2]Institute of Sport Science, University of Oldenburg
[3]School of Kinesiology and Health Sciences, York University

Recent research has observed significant effects of a community's population density on the production of elite athletes (Rossing et al., 2015; Hancock et al., 2017). A community's proximity to local high performance developmental sport clubs may also favorably expose youth athletes to scouting, resources, and socio-cultural environments that promote athlete development (Curtis & Birch, 1987; Balish & CÃ´tÃ©, 2014). However, the effects of population density and proximity to developmental sport clubs on developing National Hockey League (NHL) draftees has yet to be explored. The purpose of this study was to explore the relationship between the number of NHL draftees produced and city/town population density as well as proximity to Canadian Hockey League (CHL) teams in Canadian born hockey players (from all provinces) drafted into the NHL between 2000-2014 (N = 1502). Linear regression analyses showed a significant positive relationship between population density and the production of draftees in all provincial regions (R2 range: 0.019 to 0.229; standardized ?-coefficients range: 0.142 to 0.480). A significant negative relationship between distance to CHL teams and NHL draftee production was observed in 4/6 provincial regions (R2 range: 0.004 to 0.022; standardized ?-coefficients range: -0.066 to -1.570); cities closer to CHL teams produced more athletes. Future research may benefit from exploring the influence of these two variables with respect to inconsistencies in the relationship between a regionals population size (i.e., community size effect) and the production of elite athletes (e.g., Baker et al., 2009; Farah et al., 2016).

Family Dynamics and Sport Expertise

Stuart Wilson[1], Melissa Hopwood[2], Joseph Baker[3]
[1]School of Kinesiology and Health Science, York University
[2]Paralympics New Zealand
[3]School of Kinesiology and Health Sciences, York University

An athlete's family is known to play a significant role in their development and, arguably, their level of sport attainment (Knight, 2017). The current investigation sought to explore how family members' physical activity and sport involvement related to athletes' skill level. Data collected using the Developmental History of Athletes Questionnaire (DHAQ; Hopwood, 2013) on 229 athletes (M = 24.6 years, SD = 5.8) from 34 sports was examined. Athletes' skill level (Non-elite, pre-elite, or elite) were compared to familial characteristics and involvement in sport and physical activity using chi-square contingency tables or one-way ANOVA depending on variable type. Athlete skill level was associated with parent participation in each of the categories of physical activity examined (general fitness activities: $p = .03$, $V = .18$; recreational sport: $p = .03$, $V = .18$; competitive sport: $p = .02$, $V = .18$), and with sibling participation in all three categories combined ($p = .04$, $V = .13$). Athlete skill level was also associated with the highest level of competitive sport reached by parents ($p < .01$, ?b = .27) and siblings ($p < .01$, ?b = .22). Additionally, higher skilled athletes were more likely to be younger in birth order (adjusted

standardized residual = 3.69). Moreover, the activity patterns of family members interacted to affect athlete development. This investigation extends the current understanding of how a family's physical activity and sport participation are related to athlete sport attainment, and reinforces the importance of family characteristics in the development of sport expertise.

The Relationship between Athletes' Self-Reported Grit Levels and Coach-Reported Practice Engagement over One Sport Season.

Rafael A.B. Tedesqui, Bradley W. Young
School of Human Kinetics, University of Ottawa

Grit is the tendency to work hard toward long-term goals, maintaining effort and interest despite challenges (Duckworth et al., 2007). Cross-sectionally, grit relates to achievement criteria outside sport (CredÃ© et al., 2016) as well as practice amounts and skill level within sport (Tedesqui & Young, 2017). This study aimed to longitudinally examine relations between grit and practice engagement. At time 1, 14 athletes (10m, 4f; 13-23 yrs-old; weekly practice hours = 10.46, SD = 6.34) from two Canadian canoe/kayak clubs identified for having structured, competitive, and demanding programs, completed a survey for two grit facets (Tedesqui & Young, 2017): perseverance of effort (PE) and consistency of interests (CI). At times 1, 2 (one month later), and 3 (two months after time 1) coaches assessed each athlete's level of practice engagement (i.e., diligence, hard work, attitude, attendance). Results were plotted as performance profile cases or radar charts (Butler & Hardy, 1992). We examined representative cases to elucidate the suitability of each facet for explaining the variability/stability of practice engagement. Results highlight cases identified as (a) high PE at time 1, which were accompanied by evidence for stable levels of practice engagement (across the three time points); and (b) high CI at time 1, where no discernible patterns of association with measures of practice engagement and attendance could be gleaned. Discussion focuses on why the two grit facets differentially associate with measures of practice engagement longitudinally, and the value of using performance profile cases for observing such associations.

This research was supported initially (2013-2016) by the Social Sciences and Humanities Research Council of Canada (SSHRC) through the Joseph-Armand Bombardier Canada Graduate Scholarship (767-2013-2136), and subsequently (2016-2017) by an Ontario Graduate Scholarship.

