

Thursday, October 15, 5:30 – 7 pm

Young Scientist Awards

Motor Control Winner: Jarrod Blinch

PREPARATION COST FOR BIMANUAL ASYMMETRIC MOVEMENTS IS CAUSED BY RESPONSE SELECTION

Jarrod Blinch<sup>1</sup>, Ian M Franks<sup>1</sup>, Mark G Carpenter<sup>1</sup>, Romeo Chua<sup>1</sup>

<sup>1</sup>School of Kinesiology, University of British Columbia

Movement preparation of bimanual asymmetric movements takes more time than bimanual symmetric movements in choice reaction-time conditions, even when movements are directly cued. This bimanual asymmetric cost may be caused by increased processing demands on any stage (or stages) of movement preparation: specifically, stimulus identification, response selection, or response programming. The present experiment tested the contributions of each stage of movement preparation to the asymmetric cost by using the additive factors method. This involved: altering the stimulus contrast (bright or dim), the response compatibility (compatible or incompatible), and the response complexity (reaches or reversals). These manipulations changed the processing demands on stimulus identification, response selection, and response programming, respectively. There was an over-additive interaction for the reaction times of bimanual asymmetric movements with incompatible responses. This suggested that the bimanual asymmetric cost was caused by increased processing demands on response selection, despite the use of direct cues that placed fewer processing demands on translation processes compared to symbolic cues. Stimulus identification and response programming did not appear to contribute to the asymmetric cost. Selecting or integrating two different, asymmetric responses could have increased the processing demands on response selection. Although response selection contributed to the asymmetric cost in this task, altering how the task is presented or conceptualised may change when bimanual asymmetric costs occur or the magnitude of the costs.

Sport and Exercise Psychology winner: Ben Sylvester

VARIETY SUPPORT AND EXERCISE ADHERENCE BEHAVIOUR: EXPERIMENTAL AND MEDIATING EFFECTS

Ben Sylvester<sup>1</sup>, Martyn Standage<sup>2</sup>, Desmond McEwan<sup>3</sup>, Svenja Wolf<sup>3</sup>, David Lubans<sup>4</sup>, Narelle Eather<sup>4</sup>, Megan Kaulius<sup>3</sup>, GERALYN RUISSSEN<sup>3</sup>, Peter Crocker<sup>3</sup>, Bruno Zumbo<sup>3</sup>, Mark Beauchamp<sup>3</sup>

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<sup>4</sup>The University of Newcastle

Efficacious intervention strategies are needed to address the prevalence of physical inactivity. Through use of an experimental design, the purpose of this study was to examine the extent to which the provision of variety (i.e., variety support) is related to exercise behaviour among physically inactive adults and the extent to which the experience of variety mediates those potential effects. We also examined the extent to which variety support is differentially related to the experience of variety, when compared to three basic psychological needs that have been implicated in supporting human functioning, namely competence, relatedness, and autonomy (cf. Ryan & Deci, 2002). One hundred and twenty one physically inactive

university students were randomly assigned to follow a high or low variety support exercise program for 6 weeks. Assessments were conducted at baseline, mid-intervention (3-weeks) and post-intervention (6-weeks). As a manipulation check, after statistically controlling for baseline scores of perceived variety, competence, relatedness, and autonomy, variety support was found to be a statistically significant predictor of perceived variety in exercise ( $\beta = .47, p < .01$ ; but not perceived competence, relatedness, or autonomy) 3 weeks later. Participants in the high variety support condition displayed higher levels of adherence to the exercise program than those in the low variety support condition ( $F(1, 116) = 5.55, p = .02, \eta^2 = .05$ ) and the relationship between variety support and adherence was mediated by perceived variety ( $\beta = .16, p < .01$ ). Exercise-related variety support may facilitate greater exercise adherence by fostering perceptions of variety. Variety support holds potential to be an efficacious method for influencing exercise adherence behaviors of previously inactive people.

**Friday, October 16, 8:30 – 10 am**

**Symposium: Face of Emerging Physical Activity Initiatives; Friday, October 16, 8:30 – 10 am**

THE FACE OF EMERGING PHYSICAL ACTIVITY PROMOTION INITIATIVES ACROSS THE COUNTRY: SOMETHING FOR EVERYONE, EVERYWHERE.

Christopher Shields<sup>1</sup>

<sup>1</sup>School of Kinesiology, Acadia University

Despite evidence-based physical activity recommendations, and overwhelming evidence that physical inactivity is linked to many chronic diseases only 15% of Canadians meet recommended physical activity levels and participation rates among special populations such as those with chronic conditions, the elderly and those with disabilities are even lower. The burden of inactivity in Canada is clear and implementing effective programs to promote physical activity is a public health priority. In light of this, researchers, exercise professionals, and increasingly health care providers have taken up this challenge, with innovative programs and initiatives across the country. This integrated symposium brings together experts in behaviour change, nutrition, and health care delivery to discuss the design, implementation and evaluation of emerging physical activity promotion programs across Canada including those at the regional, provincial and national level. Specifically, five separate physical activity promotion initiatives will be discussed including Exercise is Medicine Canada, Igniting Fitness Possibilities for youth with disabilities, Small Steps for Big Changes for those with prediabetes, Prescription to Get Active, and Healthy Eating and Active Living for Diabetes in Primary Care Networks. Initial evidence suggest that these action-oriented, community-based initiatives are making a difference for participating individuals and the health care professionals delivering the interventions including changes in perceptions and physical activity behaviours. These symposium presentations will highlight the ongoing evolution of the integration of physical activity promotion within the broader approach to health care including the successes and ongoing challenges with implementation of physical activity promotion programs for everyone, everywhere.