Free Communications & Symposium - 4:00-5:30 pm

Motor Control - *Skill Acquisitions & Performance*

Using Video Simulations and Virtual Reality to Improve Decision-Making Skills
Caleb Pagé[1], Pierre-Michel Bernier[1], Maxime Trempe[2]
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[2]Sports Studies Department, Bishop's University

A large body of literature supports the effectiveness of video-simulation to improve on-court/on-field performance in interceptive tasks (e.g., hitting a baseball; Broadbent et al. 2015). However, its effectiveness for invasion tasks requiring the localization of teammates and opponents to select the optimal action has yet to be demonstrated. In addition, whether presenting the video-simulation in virtual-reality provides an added-value is unknown. To test these two questions, varsity-level basketball players underwent four training sessions during which they observed video clips of basketball plays presented either on a computer screen (CS group) or using a virtual-reality headset (VR group). A third group watched footage from NCAA playoff games on a computer screen (CTRL group). Decision-making skills were tested on-court before and after the four training sessions using two types of plays: “trained” plays (plays presented during the CS and VR training sessions) and “untrained” plays (plays presented only during the on-court tests). Our results revealed that both VR and CS simulations allowed participants to significantly improve their on-court decision-making skills compared to the CTRL group (mean improvement of 25.1%±6.64, 11.3%±3.59, and 0.9%±3.31, respectively). In addition, while VR and CS groups both significantly improved for the “trained” plays (23.5%±6.9 and 15.5%±5.5, respectively), only VR led to a performance increase of the “untrained” plays (28.3%±11.8 and 3.3%±6.7, respectively). Our results demonstrate that video-simulation is an effective technique to improve decision-making skills for invasion tasks and suggest that VR training stimulate processes that are, at least in part, distinct from those engaged in CS training.

Pay More Attention to the Positives, Your Brain Already Does it Anyways
Chris Holland[1], Kevin LeBlanc[2], Camille Fraser[3], Lindsay Beaver[3], Heather F. Neyedli[3]
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Value positive incentives (high vs. low values) have been shown to have an effect on attention when performing simple motor tasks (Anderson, Laurent, & Yantis, 2011). During a training phase, participants learned to associate stimuli with value (e.g., monetary reward). Following training, the presence of these value associated stimuli serve as distractors increasing response time compared to when there were no value associated stimuli in the environment. Little research, however, has yet been done regarding the impact of negative outcomes on attention capture and response times. The purpose of this study was then to determine whether stimuli associated with negative value would affect response time. The study was broken into three separate experiments. The first experiment was a replicate of original experiment (only positive outcomes) and was used as a manipulation check to verify that the original study could be replicated in our lab. The second experiment incorporates positive and negative outcomes, used

to compare the effects of the different forms of value. The third experiment included varying values of negative outcomes (high and low penalties). All three experiments used response times as the determinant of performance. Results indicated that high-value positive outcomes caused more attentional capture, causing participants to have increased response times in the positive only experiment. However, when negative outcomes were introduced, the value associated stimuli (positive or negative) had no effect on response time. These results indicate that positive and negatively associated stimuli have differential effects on attention capture.

The Reinforcement Landscape Influences Sensorimotor Learning

Joshua Cashaback, Christopher Lao, Dimitri Paladis, Susan Coltman, Heather McGregor, Paul Gribble
Brain and Mind Institute, Western University

Successful movement, such as hitting a long and straight golf drive, produces a satisfying feeling. Such positive reinforcement feedback has been suggested to influence motor learning. Here, we tested the idea that the reinforcement landscape—the probability of task success given a motor action—can be manipulated to influence learning. In Experiment 1, we tested the prediction that participants experiencing a steep reinforcement landscape would learn faster than those experiencing a shallow landscape. In Experiment 2, we predicted that participants experiencing a complex landscape with multiple gradients would change where they aimed their hand such that they would ascend the steeper portion of the landscape. Participants grasped the handle of a robot arm. They reached from a home position to a displayed target. Vision of the upper limb was occluded. Critically, we shaped the reinforcement landscape by manipulating the probability of reward as a function of their angular displacement from the displayed target. Depending on the assigned landscape, participants were more likely to receive reward if they reached to the left and/or right of the displayed target. We found that participants learned at a faster rate when experiencing a steeper landscape and were more likely to ascend the steeper portion of a complex landscape. Finally, we developed a simple computational model that replicates both experiments. The model naturally reproduces several other hallmarks of human movement, such as random-walk behaviour in task-irrelevant dimensions, increased learning rates with greater movement variability and exponential learning curves.

Using Error Estimation to Better Understand the Advantages of Self-Controlled Practice

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Exercising choice during practice (self-controlled group) consistently leads to increased learning compared to being denied these choice opportunities (yoked group). Wulf and Lewthwaite (2016) proposed a motivational mechanism for self-controlled learning advantages, emphasizing autonomy-support, perceived competency, and enhanced expectancies. Others however, have advocated a greater relative contribution of informational factors such as error estimation and feedback processing (Carter & Ste-Marie, 2017). Here, we contrasted these two perspectives using three groups: a self-controlled (SC), a yoked (YK), and a yoked with error-estimation (YK+EE) group that estimated their movement time (MT) prior to receiving KR. Participants practiced a spatiotemporal motor task with a MT goal of 900 ms and completed motivation

questionnaires after blocks one and six. Learning was inferred using 24-hour no-KR retention and transfer (new MT goal) tests, which included participants estimating their MT after each trial. No group differences were found during acquisition or for measures of motivation; however, there was a trend for less MT |CE| in retention and transfer for the SC (M=102.29 & 156.27ms) and YK+EE (M=102.79 & 125.67ms) groups compared to the YK group (M=186.77 & 221.59ms). A similar trend for more accurate estimations in retention and transfer were noted for the SC and YK+EE groups relative to the YK group. Although our findings were in the expected direction and suggest the detrimental effects of practicing in a yoked group can be attenuated through error estimation, the lack of significance prevents us from strongly asserting this conclusion.

Functions of Observational Learning in Coaches and Officials: New Themes

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The Sport Imagery Questionnaire was used as a framework for the development of the Functions of Observational Learning Questionnaire (FOLQ). Some researchers have challenged whether the FOLQ fully captures all uses of OL, given distinctive qualities exist between OL and imagery. We examined this possibility and worked with existing data from Hancock et al. (2011) in which they extended the use of the FOLQ to coaches and officials of team interactive sports. In that research, the following open-ended question "Do you observe others/self for anything not addressed above?" had been included on the questionnaire but was not analyzed. Of the 210 questionnaires completed, 18 coaches and 23 officials responded to the open-ended question. The first and last authors coded participants' responses, achieving researcher consensus. Following this, the second and third authors assumed the role of critical friends. Results highlighted many responses that were grounded in the FOLQ; specifically, 72% and 69% for coaches and officials respectively. A number of responses, however, fell outside of the FOLQ. One particular theme was the use of OL to improve communication (e.g., how to talk to players) among coaches and officials. A second theme, unique to referees, was that of self-presentation (e.g., appropriate attire and conduct). Although less robust, the notion of self-reflection also emerged with the coaches. With new themes emerging, it suggests that the current FOLQ is lacking in its content structure and further research may be needed to improve the FOLQ.

Relationships between Error Production in Motor Skills in High and Low-Stakes Situations over a Competitive Season

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Recent work examining performance in a sport context has reported a positive relationship between error rankings in simulated (low-stakes) and actual (high-stakes) gameplay (Sanli,

Slauenwhite & Carnahan, 2017). Of interest in the present study was whether the relationship between high and low-stakes performance changed as players gained experience over a five-month competitive volleyball season. Three types of errors (attack, serve, and serve receive) were recorded during actual and simulated (in practice) gameplay for fourteen varsity volleyball players. Early in the season there was a significant, positive relationship between high-stakes error rankings and low-stakes error rankings when player position as well as the percentage of time on the court for practice and game segments were controlled for (partial correlation $r = .89$, $p < .001$). The strength of this relationship was not maintained mid (partial correlation $r = .11$, $p = .74$) and late (partial correlation $r = .19$, $p = .58$) season. These results suggest that the role of errors in simulation in relation to high-stakes performance may change with extended experience in both high and low-stakes contexts.

Sport Psychology - *Doping & Risky Behaviours*

"I Definitely Don't Think It was Enough at All": A Qualitative Exploration of Athletes' Experiences and Perspectives on Doping Prevention on Doping Prevention Education

Laura Hallward, Lindsay Duncan
Department of Kinesiology and Physical Education, McGill University

Adolescent athletes are being exposed to steroids and other illegal doping agents as early as 12 years of age. Educational doping prevention programs are being implemented during adolescence, but many athletes still lack doping knowledge. To ensure more effective doping education for adolescents, current gaps in doping knowledge needs to be identified and educational program delivery should be tailored to athletes' preferences. The purpose of this study was to explore young adult athletes' insights about the adequacy of the doping education they received as adolescents, and their recommendations for improving doping prevention education. Individual semi-structured interviews were conducted with 21 athletes ($n = 11$ women and $n = 10$ men) who have competed at the provincial level or higher. Interviews were audio recorded, transcribed verbatim, and analyzed inductively with thematic content analysis. Four themes emerged relating to athletes' doping education. First, athletes value doping prevention education, but the extent to which they deem it to be valuable in their sport varies considerably. Second, athletes discussed how they acquired their doping knowledge, with many athletes receiving very little education as an adolescent. Third, athletes discussed forms of doping education that were impactful and effective for them. Fourth, the athletes provided recommendations for delivering doping education to adolescent athletes based on their experiences and knowledge. The athletes received insufficient and inadequate doping education as adolescents. The athletes highlight a need to implement more formal doping education during adolescence that is more engaging, and delivered by sources respected by the athletes.