## EXERCISE IS MEDICINE CANADA: EARLY BUT IMPORTANT SIGNS OF THE EFFECTIVENESS OF THIS NATIONAL INITIATIVE

Christopher Shields<sup>1</sup>, Jonathon Fowles<sup>1</sup>, Myles O'Brien<sup>1</sup>, Susan Yungblut<sup>2</sup>, Michelle Fortier<sup>3</sup>, Paul Oh<sup>4</sup>

<sup>1</sup>School of Kinesiology, Acadia University

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Exercise is Medicine Canada (EIMC) is a national initiative aimed at increasing the number of health care providers (HCPs) assessing, counseling and prescribing physical-activity or exercise as part of routine health care visits. An integral component of this program is a national workshop campaign to educate and train primary HCPs on how to effectively use EIMC materials (i.e. prescription pad). Analyses of the immediate impact of these workshops shows HCPs reported improved confidence in their ability to prescribe physical-activity and view this professional development as valuable to their practice. The purpose of this session is to describe the EIMC initiative, review the initial impacts of the workshop series and present the first wave of follow-up evaluations completed 2-3 months post-workshop. Repeated measures MANOVA revealed HCPs report significant increases in confidence to discuss and prescribe physical-activity and exercise ( $p < .05$ ) and knowledge of physical-activity counselling ( $p < .05$ ). While the number of barriers to counsel appears to remain unchanged and high, their reported impact on providing physical-activity counselling is lower. HCPs report that the EIMC prescription pad is moderately helpful in discussing physical-activity; however, they also report using additional resources including: other experts, educational pamphlets, internet resources, and novel educational approaches with clients. The EIMC initiative represents a step forward in establishing physical-activity counselling as a routine part of health care visits in Canada. While implementation and evaluation challenges remain, these initial findings support the effectiveness of the initiative in changing the perceptions of HCPs in the short to medium term.

Acknowledgements: This work was supported by funding from the Lawson Foundation

## LEVELING THE PLAYING FIELD: IGNITING PHYSICAL ACTIVITY AMONG CANADIAN YOUTH WITH DISABILITIES

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

<sup>2</sup>Bloorview Research Institute, Holland Bloorview Kids Rehabilitation Hospital

Physical activity (PA) is critical for optimal health and well-being, although the majority of Canadian youth are inactive. While of concern for typically developing (TD) youth, there are even greater implications for those with disabilities. Getting Canadian youth more active is part of our country's agenda and greater priority must be directed towards incorporating the needs, interests, and abilities of youth with disabilities into national PA initiatives. The purpose of this presentation is to provide an overview of the research surrounding the development, implementation, and evaluation of community-based PA programs in youth with disabilities. Preliminary work with youth with physical disabilities within the Greater Toronto Area revealed overall low self-reported PA levels ( $M = 2.43/5$ ), as well as poor PA attitudes ( $M = 2.13/5$ ); no differences emerged for gender or age ( $ps > .20$ ). Results from an initial pilot of an inclusive PA program for youth (TD and with disabilities) in middle school revealed high engagement and interest in the program ( $M$  attendance of 80%), and improvements in self-determined motivation ( $d = 0.41$ ), and objective sedentary and PA behaviour ( $ds = 0.63$  and  $0.25$ , respectively). Additional qualitative research with youth (TD and with disabilities) in high school revealed that PA programs which are of moderate

intensity, and that offer opportunities for acceptance of others' abilities, choice, and friendships are of interest. Overall, these findings highlight the importance of considering youth's interests and motivations when designing and implementing PA programs, and the need for more rigorous, theory-driven research within this population.

## PHYSICAL ACTIVITY COUNSELLING FOR INDIVIDUALS LIVING WITH PREDIABETES: EVIDENCE-BASED AND PRACTICAL SOLUTION

Mary Jung<sup>1</sup>, Jessica Bourne<sup>1</sup>, Jonathan Little<sup>1</sup>

<sup>1</sup>School of Health and Exercise Sciences, University of British Columbia Okanagan

Exercise is a cornerstone for the treatment and prevention of Type 2 Diabetes (T2D). Despite the effectiveness of regular exercise for decreasing the risk of developing T2D in those with prediabetes, very few community programs exist for this population. To reach the growing number of individuals most at risk for development of T2D, feasible programs specific to prediabetes must be developed. Small Steps for Big Changes is an evidence-based, brief physical activity counselling program designed to be implemented in the community. Initial efficacy of this program was first evaluated in a controlled setting. Over a two-week period, 120 individuals with prediabetes were provided with 70 minutes of counselling targeting goal-setting, self-monitoring, self-efficacy, outcome expectancies and value, rewards and feedback. This brief amount of counselling resulted in significant improvements in self-regulatory efficacy, outcome expectations, and enjoyment post-intervention ( $p$ 's < .05), and has significantly increased and maintained purposeful bouts of moderate and vigorous exercise 1 year after the program concluded ( $p$ 's < .05), as assessed by accelerometry. This symposium talk will also discuss recent findings of the implementation of Small Steps for Big Changes in a sample of 60 individuals with T2D. These findings provide support for the utility of very brief, evidence-based counselling to combat the growing problem of diabetes in Canada. While the cost of delivering this counselling is low, dissemination and translation of it requires investment and commitment at the community level. Implications for uptake at the community level for this evidence-based program will be discussed.

## PRESCRIPTION TO GET ACTIVE - MORE THAN JUST MEDICINE

Melanie Fuller<sup>1</sup>, Len Frank<sup>2</sup>

<sup>1</sup>Pan-PCN project manager, Leduc Beaumont Devon Primary Care Network

<sup>2</sup>Executive Director, Leduc Beaumont Devon Primary Care Network

In 2011, Leduc Beaumont Devon Primary Care Network (PCN) began a Prescription to Get Active Initiative. The Leduc Beaumont Devon area is a mixed suburban and rural population just outside of Edmonton, Alberta. Prescription to Get Active is an integrated partnership between primary care, Alberta Health Services, municipal and private recreation facilities to promote the importance of daily regular physical activity. In early 2014, this initiative expanded to the greater Edmonton area. Prescription to Get Active targets low risk, sedentary individuals who are not meeting Canada's physical activity guidelines by addressing common barriers of motivation and access. Participating physicians and other healthcare professionals provide a written prescription for physical activity which can be turned in to receive complimentary access to participating facilities. We have asked our partner facilities to report the number of prescriptions redeemed between the regional launch in February 2014 to March 2015. With approximately 1000 family physicians and primary care allied providers participating in the initiative, 682 prescriptions have been redeemed across the Edmonton zone to date. Partnering facilities report that between 20-40% of patients attending with a Prescription to Get Active continue past the initial complimentary access period to purchase a longer term membership. Our results indicate that prescribing

physical activity by a family physician or a member of their team can lead to successful behavior change. This program supports the premise that a strong partnership between primary care and community recreation is a critical component of a physical activity prescription program.