"And That's How it All Began": An Examination of Personal and Situational Factors That Lead to Doping in Sport

Lindsay Duncan, Laura Hallward
Department of Kinesiology and Physical Education, McGill University

To address the problem of doping in sport, primary prevention targeting adolescent athletes is critical. Few primary prevention interventions are effective, suggesting the need for new approaches including content that is engaging, relatable, and addresses realistic situations athletes may encounter. To begin building this content, the purpose of this study was to explore athletes' perspectives on the personal and situational factors that lead to the initiation of doping. Based in an interpretive paradigm, relativist ontology, and transactional epistemology, interviews were conducted with 21 young adult athletes who competed in sports as adolescents. Interviews were audio recorded and transcribed verbatim. To communicate the richness of the participants' stories and the complexity of doping initiation, data analysis, interpretation, and presentation were conducted through thematic analysis and the development of creative nonfiction stories. Three stories were created that detail the interactions between key characters and situations within sporting, social, and family contexts that lead an athlete toward doping. The stories include situations in which pressure to dope is placed upon an athlete both deliberately and inadvertently. Emphasis is placed on the athlete's appraisal of their personal relationships and situations as their appraisal plays a critical role in whether they will initiate doping. Quotations are presented throughout to help express the stories in participants' own words. This study extends a new mode of knowledge production within the doping literature, creative nonfiction story-telling, to present the experiences of young athletes facing pressure to dope in a manner that can be built directly into prevention interventions.

Doping From a Societal Point of View: Stuck Between Rejection and Tolerance

Katharina Poeppel[1], Bernd Strauß[2], Andrea Petróczi[3]
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[2]Department of Sport Science, University of Muenster
[3]Department of Applied and Human Sciences, Kingston University London

Doping is a crisis in high-performance sports, which affects also the public opinion. High-performance sport finds itself in conflicts between diverse external protagonists such as politics, media and the society, which demand peak performance but intended to preserve the "clean sport image", and impose sanctions in case of doping (Petróczi & Strauss, 2015). In this presentation, results of a narrative review concerning outwardly presented public stances towards doping will be discussed. An analysis of articles linked by the scientific database "SCOPUS" concerning the keywords "doping" and "perception" and corresponding terms was carried out. Due to the choice of wide-ranging keywords to receive a comprehensive impression of the topic, the high amount of initial search results (N=726) were strictly restricted on thematic ground. Thus, a high amount of studies concerning athlete's attitudes or coaches' attitudes towards doping were eliminated. Additionally, a forward- and backward search was conducted. Two complementary themes emerged: On one hand, there is a clearly rejecting attitude towards doping, which was associated with strong demands for severe sanctions (Engelberg, Moston, & Skinner, 2012). On the other hand, a more tolerant stance presents, especially if the connection between athletes and sport fans is considered (Solberg, Hanstad, & Thøring, 2010). A differentiated and not solely negative public stance towards doping becomes obvious. Therefore, the public stance should be further investigated based on experimental designs. This could help to develop a deeper insight into, whether we face some kind of double standards concerning the public perception of high-performance sports and athletes.

Everyone Else is Doing It: The Association between Social Identity and Conforming to Peer-Influence in NCAA Athletes

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While student-athletes broadly benefit from involvement in intercollegiate sport, student-athletes also have many opportunities to engage in risky behaviors that impact their own health and that of others (e.g., binge drinking, hazing). In the current study, we examined athletes' conformity to their teammates' risky behaviors through an in-situ team-based paradigm, to test the expectation that athletes who strongly socially identify with their team would be at increased risk of conforming to teammates' behaviors. Participants included 379 athletes from 23 intact NCAA teams who completed an electronic survey to complete scale-scored survey items (e.g., social identity) and report the extent they would engage in six scenarios (i.e., binge drinking, marijuana use, drinking/driving, playing through concussion, performance enhancing drug (PED) use, hazing). Researchers then displayed ostensible responses that were manipulated to appear as though teammates participated in highly 'risky' behavior before athletes again responded to the scenarios. Across the sample, post-manipulation scores increased significantly – indicating conformity – for all scenarios (t-values: 6.66-11.27) with the percent of athletes conforming ranging from 12-30%. Using hierarchical mixed-effect models to account for individual- and team-level effects, individual ratings of social identity (level-1) significantly predicted conformity to all risky behaviors except for PED use (b's from .08 to .20), while group-level social identity (level-2) predicted playing through a concussion (b=.34) and drinking/driving (b=-.25). The current results support our hypothesis that social identity plays an important role in conformity to peer-influence and may inform efforts to leverage group-level processes in interventions to prevent risky behaviors in student-athletes.

Explaining Sport-Based Moral Behaviour among Adolescent Athletes: The Interactive Roles of Perfectionism and Gender

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Lakehead University

The purpose of this study was to examine the degree to which adolescent athletes' moral behaviour in sport is dependent on their perfectionistic orientation and their gender. Female (n = 123) and male (n = 132) adolescent club basketball players (Mage = 17.44 years, SD = 1.03) completed the Sport Multidimensional Perfectionism Scale-2 (Sport-MPS-2: Gotwals & Dunn, 2009) and the Prosocial and Antisocial Behaviour in Sport Scale (PABSS; Kavussanu & Boardley, 2009). Cluster analysis conducted upon the participants' Sport-MPS-2 subscale scores revealed that the sample could be categorized into three theoretically meaningful groups: Pure Personal Standards Perfectionists, Mixed Perfectionists, and Non-Perfectionists (see Gaudreau & Thompson, 2010). A 2 (gender) × 3 (perfectionism group) factorial MANOVA then tested for main and interaction effects across the four PABSS subscales. Regarding prosocial behaviour towards opponents, mixed perfectionists and pure personal standards perfectionists showed

higher levels than non-perfectionists and females showed higher levels than males. Regarding prosocial behaviour towards teammates, the same pattern of differences emerged across the perfectionism subtypes, but only among females. Regarding antisocial behaviour towards opponents and antisocial behavior towards teammates, the mixed perfectionists showed higher levels than the pure personal standards perfectionists and the non-perfectionists, but only among males. In discussion we relate the present cluster solution to perfectionism research and theory; speculate why mixed perfectionists and pure personal standards perfectionists would report different levels of antisocial behaviour, but similar levels of prosocial behaviour; and explore why these differences would be exhibited among one gender, but not another.