## CONTEXTUALIZING THE PROVEN EFFECTIVENESS OF A LIFESTYLE INTERVENTION FOR TYPE 2 DIABETES IN PRIMARY CARE: A QUALITATIVE ASSESSMENT USING RE-AIM

Lisa Wozniak<sup>1</sup>, Allison Soprovich<sup>1</sup>, Clark Mundt<sup>1</sup>, Jeffrey Johnson<sup>2</sup>, Steven Johnson<sup>3</sup>

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<sup>2</sup>Department of Public Health Sciences, University of Alberta

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**Objective:** The Healthy Eating and Active Living for Diabetes in Primary Care Networks (HEALD) intervention proved effective in increasing daily physical activity among people with type 2 diabetes in four community-based Primary Care Networks (PCNs) in Alberta. Here, we contextualize its effectiveness by describing implementation fidelity and PCN staff's perceptions of its success in improving diabetes management. **Methods:** We used the RE-AIM framework to evaluate HEALD. Qualitative methods used to collect data related to the RE-AIM dimensions of Implementation and Effectiveness included interviews with PCN staff (n=24), research team reflections (n=4) and systematic documentation. We used content analysis, and data were imported into and managed using Nvivo 10. **Results:** HEALD was implemented as intended with adequate fidelity across all four PCNs. Identified implementation facilitators included appropriate human resources, training provided, ongoing support, provision of space and simplicity of the intervention. However, PCN staff reported varying opinions regarding its potential for improving diabetes management among patients. Rationales for their views included: intervention "dose" inadequacy, quality of usual care for people with diabetes was already good, patients were already managing their diabetes well and potential for co-intervention. Recommended improvements to HEALD included increasing the dose of the intervention, expanding it to other modes of exercise and incorporating a medical clearance process. **Conclusions:** Based on the high degree of fidelity, the demonstrated effectiveness of HEALD in improving physical activity among patients was a result of sound implementation of an efficacious intervention. Increasing the dose of HEALD could result in additional improvements for patients. **Acknowledgements:** This work was supported in part by a contract from Alberta Health, a grant from the Lawson Foundation and a Canadian Institutes for Health Research (CIHR) Team Grant to the Alliance for Canadian Health Outcomes Research in Diabetes sponsored by the CIHR Institute of Nutrition, Metabolism and Diabetes.

**Free papers: Coaching and officiating; Friday, October 16, 8:30 – 10 am**

## (DIS)ABILITY AND INCLUSION IN YOUTH SPORT: THE PERSPECTIVES AND EXPERIENCES OF SPORT PRACTITIONERS

Nancy Spencer-Cavaliere<sup>1</sup>, Jennifer Thai<sup>1</sup>, Bethan Kingsley<sup>1</sup>

<sup>1</sup>Faculty of Physical Education and Recreation, University of Alberta

Evidence indicates that effective coaching and teaching skills are fundamental to creating inclusive sport environments, yet sport practitioners continue to struggle in meeting the needs of young people who experience disability. It is well documented that meaningful opportunities for young people who experience disability to engage in sport and recreation are inadequate and inequitable. Consequently, many of these youth take part in segregated settings rather than integrated programs in the community. Purpose:

Given the influential role of coaches in creating inclusive environments, the aim of this study was to examine sport practitioners' experiences coaching in these settings. The goal was to identify inclusive coaching practices with the potential to bridge segregated and integrated sport settings for youth who experience disability. Method: Using qualitative and interpretive description, semi-structured interviews were conducted with 15 sport practitioners who coached in segregated and/or integrated settings across a range of sports (e.g. handball, sledge hockey, rhythmic gymnastics, and swimming). Results: Thematic analysis of the data led to three themes: (a) (dis)ability and expectations, (b) a part of and apart from, and (c) coaching rewards and responsibilities. The themes represent a dichotomy of opportunities and struggles that occur within segregated and integrated sport settings. Conclusion: Recommendations for future coaching practices are discussed, in addition to consideration of the ways in which incompatible conceptualizations of disability and sport emerge in segregated and integrated youth sport.

## INCONGRUENCE IN THE COACH-ATHLETE RELATIONSHIP: POTENTIAL CONSEQUENCES FROM MISUNDERSTANDING.

Mark Surya<sup>1</sup>, Mark A. Eys<sup>1</sup>, Alex J. Benson<sup>1</sup>

<sup>1</sup>Wilfrid Laurier University

Achieving a shared understanding facilitates positive interpersonal interactions in dyadic relationships (Laing et al., 1966). Based on a case study of a large competitive sport team, we assessed perceptions of the coach-athlete relationships from the perspective of both the coach and each athlete. Each athlete (n = 60) completed the Coach-Athlete Relationship Questionnaire (Jowett & Ntoumanis, 2004) in regard to the head coach of the team (e.g., I feel close to my coach) and a measure of role satisfaction. Meanwhile, the head coach completed a questionnaire designed to assess his meta-perceptions of what each player would report regarding the coach-athlete relationship. We used polynomial regression analysis coupled with response surface methodology to examine how these different perspectives of the coach-athlete relationship relate to athletes' role satisfaction. The regression equation accounted for significant variance in athletes' satisfaction with their role ( $\Delta R^2 = .53$ ,  $p < .001$ ). The response surface patterns revealed a concave slope along the line of discrepancy ( $b = -1.08$ ,  $p = .023$ ) and a positive linear slope along the line of agreement ( $b = 1.52$ ,  $p < .001$ ). Put simply, role satisfaction decreased as athletes' perceptions of the coach-athlete relationship began to deviate from the coach's meta-perceptions of the relationships. In addition, role satisfaction was higher when similarity was achieved at a higher absolute level, when compared to similarity at a lower absolute level. In sum, athletes were more satisfied with their role when their perceptions matched the coach's meta-perceptions, and both of them viewed the relationship positively