Pre-Injury Variables and Risk of Sport Concussion

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Introduction: Concussions are a public health concern in Canada, and may cause physiological and neuropsychological consequences. Research on risk factors is not extensive and many questions remain unanswered. Objective: This study examined whether cognitive functioning, history of concussion (HOC), and sex predicted risk of sport concussion. Design: Retrospective study design using logistic regression and predictive models. Participants: 708 data observations from 701 varsity athletes (41.2% female), representing 14 sports. Assessment of Risk Factors: Two measures of cognitive functioning (mean reaction time and throughput [speed and accuracy]) were assessed using the Automated Neuropsychological Assessment Metrics testing battery. Sex and self-reported HOC were examined. Outcome Measures: Occurrence of concussion after baseline testing. Main Results: HOC was a significant predictor for both sexes. For every previous concussion, the odds of sustaining another concussion increased by 1.5 (95% Confidence Interval [CI]: 1.1, 2.1 [females]; 1.2, 1.9 [males]). Females with a HOC had twice the odds of sustaining another concussion than those without a HOC (CI: 1.1, 4.0). For males, the odds were three times (CI: 1.7, 5.6). Cognitive functioning and sex were not meaningful predictors. Conclusions: This study provides sex-specific evidence that HOC is a risk factor and suggests that pre-injury cognitive functioning is not a risk factor for sport concussion. Thus, it is important for clinicians to record HOC, and to encourage athletes to report concussions to ensure accurate recording. Despite common practice, pre-injury cognitive screening of athletes is not recommended for assessing risk of future concussion.

Exercise Psychology- *Adolescents & Young Adults*

Peer-created Motivational Climate and Motivation of Adolescent Soccer Players

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Peers can contribute to adaptive and maladaptive motivational outcomes in youth sport (Smith, 2007; Weiss & Stuntz, 2004). One way this may occur is through the reinforcement of goal structures and expectations that frame perspectives on sport success (Ntoumanis, Vazou, & Duda, 2007). Referred to as peer-created motivational climate, perspectives that are task-involving (improvement, relatedness support, and effort emphasis) and ego-involving (intrateam competition/ability and intrateam conflict emphasis) can be emphasized. In light of the importance of peers during adolescence and the need for empirical work on peer-created motivational climate, the purpose of this study was to examine peer-created motivational climate perceptions as predictors of important motivational outcomes in adolescent soccer players. Participants (N = 96; M age = 15.3 years, SD = 1.2) completed established questionnaires assessing demographic variables, perceptions of the peer-created motivational climate, and adaptive and maladaptive motivational sport outcomes (i.e., enjoyment, commitment, burnout, and anxiety). Multivariate multiple regression analysis demonstrated a significant moderate association (Rc = .47) between the variable sets, $p < .05$. Hours of soccer per week, a control variable, and all peer climate dimensions except intrateam competition/ability (excluded because unreliably measured) contributed meaningfully and in expected directions to the multivariate relationship, as did all motivational outcome variables. Variance explained in the motivational outcome variables was 13.3%. The findings suggest that peers may both foster and undermine motivation of adolescent athletes through the climate they reinforce. Intensified research on the peer-created motivational climate holds potential to enhance understanding of the youth sport experience.

Sedentary Behaviour among University Students: A Mobile APP Pilot Intervention

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Sedentary behaviour (SB) poses a number of health risks (Katzmarzyk et al., 2009) and university students in particular are at risk of engaging in prolonged SB. Due to the pervasiveness of smartphones, mobile apps may be used to encourage less SB in this population. The purpose of this study was to pilot a SB app among undergraduates. Participants (n=177) first completed an online survey that included self-reported levels of SB and experiences with apps. Following this, participants were asked to participate in a follow-up study and were randomly assigned to a trial group (used the app Rise & Recharge® for 2 weeks; n=53) or a control group (n=74). After 2 weeks, participants in trial (n=18) and control groups (n=38) completed a second online survey that repeated the self-report SB questions. Participants in the trial group responded to additional questions about their app experience. A two-way mixed ANOVA was conducted on data for participants who had SB data at both time points. This yielded a significant interaction between group and time ($F(1,35)=5.59$, $p=0.02$, $np2=0.14$) in which the trial group (n=11) had lower SB at Time 2 than the control (n=26) group. Despite this, participants in the trial group rated the app as only ‘slightly influential’. Further, students’ open-ended responses showed that they perceive a lack of control over their own SB due to the demands of university. Overall, this study provides insight into SB among university students, and sheds light on the potential of using apps to influence this behaviour.

Standing in the University Classroom: A Real Possibility

Siobhan T. Smith, Matthew J. Fagan, Jordan C. LeSarge, Harry Prapavessis
The University of Western Ontario

There are many health risks, independent of moderate-to-vigorous physical activity, associated with prolonged sedentary time; however breaking up periods of sitting can attenuate these risks. Alternative workstations have successfully reduced sedentary time without hindering productivity in office workers. However, to date there is limited research on the effect of active workstations on classroom performance of university students. This study investigated the effect of sitting, dynamic sitting, and standing desks on classroom performance (primary outcome). Secondary outcomes included cognitive performance, enjoyment, focus, discomfort and difficulty. Using a randomized counterbalance design, university students (N = 20, mean age = 21.85) listened to three 50-minute lectures followed by three quizzes pertaining to the lectures, performed cognitive tasks, and rated their discomfort, ease, enjoyment, focus, and future use after each desk condition. No significant difference for classroom performance, cognitive performance, enjoyment, or focus was found between the desks (all p values > .05). Significant differences however were found for discomfort and difficulty as well as future use (all p values < .05). Specifically, students rated the standing desks to cause slightly more discomfort and difficulty than the classic sitting desk and rated they were more likely to use a dynamic sitting desk over a standing desk in a classroom setting. Based on these findings, we recommend the use of standing and dynamic sitting desks in university classrooms to allow students to receive health benefits as they learn.

Enhancing University Practicum Students' Roles in Implementing the Ontario Daily Physical Activity (DPA) Policy

Angela M. Coppola[1], David J. Hancock[1], Veronica Allan[2], Matthew Vierimaa[3], Jean Côté[2]
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In Canada, the Ontario Daily Physical Activity (DPA) policy promotes comprehensive school physical activity programs (CSPAP) by mandating 20 minutes of daily physical activity in schools. As community and teacher involvement is a key component of the CSPAP framework, developing partnerships to implement CSPAPs is worth exploring to facilitate meaningful and relevant engagement of partners. One understudied role is that of university Physical Education practicum students who intern in the CSPAP context. Thus, the purpose of this study was to explore university practicum students' perceptions of DPA engagement and identify strategies to enhance their roles in implementing DPA. Using abductive reasoning to create meaningful and practical findings for CSPAP partners, we analysed the experiences of nine practicum students before and after DPA implementation using the CSPAP framework. We contextualized the findings using the CSPAP and community-based participatory research literature. Three themes provided insight into how to prepare practicum students for and enhance their roles in DPA: (1) building relationships to enhance DPA and facilitate school partners' engagement, (2) maximizing use of resources, and (3) co-learning implementation knowledge and skills. The main contributions of this study include the application of co-learning and mutual capacity-building strategies to the DPA and CSPAP context, and reflective questions to facilitate building

relationships, maximizing use of resources, and co-learning between partners. Methodologically, this study is an example of creating practical DPA partnership findings using the CSPAP framework and provides support for further use of abductive reasoning methodologies to explore DPA and CSPAP programs and partnerships.

Sport Enjoyment and Weight Related Comments from Coaches, Teammates, Peers, and Family Members

Melissa deJonge, Eva Pila, Madison Vani, Angela J. Fong, Catherine M. Sabiston
University of Toronto

Among adolescent girls, weight related comments (WRCs) exacerbate appearance concerns and may negatively impact sport experiences. However, WRCs from the primary sociocultural agents who may influence sport enjoyment (i.e. family, peers, coaches and teammates) is underreported. Thus, the current study had two main objectives; (1) determine the frequency of WRCs from family, peers and sport coaches and teammates, and (2) examine whether WRCs predicted sport enjoyment above and beyond perceptions of sport competence. Adolescent girls (N=198, Mage= 16.05, SD= 1.37) completed questionnaires. In total 64% of adolescent girls reported WRCs from family, peers, coaches and teammates: 61% were reported from family, 19% from peers, and 24% from coaches and teammates. Predictors of sport enjoyment were examined using hierarchical regressions. Controlling for age and body mass index, sport competence (?=0.54, p <0.001) and WRC from coaches and teammates (?=-0.21, p=0.002) predicted sport enjoyment (R2=0.33). Findings suggest that WRCs from teammates and coaches (compared to peers and family), may be particularly detrimental to sport enjoyment in adolescent girls. The findings provide implications for improving adolescent girl sport participation and suggest that strategies should be developed to reduce WRCs in the sport environment.

The Effects of Exercise, Stress, and Sleep on Depression in First-Year Undergraduate Students

David Brown[1], Andrea Josse[1], Panagiota Klentrou[1], Bareket Falk[1], Kimberly Gammage[1], Camerone Muir[2]
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Introduction: Major depressive disorder, commonly known as depression, is a complex mental disorder that affects 30% of university students. First-year university students are under unique types of stress and may adopt negative lifestyle habits including decreased sleep and exercise. These changes can affect depression levels, however, research addressing depression and its lifestyle risks within this population is limited. Purpose: The primary purpose of this study was to examine the relationship between physical activity, stress, sleep quality, and depression as well as how these variables change over first-year of university. Method: 301 first-year undergraduate students (230 females, 71 males) between the ages of 17 and 23 years old completed validated questionnaires examining exercise habits, sleep quality, stress and depression levels at two time points during the first academic year; September (pre-study) and March/April (post-study). Results and Conclusion: Light, moderate and vigorous exercise, MET minutes and energy expenditure significantly decreased, while perceived stress scores and depression significantly increased from pre-study to post-study. The number of stressful events

did not change between time points. The number of stressful events and perceived stress scores pre-study were positively related to pre-study depression, while pre-study energy expenditure and depression, and post-study sleep quality and perceived stress were significantly related to post-study depression. Results emphasize the need to focus on ways to increase first-year students' ability to deal with stress, potentially by increasing resources for students as well their awareness of them, in order to decrease mental health issues within this population and ease the transition into university.