## THE INFLUENCE OF PARTICIPANT BEHAVIOUR ON OFFICIALS' SATISFACTION

Kim D. Dorsch<sup>1</sup>, Elaine Cook<sup>2</sup>

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Despite their critical role, officials have been largely overlooked in the sport psychology literature. It is the purpose of this study to examine how participants' behaviour in the sporting context (i.e., coaches, players, and spectators) influences officials' satisfaction with the event. The Justplay Behaviour Management Program (JBMP) asks all game officials to provide a behavioural conduct rating of the home and away coach, players, and spectators on a scale of 1 Very Good to 5 Very Poor. They also provide a rating of their satisfaction with the game on the same scale. The data collection tool is known as a card. Data were collected by the JBMP from 120 officials in approximately 279 games in three sports (baseball, soccer,

and football) which resulted in 1066 cards. Overall, officials were quite satisfied with the games ( $M_s = 1.52, 1.59, \text{ and } 1.76$  respectively). The six behavioural conduct ratings were then regressed on the satisfaction ratings using a stepwise linear regression for each sport ( $p_s < .000$ ). The influence of participant behaviour on officials' satisfaction differed for each sport. In baseball, the home and away players and coaches, and home spectators were the most influential ( $R^2_{\text{adjusted}} = .78$ ). For soccer officials, all three visiting participants and the home coaches were most influential ( $R^2_{\text{adjusted}} = .42$ ); and for football, only the coaches of both the home and away teams influenced the officials' satisfaction ( $R^2_{\text{adjusted}} = .38$ ). Discussion will revolve around implications for officiating training and the role sport psychology can play in this education.

## THE EFFECTS OF COACHES' OBSERVABLE EMOTIONS ON ATHLETES' SELF-REPORTED ENJOYMENT IN A YOUTH RECREATIONAL BASKETBALL LEAGUE

Courtney Braun<sup>1</sup>, Matthew Vierimaa<sup>1</sup>, Veronica Allan<sup>1</sup>, Jean Côté<sup>1</sup>

<sup>1</sup>Queen's University, Kingston, ON

Perceived enjoyment has consistently been reported as one of the main determinants of youth sport participation, with coaches playing a salient role in facilitating an enjoyable environment. Observational studies of coaches and their interactions with athletes have traditionally focused on the content of coach behaviours; however there have been recent calls to explore the emotional tones of these behaviours. Given the affective nature of the enjoyment construct and growing interest in the topic of interpersonal emotion regulation, coaches' emotions represent a novel and potentially influential role in athletes' perceptions of enjoyment. Thus, the purpose of this study was to explore the relationship between coaches' observed emotions and youth athletes' perceived enjoyment in a recreational basketball league. Male coaches ( $n = 6$ ) and their respective youth male athletes ( $n = 35$ ;  $M_{\text{age}} = 11.9$ ) were videotaped during games, while athletes also completed a self-report measure of sport enjoyment (SEYSQ; Wiersma, 2001). Coach behaviour was coded using the Assessment of Coaches' Emotions systematic observation instrument (ACE; Allan et al., 2014). A hierarchical cluster analysis of coaches' emotions revealed three distinct clusters: the "tense" coach ( $n = 1$ ), the "neutral" coaches ( $n = 3$ ), and the "happy" coaches ( $n = 2$ ). Separate ANOVAs compared athletes' enjoyment data from six subscales within the SEYSQ. The "happy" coaches' athletes reported significantly higher levels of enjoyment from competition than athletes who were coached by the "tense" coach. The findings of this study provide preliminary evidence to suggest that coaches' emotions influence athletes' enjoyment, specifically competitive excitement.

## PREDICTING HIGH SCHOOL TEACHER-COACHES' JOB SATISFACTION

Meredith Rocchi<sup>1</sup>, Martin Camiré<sup>1</sup>, Tanya Forneris<sup>1</sup>

<sup>1</sup>University of Ottawa

In Canada, high school athletic programs rely on the efforts and initiatives taken by high school teachers. These "teacher-coaches" coach sports teams outside of their regular academic responsibilities, and volunteer to ensure the success of their school's athletic program. Previous research suggests that involvement in extra-curricular activities is associated with increased job satisfaction for teachers; however, limited research has examined specific aspects of the coaching experience and how these may impact teacher-coaches' job satisfaction. The purpose of this study is to examine high school teacher-coaches' impressions of the quality of their relationships with their athletes, as well as their self-efficacy towards coaching, and how this relates to their reported teaching satisfaction. The sample was comprised of 2949 teacher-coaches, representing all of the Canadian provinces and territories, who participated in a national survey on their experiences. The results showed that teachers who reported increased

commitment, closeness, and complementary with their athletes (coach-athlete relationship questionnaire) and increased self-efficacy towards coaching in terms of developing motivation, game strategy, technique, character, and physical conditioning (Coaching Efficacy Scale), reported higher teacher satisfaction (Teacher Satisfaction Scale). The model was tested using structural equation modeling and had a good fit ( $\chi^2(63) = 614.08$ ,  $p < .001$ , SRMR = .044, CFI = .967, TLI = .959, RMSEA = .054 CI95 [.050, .058]). Alternative models were also explored and invariance testing for gender and teaching subject was also conducted. Overall, the results support that positive coach-athlete relationships, along with self-efficacy for coaching, predict increased teacher satisfaction.

Acknowledgements: This research was conducted in with the assistance of an Insight Development Grant from SSHRC and Sport Canada through the Sport Participation Research Initiative.

## INTERPERSONAL EMOTION REGULATION IN LACROSSE REFEREES AT A WORLD CHAMPIONSHIP

Andrew P. Friesen<sup>1</sup>, Tracey J. Devonport<sup>1</sup>, Andrew M. Lane<sup>1</sup>

<sup>1</sup>University of Wolverhampton

Like coaches and athletes, referees and officiating crews are under pressure to perform well in competitive events. Drawing from a mixed-methods study that assessed emotions and emotion regulation strategies of 19 referees officiating at a Lacrosse World Championship, we explored how referees managed their own emotions as well as the emotions of coaches, athletes, and other officials. We also assessed referees' emotional states and satisfaction with their emotion regulation abilities throughout the course of the tournament, as well as participants' self-rated performance. Results indicated that emotions fluctuated throughout the tournament as referees encountered intrapersonal and interpersonal emotion-eliciting events. Attempts to regulate these emotions are situated within a socio-functional approach to emotions drawing upon the Van Kleef (2009) Emotions As Social Information (EASI) model to explain the processes of interpersonal emotion regulation. Factors that potentially moderate strategy effectiveness are also presented.