SYMPOSIUM – 4:00-5:30 pm

"[My Life] Would Not Have Been the Same Without Them": The Role of Peer Mentorship among Adults with a Physical Disability

Symposium presenters:
• Krista Best, Postdoctoral Fellow, Université Laval
• Heather Gainforth, Assistant Professor, University of British Columbia Okanagan
• Shane Sweet, Assistant Professor, McGill University
• Jeffrey Caron, Postdoctoral Fellow, McGill University/Yale University
• Haley Flaro, Executive Director, Ability New Brunswick (Discussant)

General Symposium Abstract

Approximately 14% of Canadians have a physical disability. These individuals typically report lower levels of "participation", which refers to the engagement in daily (e.g., self-care, mobility) and social (e.g., sport/exercise, hobbies) activities. With the goal of enhancing participation, peer mentorship programs for individuals with physical disabilities have been implemented across Canada. Peer mentors are individuals who, through their experiences living with a disability, can provide empathetic understanding, practical advice, and emotional support to peers with a physical disability. The purpose of this symposium is to present four approaches to understanding peer mentorship among adults with physical disabilities. First, Dr. Best will discuss the impact of a peer-led wheelchair program on wheelchair users' self-efficacy, their wheelchair skills and its impact on broader outcomes. Second, Dr. Gainforth will present her research program that focuses on understanding the specific methods/tools spinal cord injury (SCI) peer mentors use to enhance participation. Third, Dr. Sweet will discuss findings from qualitative and quantitative research that investigated SCI peer mentorship through the lens of self-determination theory. Fourth, Dr. Caron will take a different look at SCI peer mentorship by presenting the perspectives of peer mentors regarding their roles and perceived impact. To conclude the symposium, Haley Flaro of Ability New Brunswick, a community organization that represents individuals with disabilities, will provide her community perspective on these projects. She will discuss the gaps that need to be addressed to inform community organizations' efforts to enhance the lives of people with disabilities through peer mentorship.

"If you can do it, I can too: Impact of peer-led wheelchair training on wheelchair skills, self-efficacy, and participation."

Speaker: Krista Best, Université Laval
Authors: Krista Best, William C. Miller, Janice J. Eng, & François Routhier

Training is an important component of manual wheelchair (MWC) procurement, yet less than 50% of new users receive any training. MWC training has been primarily the responsibility of clinicians; however, peers may provide an alternative approach to augment existing training efforts. Peer-led training may also provide a means for community-based initiatives, where individuals could access training anytime (e.g., after community integration when the task demands of wheelchair use are better understood). Two randomized controlled trials (RCT) support peer-led training for improving MWC use outcomes. The intervention in both studies consisted of 6x1.5 hour peer-led MWC training sessions (delivered to a pair of MWC users) and individualized based on participation goals. The first RCT with 28 adult (≥18 years) MWC users (usual care control group) showed that peer-led training yielded large effect sizes on MWC use self-efficacy (ES=1.4), MWC skills capacity/performance (ES=1.3/1.0), with a trend towards statistical significance on satisfaction with participation (ES=0.7). A second RCT with 40 older adults (≥50 years) (active control group = 6 didactic information sessions) indicated that peer-led MWC training was feasible to administer (i.e., indicators of process, resources, management, and safety) and had a large effect on MWC skills performance (ES=0.9), with a trend towards statistical significance on satisfaction with participation (ES=0.6). All participants in both RCTs perceived benefits of peer-led wheelchair training. Peer-led MWC training may address the training needs of community-living MWC users. The potential for group training may have time and cost efficiencies, while reducing burden on health care professionals.

Listening In: Using Dynamic Systems Methods to Understand the Peer Mentor – Mentee Relationship
Speaker: Heather L. Gainforth, University of British Columbia Okanagan
Authors: H.L. Gainforth, R. Mackay, E. Giroux, S. N. Sweet, S. Casemore, T. Clarke, C. McBride, K.A. Martin Ginis, K. Erickson.

Background: Peer mentorship has shown preliminary success for promoting participation among people with spinal cord injury (SCI). Little is known about how peer mentors help reach their social participation goals and current research methods do not account for the reciprocal and real-time nature of peer mentorship conversations.
Objectives: The presentation will outline a research program that aims to understand how peer mentorship conversations enhance participation among mentees using a dynamic systems methodology called state space grids. This method has potential to account for the reciprocal and real-time nature of peer mentorship conversations.
Methods and Results: Findings from the three phases of the research program will be presented (n=113 people with SCI). In Phase 1, a reliable coding method was developed to categorize all statements made by peer mentors and mentees during conversations (n=30 recorded conversations; Agreement>70%). In Phase 2, a method for judging peer mentors' ability to enhance participation amongst mentees was developed using a Delphi consensus exercise (n=43 people with SCI). In Phase 3, the methods developed in Phase 1 and Phase 2 will be used to apply the state space grid methodology to examine real-time differences in conversation style between peer mentors who are perceived to be most vs. least effective at enhancing participation among mentees.