**Free papers: Coordination and control of complex movements; Friday, October 16, 8:30 – 10 am**

## WHEN VISION IS IMPAIRED, WHAT SHOULD ATHLETES FOCUS ON? THE UNDERLYING MECHANISMS OF HUMAN MOVEMENT.

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<sup>1</sup>School of Sport, Health and Exercise Sciences, Bangor University; <sup>2</sup>Bangor University

Research demonstrates robust benefits of an external focus of attention and although the Constrained Action Hypothesis accounts for this phenomenon, traditional outcome measures are limited in progressing our understanding of underlying mechanisms here. The current study utilises 'vision' in addressing this. Literature advocates attentional as opposed to visual processes in accounting for external benefits and subsequently these mechanisms have been investigated independently. Aiming literature suggests the role of vision in executing accurate movements is twofold; firstly in planning movements (i.e. offline) and secondly in correcting errors during movement (i.e. online). The rationale for this study was to investigate visual feedback in the utilisation of offline/online processes under different attentional foci. Participants were randomised into four groups; internal full-vision (IF-FV), internal no-vision (EF-NF), external full-vision (EF-FV) and external no-vision (EF-NV). The task was a rapid aiming movement, performed over five experimental phases. Dependent measures included constant and variable error, movement time and within-participant standard deviation in distance travelled throughout the movement trajectory. A 4(group)



x 4(distance travelled) ANOVA on variable error at retention revealed a distance travelled x group interaction. Whilst both the NV groups increased in variability as the movement progressed, this increase reduced during movement execution under IF but not EF conditions (reflective of online control in the IF not EF condition). When visual information wasn't available, participants adopting an IF were better able to process proprioceptive feedback to make movement adjustments online. Presumably, through an increased focus on the actual movement characteristics; something not afforded under EF conditions.

## INDEPENDENT PLANNING OF TIMING AND SEQUENCING FOR COMPLEX MOVEMENTS

Dana Maslovat<sup>1</sup>, Romeo Chua<sup>1</sup>, Stuart T. Klapp<sup>2</sup>, Ian M. Franks<sup>1</sup>

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The current studies examined the processes involved in response sequencing and timing initiation for complex, multiple-element movements. Participants performed three element key-press movements in simple and choice reaction time (RT) paradigms (Experiment 1), or a study time paradigm that allowed the participants to control the foreperiod delay, which is thought to reflect advance preparation duration (Experiment 2). Sequencing requirements were manipulated by using either one hand (low sequencing complexity) or two hands (high sequencing complexity) and timing was manipulated by using either an isochronous (low timing complexity) or non-isochronous (high timing complexity) pattern. Increasing sequencing complexity had little effect on simple RT but increased participant-controlled foreperiod delay (i.e., study time). Conversely, increasing timing complexity had no effect on foreperiod delay but increased simple RT. These results provide compelling evidence that in a simple RT paradigm, sequencing preparation is performed during the foreperiod while timing preparation is delayed until the RT interval. Furthermore, choice RT increased with sequencing complexity and was relatively unaffected by timing complexity, indicative of sequencing preparation occurring during the choice RT interval and timing preparation occurring on-line. Collectively, the data indicate a dissociation and independence of the preparation of response timing and sequencing for complex movements, which is discussed in relation to the potential neural structures involved.

Acknowledgements: Supported by the Natural Sciences and Engineering Research Council of Canada.

## INTRODUCING HAPTIC FEEDBACK THROUGH OBJECT TOUCH CHANGES VISUAL INFORMATION SUPPORTING 2D OBJECT GRASP FROM RELATIVE TO ABSOLUTE

Shirin Davarpanah Jazi<sup>1</sup>, Stephanie Hosang<sup>1</sup>, Matthew Heath<sup>1</sup>

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

Grasping a 2D object requires the processing of relative target features and functions distinct from the absolute visual information supporting the grasp of a 3D object (Holmes & Heath, 2013: Brain Cogn). Interestingly, the distinct visual cues mediating 2D and 3D grasping may – in part – reflect the fact that the former task does not entail the provision of terminal haptic feedback (Davarpanah Jazi et al. 2015: Neuropsychologia). As such, in the present study we investigated whether the provision of terminal haptic feedback influences the nature of the information supporting 2D grasping. In particular, participants grasped differently sized 3D objects and their 2D counterparts in conditions wherein terminal haptic feedback was present (i.e., 2DH+) or absent (i.e., 2DH-). More specifically, the 2DH+ condition provided terminal haptic feedback comparable to that associated with the grasping of a 3D object. Just noticeable difference scores (JNDs) computed at peak grip aperture in the 2DH- condition scaled to target size, whereas values for 3D and 2DH+ trials elicited a null scaling. In other words, grasping a 2D object adhered to the relative psychophysical principle of Weber's law, whereas the provision of terminal haptic

feedback resulted in grasps that violated the law. Accordingly, we propose that terminal haptic feedback provides absolute size cues that supports veridical aperture shaping.

Acknowledgements: National Sciences and Engineering Research Council of Canada (NSERC)

## DOES SIZE REALLY MATTER? EXPLORING THE INTERFERENCE EFFECTS OF SIZE AND ORIENTATION WITHIN A SEQUENTIAL GRASPING TASK.

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<sup>1</sup>Psychology and Neuroscience, Dalhousie University

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Previous research has suggested that orientation might be more influential in sequential tasks than size information. However, recent evidence from our lab has shown that preparing an action to the second object does not produce interference to the first action, but attending to its size for verbal judgment does. Specifically, as the size of the second object increased, the amplitude of peak grip aperture (PGA) towards the first object also increased when performing the perception condition. The current study was designed in order to incorporate both size and orientation within a sequential task. Participants were required to grasp a cylinder (5cm in diameter) place it on an identified target area and then either grasp or make a perceptual judgment to the second object. The second object was either 3cm or 7cm in length and was either presented on a 45degree angle towards the left or the right. Based on the action-centered model of attention, it was predicted that both conditions would yield similar results when analyzing the interference of the size and orientation of the second object when grasping the cylinder. It was shown that participants' time to reach PGA was faster when the second object was the 3 cm object relative to the 7cm within the action condition. No such differences were found in the perception condition. Reaction times were overall faster in the action condition in comparison to the perception condition. Preliminary analyses provide a hint that orientation information affected grip posture more so than size information.

## THE EFFECTS OF MOVEMENT DIRECTION ON MOVEMENT TIME AND ACCURACY DURING MANUAL CONTROL TASKS

Amanda N Forsyth<sup>1</sup>, Megan Puckering<sup>1</sup>, Pamela J Bryden<sup>1</sup>

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The two frames of reference used to position the body in space are termed egocentric, where location and orientation are determined with respect to the individual, and allocentric, where location and orientation are based on the environment (Dassonville, Schlag & Schlag-Rey, 1995). Egocentric movements are used most often within peripersonal space, such as reaching. Kelly & Weaton (2013) showed that tool manipulation is completed more successfully in egocentric space than allocentric space, regardless of hand preference. The current study investigated whether handedness and movement direction influence accuracy and movement time on a manual task without tools. Forty-two young adults (29 right-handers, 13 left-handers) completed the Waterloo Handedness Questionnaire and a tablet-tracing task. An ACER Aspire Switch tablet was placed on a table in front of the participant, who then traced a track slightly larger than finger-width either going toward (egocentric) or away from (allocentric) the body. Results showed that movement time was significantly faster for egocentric trials, and the preferred hand performed significantly faster than the non-preferred hand, regardless of the task. Additionally, a 3-way interaction was found between direction, hand preference, and the hand used, where the preferred hand of right-handers was significantly faster making movements toward the body than the non-preferred hand. Interesting, left-handers showed no difference between the preferred and non-preferred hands. No effect of

accuracy was found for movement type or hand preference, suggesting that participants sacrificed speed for accuracy. These results will be discussed in light of current theories regarding hand preference.

**Friday, October 16, 10:30 – 12**  
**Keynote Lectures**

Dr. Ryan Rhodes, University of Victoria  
Dr. Mel Goodale, Western University

**Friday, October 16, 1:30 – 3 pm**

**Symposium: Fitts (1954: J Exp Psychol): Law or Theorem? Friday, October 16, 1:30 – 3 pm**

FITTS (1954: J EXP PSYCHOL): LAW OR THEOREM?

Matthew Heath<sup>1</sup>, Luc Tremblay<sup>2</sup>, Howard N. Zelaznik<sup>3</sup>, Digby Elliott<sup>4</sup>

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

<sup>2</sup>University of Toronto

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Paul Fitts' classic work (1954: J Exp Psychol) is a staple for all undergraduate courses in motor control and is a core topic in human factors and systems engineering. Fitts' work has garnered significant interest because it provides a basic and elegant formulation for predicting movement time for goal-directed actions (i.e., Index of Difficulty in bits of information:  $ID = \lceil \log_2[2A/W] \rceil$ ). Indeed, some researchers have stated that Fitts' work provides a law-based measure of human performance – an assertion quantifying Fitts' Law as the movement sciences "law of relativity". The goal of this symposium is to outline recent work examining fundamental support for, and violations to, Fitts' formulation of speed-accuracy relations. The first talk (Zelaznik) will outline behavioural mechanisms associated with speed-accuracy relations and provide recent evidence that individual differences in speed-accuracy relations are correlated. The second talk (Tremblay) will examine speed-accuracy relations across a range of IDs and outline whether Fitts' theorem provides a unitary or non-unitary basis to predict movement time for amplitude- and width-based manipulation to an aiming environment. The third talk (Heath) will outline speed-accuracy relations related to Fitts' theorem in the oculomotor system. Last, Digby Elliott will serve as Reactor and discuss the relative merits of ascribing Fitts' work as a law-based or conceptual framework in the movement sciences. The ultimate aim of this symposium is to generate debate regarding the relative merits of expressing Fitts' work as a law-based phenomenon in the movement sciences. Supported by NSERC (MH, LT, DE).

**ON THE ROBUSTNESS OF FITTS' LAW**

Howard N. Zelaznik<sup>1</sup>

<sup>1</sup>Purdue University

Fitts' Law (Fitts, 1954: J Exp Psychol) discovered the logarithmic relation between the ratio of distance and target width with movement time, such that  $T = a + b \log_2(2D/W)$ . In the present paper I explore the ramifications of Fitts Law. First, the classic paper by Carlton (1994: J Mot Behav) shows that Fitts' Law

behaviour is not related to the linear speed-accuracy trade-off (Schmidt, et al. 1979: Psychol Rev). We then present two new experiments that show that individual differences in Fitts' Law performance are correlated. Finally, it is demonstrated that linear speed accuracy trade-off performance is related to Fitts' Law performance. Thus, although these two relations are mathematically distinct, a common principle relates the two tasks. Possible explanatory mechanisms are discussed.

## THE REACH OF FITTS' THEOREM INTO AND BEYOND THE REAL WORLD

Luc Tremblay<sup>1</sup>, John de Grosbois<sup>1</sup>

<sup>1</sup>University of Toronto

Paul Fitts conducted landmark studies involving upper-limb movements to show how the amplitude of the reaching movement and the width of the target influence the time taken to complete the movements (Fitts 1954: J Exp Psychol; Fitts and Peterson 1964: J Exp Psychol). The formula developed in these studies has been shown to account for relationships between the speed of upper-limb movements and its accuracy. However, one notable problem with the proposed formula is the presumed unitary relationship between amplitude and width manipulations. On one hand, Heath et al. (2011: C J Exp Psychol) reported stronger than expected influences on movement time with amplitude compared to width manipulations. On the other hand, a close re-analysis of Fitts and Peterson indicates stronger than expected influences of width compared to amplitude manipulations. In this presentation, three possible explanations of the discordance between actual and expected influences of amplitude vs. width manipulations on movement time will be discussed. The first explanation is associated with the use of actual vs. effective target width. The second explanation concerns the availability of terminal feedback. The third explanation is related to the actual target sizes employed and their relevance in the real world.

## FITTS' INDEX OF DIFFICULTY: A USEFUL THEOREM FOR SPEED-ACCURACY RELATIONS IN THE OCULOMOTOR SYSTEM

Matthew Heath<sup>1</sup>

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

The present discussion will outline work examining whether ID-based speed-accuracy relations hold for goal-directed eye movements (i.e., saccades). Indeed, although the oculomotor literature has shown that amplitude-based ID changes elicit a robust increase in movement time (MT) it is largely unclear whether width-based ID changes similarly influence MT. This distinction represents an important test of Fitts' theorem and the assertion that movements yielding the same ID produce equivalent MTs regardless of the response's amplitude and width combination (i.e., unitary MT/ID relations). To that end, participants completed saccades in separate conditions that manipulated the amplitude and width characteristics of a target object. Importantly, the separate amplitude and width conditions were equated for ID (i.e., 3.34, 3.67, 4.06 and 4.61 bits of information) – a manipulation that provided a test of whether saccades are governed via unitary MT/ID relation. MTs for primary saccades across amplitude and width conditions increased as a function of increasing ID ( $R^2=0.99$  and  $0.76$ ); however, the slope of the MT/ID relation for the amplitude condition (18 ms:  $CI_{95\%}=5$ ) was steeper than the width condition (3:  $CI_{95\%}=2$ ). Further, aggregation of MTs for primary and secondary saccades did not enhance the explanatory power for MT/ID relations ( $R^2=0.97$  and  $0.54$ ). Thus, the present results demonstrate that, for saccades, the fixed parameter nature of Fitts' ID cannot be applied to a continuous range of veridical movement amplitudes and target widths.