Discussion: To our knowledge, this research is the first to describe how mentors support mentees using data from real-time conversations. The development of methods for and the impact of examining peer mentorship conversations in real time will be discussed.

Focusing on the mentees: Can self-determination theory be applied in a spinal cord injury peer mentorship setting?
Speaker: Shane N. Sweet, McGill University
Authors: Shane N. Sweet, Jeffrey G. Caron, Emilie Michalovic, Keryn Chemtob and the SDT in SCI peer mentorship team

Self-determination theory (SDT) provides a person-centered theoretical framework to examine the social context created by spinal cord injury (SCI) peer mentors. This presentation will discuss the results of two studies that explored SDT in the SCI peer mentorship context. The first study qualitatively examined the perspectives of 13 mentees who received peer mentorship using semi-structured interviews. The mentees expressed a number of interpersonal behaviours that aligned with SDT. Specifically, mentees felt their mentors involved them in the decision making process and personalized their sessions (autonomy), provided care and empathy (relatedness), and encouraged them and modeled new behaviours (competence). In the second study, a convenience sample of SCI mentees (n= 68) and non-mentees (n= 63) completed measures on SDT's basic psychological needs of autonomy (i.e., sense of volition), competence (sense of ability) and relatedness (sense of connectedness), quality of life, and participation. SCI peer mentorship only predicted greater competence ($B=.44$, $p<.05$) and relatedness ($B=.42$, $p<.05$). Competence ($B=.33$, $p<.05$) and relatedness ($B=.30$, $p<.05$) also mediated the relationship as they positively predicted quality of life. Competence also mediated participation in self-care ($B=.62$, $p<.05$) and mobility-related ($B=.60$, $p<.05$) activities, while relatedness mediated participation in family roles ($B=.49$, $p<.05$). Results from these studies provide preliminary insight into the role of SDT in SCI peer mentorship. Overall, these findings indicate that SCI mentors provide a person-centered approach that aligns with SDT, and SCI mentees' basic psychological needs are being met. Further discussion and investigation are needed regarding the role of autonomy within SCI mentees and non-mentees.

A narrative examination of spinal cord peer mentors' perspectives on peer mentorship
Speaker: Jeffrey G. Caron, McGill University
Authors: Jeffrey G. Caron & Shane N. Sweet

Spinal cord injury (SCI) peer mentorship has been found to improve people's lives by helping them engage in daily (e.g., employment, mobility, sport/exercise) and social (e.g., parent, spouse) roles and activities. Despite gaining this knowledge from peer mentees' experiences, little research has focused on the mentors' perspectives regarding their roles and potential impact. We investigated the experiences of four (2 male and 2 female) SCI peer mentors (Mage= 56.75, SD= 3.59; Myears since injury= 35.00, SD= 6.00) using semi-structured interviews. The mentors had different levels of injury (2 with paraplegia and 2 with tetraplegia) and worked for the same SCI community organization. Using thematic narrative analysis, we first co-constructed a narrative account for each participant before searching for salient themes across the four narratives. Although the mentors storied themselves in different ways (e.g., reflective, organized, spirited), a number of common themes became apparent that shed some light regarding the

"what" and "how" of SCI peer mentorship: "knowing how/when to approach clients", "providing options not solutions", "navigating interactions with mentees, health professionals, and family members" and the "dark side of peer mentorship". Some of these findings support previous research on SCI peer mentorship (e.g., importance of supporting mentees' autonomy), however others hint at previously untapped areas in this domain. For example, the SCI peer mentors talked about being able to "sense" the right moment to approach mentees, which indicates that emotional intelligence could be important in successful mentor-mentee interactions aimed to promote daily and social activities among adults with SCI.

Peer mentorship: A community-based organization perspective
Discussant: Haley Flaro, Executive Director, Ability New Brunswick

Ability New Brunswick was initially founded in 1956 as an organization of peer volunteers who offered help to injured veterans and others with a spinal cord injury. New Brunswick has the second highest rate of disability in Canada (16.4%) and mobility is the most prevalent disability type. Ability New Brunswick recognized very early on that access to the support of people who have personal experience living with a disability often leads to improved emotional and physical well-being. Research on the qualities and impact of peer mentorship are essential for community-based learning organizations like Ability New Brunswick as there is more we need to understand to build successful programs. Key research themes including the application of self-determination theory, how mentorship influences community participation and the key characteristics of mentorship are strong foundations for the future development of these experiential learning and support programs. More knowledge is needed about the key qualities and characteristics of mentors and the mentorship experience in parallel sport and recreation. Future research on the overall impact of peer mentorship, the application of spinal cord injury peer programs to other disability populations and the impact of mentorship on mental health are also important considerations. Knowledge translation that appeals to program participants and funders is also essential