Acknowledgements: Supported by NSERC

**Free papers: Exercise and cancer; Friday, October 16, 1:30 – 3 pm**

**THE DEVELOPMENT OF EVIDENCE-BASED EXERCISE GUIDELINES FOR PEOPLE WITH CANCER**

Jennifer R. Tomasone<sup>1</sup>, Roanne Segal<sup>2</sup>, Caroline Zwaal<sup>3</sup>, Esther Green<sup>4</sup>, Teresa Petrella<sup>5</sup>, Andrew Loblaw<sup>6</sup>

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Exercise is a safe, cost-effective means to prevent and manage secondary health complications and enhance quality of life (QoL) among cancer survivors (CS). Published exercise recommendations for CS have been based on literature reviews and roundtable consensus and were not underpinned by a robust, standardized guideline development process using rigorous methodology (e.g., a systematic review of research evidence, extensive peer review). The objective of this study was to systematically develop evidence-informed exercise guidelines to improve aerobic and muscular fitness, and increase QOL, among CS. The Appraisal of Guidelines, Research and Evaluation II guideline development protocol was used as a methodological strategy. The evidence base for the guideline development process consisted of a systematic review and quality appraisal of research examining the effects of exercise on aerobic and muscular fitness and QoL among adults with cancer. A multidisciplinary working group reflected on the evidence and generated the guidelines. The guidelines underwent a four-stage review process in which they were reviewed by 12 internal content experts, three guideline methodology experts, five external content experts, and 69 potential end-users, with refinements made at each stage. The guidelines contain recommendations regarding the duration, frequency, and intensity of aerobic and resistance-training sessions. The guideline also includes considerations for safety, delivery methods, and long-term maintenance of exercise behaviour. More research is necessary to generate more exact exercise programs for specific cancer types. Oncologists, primary care providers, and other members of the healthcare team (e.g., rehabilitation therapists, kinesiologists, psychologists) are encouraged to adopt these rigorously developed guidelines.

Acknowledgements: Systematic review and guideline development supported by the Psychosocial Oncology Program at Cancer Care Ontario.

**MOTIVATION FOR DIFFERENT TYPES AND DOSES OF EXERCISE DURING BREAST CANCER CHEMOTHERAPY: A RANDOMIZED CONTROLLED TRIAL**

Kerry S. Courneya<sup>1</sup>, Roanne J. Segal<sup>2</sup>, James R. Vallerand<sup>1</sup>, Jennifer J. Crawford<sup>1</sup>, Cynthia C. Forbes<sup>1</sup>, Lianne B. Dolan<sup>3</sup>, Christine M. Friedenreich<sup>4</sup>, Robert D. Reid<sup>5</sup>, Karen Gelmon<sup>6</sup>, John R. Mackey<sup>7</sup>, Donald C. McKenzie<sup>8</sup>

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Background: Exercise is beneficial for breast cancer patients receiving chemotherapy but their motivation for different types and doses of exercise is unknown. Purpose: To examine exercise motivation before and after participation in a randomized trial. Methods: Breast cancer patients initiating chemotherapy (N=301) were randomized to a standard dose of 25-30 minutes of aerobic exercise (STAN), a higher dose of 50-60 minutes of aerobic exercise (HIGH), or a higher dose of 50-60 minutes of combined aerobic and resistance exercise (COMB). Patient preference and motivational outcomes from the theory of planned behavior (i.e., motivation, benefit, enjoyment, support, and difficulty) were assessed before and after the interventions. Results: At pre-randomization, breast cancer patients were significantly ( $p<0.001$ ) more likely to prefer COMB (80.1%) than STAN (9.5%), HIGH (2.0%), or no preference (8.4%). At post-intervention, patient preference changed significantly ( $p<0.001$ ) with an increase in the number of patients preferring HIGH (+5.1%) or no preference (+10.5%) and a decrease in the number of patients preferring STAN (-4.1%) or COMB (-11.5%). At pre-randomization, motivational outcomes were most favorable for COMB and least favorable for HIGH (all  $ps<0.001$ ). At post-intervention, motivational outcomes improved significantly more for HIGH, resulting in uniformly positive motivational outcomes across groups. Conclusions: Initial motivation for different types and doses of exercise during breast cancer chemotherapy varied considerably but equalized after the interventions. If indicated, clinicians can recommend exercise interventions to breast cancer patients initiating chemotherapy that are contrary to their stated preference without jeopardizing motivational outcomes.

Acknowledgements: This work was supported by a grant from the Canadian Breast Cancer Research Alliance. Dr. Kerry S. Courneya is supported by the Canada Research Chairs Program. Christine M. Friedenreich is supported by a Health Senior Scholar Award from Alberta Innovates-Health Solutions and through the Alberta Cancer Foundation's Weekend to End Women's Cancers Breast Cancer Chair.

#### EXPLORING RECTAL CANCER PATIENTS' MOTIVATIONAL RESPONSE TO SUPERVISED AEROBIC EXERCISE DURING NEOADJUVANT CHEMORADIOTHERAPY

Andria R. Morielli<sup>1</sup>, Nawaid Usmani<sup>2</sup>, Normand G. Boulé<sup>1</sup>, Diane Severin<sup>2</sup>, Tirath Nijjar<sup>2</sup>, Kurian Joseph<sup>2</sup>, Keith Tankel<sup>2</sup>, Kerry S. Courneya<sup>1</sup>

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<sup>2</sup>Department of Oncology, University of Alberta

Background: Standard treatment for locally advanced rectal cancer involves neoadjuvant chemoradiotherapy (NACRT) followed by definitive surgery. Exercise during NACRT may improve outcomes in these patients, however, no study to date has examined their motivation to exercise during NACRT. Purpose: To explore exercise motivation in rectal cancer patients during NACRT. Methods: Patients (N=18) participated in a supervised aerobic exercise program during NACRT. Using the theory of planned behavior, we assessed perceived benefits, enjoyment, support, motivation, and difficulty before and after the intervention. We also assessed patient-reported specific benefits, harms and barriers. Results: Perceived enjoyment ( $p=0.003$ ) and difficulty ( $p=0.037$ ) improved from pre-NACRT to post-NACRT. The most frequently cited benefits of the exercise program were improvements in cardiovascular fitness (75%), quality of life (75%), and self-esteem (65%). The most frequently cited harms of the exercise program were exacerbation of fatigue (31%) and diarrhea (31%). Finally, the most frequently cited barriers to the exercise were side effects of chemoradiotherapy (88%), fatigue (76%), and diarrhea (71%). Conclusions: This pilot study suggests that rectal cancer patients found an aerobic exercise intervention during NACRT to be more enjoyable and less difficult than anticipated. Moreover, rectal cancer patients identified many potential benefits but they also identified potential harms that need to be closely monitored in future interventions. Finally, most of the barriers to the supervised exercise were treatment-related and will need

to be addressed if exercise is to be tested and ultimately incorporated into standard care for rectal cancer patients receiving NACRT.

## MAGNITUDE AND CORRELATES OF THE INTENTION-BEHAVIOR GAP IN HEMATOLOGIC CANCER SURVIVORS: AN APPLICATION OF THE MULTI-PROCESS ACTION CONTROL FRAMEWORK

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**Background:** Efforts to help cancer survivors meet recommended aerobic exercise guidelines report modest success, perhaps because many theory-based interventions focus on intention formation. Only about half of survivors intending to meet exercise guidelines translate their intentions into guideline adherence. Thus, understanding the determinants of both intention formation and translation is important. The multi-process action control (M-PAC) framework proposes that the theory of planned behavior explains intention formation but additional regulatory behaviors (planning, regulation of alternatives), and reflexive factors (sense of obligation, regret, investment) are needed to translate intentions into behavior. **Purpose:** To explore the determinants of aerobic exercise intention formation and translation in hematologic cancer survivors. **Methods:** Hematologic cancer survivors (N=606) completed surveys reporting their aerobic exercise motivation and participation. The determinants of intention formation and translation were analyzed using separate logistic regressions. **Results:** Overall, 71% of participants (n=428) intended to exercise, and 60% of intenders (n=256) met exercise guidelines. The independent correlates of intention formation (all  $ps < .01$ ) were attitude (OR=1.9), perceived control (OR=1.6), descriptive norm (OR=1.3), injunctive norm (OR=1.3), younger age (OR=2.0), and higher education (OR=2.2). The independent correlates of intention translation (all  $ps < .01$ ) were a sense of obligation/regret (OR=2.5), less interest in alternative activities (OR=1.6), financially investing in personal exercise (OR=1.6), having detailed plans (OR=1.5), attitude (OR=2.0), perceived control (OR=1.7), younger age (OR=3.0), and being female (OR=1.9). **Conclusions:** The results support the M-PAC framework. Interventions that target both intention formation and translation may have the largest impact on exercise participation. Controlled trials are needed to test this proposition.

## MOTIVATIONAL EFFECTS OF AN INTERNET-DELIVERED PHYSICAL ACTIVITY BEHAVIOUR CHANGE PROGRAM IN NOVA SCOTIAN CANCER SURVIVORS.

Cynthia Forbes<sup>1</sup>, Chris Blanchard<sup>2</sup>, Kerry Mummery<sup>1</sup>, Kerry Courneya<sup>1</sup>

<sup>1</sup>Faculty of Physical Education and Recreation, University of Alberta

<sup>2</sup>Department of Medicine, Dalhousie University

**Purpose:** Previously, we reported the feasibility and preliminary efficacy of an internet-delivered physical activity (PA) behaviour change program among cancer survivors. The purpose of this study was to examine effects of this program on motivation. **Methods:** 95 cancer survivors were randomized into either UCAN, a Theory of Planned Behaviour (TPB) based PA behaviour change program, or usual care (UC). We examined mean change (MC) in motivational outcomes and underlying beliefs from baseline to post-intervention using ANCOVAs. **Results:** UCAN reported lower TPB outcomes than UC. Significant negative effects were found for self-efficacy (adjusted MC -0.7; 95% CI= -1.2 to -0.1;  $d = -0.53$ ,  $p = .019$ ), affective attitude (AMC -0.4; 95% CI= -0.8 to -0.0;  $d = -0.45$ ,  $p = .044$ ), and instrumental attitude (AMC -0.5; 95% CI= -0.9 to -0.1;  $d = -0.43$ ,  $p = .026$ ). Significant negative effects were found among the underlying control beliefs for bad weather (AMC -0.8; 95% CI= -1.6 to -0.1;  $d = -0.49$ ,  $p = .030$ ), medical or health

issues (AMC -0.7; 95% CI= -1.3 to -0.1;  $d=-0.48$ ,  $p=.031$ ), pain or soreness (AMC -0.7; 95% CI= -1.4 to -0.1;  $d=-0.52$ ,  $p=.020$ ), family responsibilities (AMC -1.0; 95% CI= -1.7 to -0.3;  $d=-0.62$ ,  $p=.005$ ), or PA becoming boring (AMC -0.8; 95% CI= -1.4 to -0.1;  $d=-0.54$ ,  $p=.016$ ). Conclusions: UCAN had a negative effect on motivational outcomes despite small beneficial effects on PA in the primary paper. These contradictory findings may be explained by methodological issues related to the measurement of motivation and to the specific intervention used in UCAN. Further research is needed before testing in a large scale phase III trial.

Acknowledgements: This work was supported by the Canada Research Chairs Program held by Kerry Courneya.

## INFORMING BEHAVIOURAL COUNSELLING EFFORTS IN CANCER SURVIVORS: EVIDENCE FROM A SYSTEMATIC REVIEW ON MULTIPLE HEALTH BEHAVIOUR CHANGE RESEARCH

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Multiple-behaviour change interventions (MBC) may have greater impact on health and wellbeing than single-behaviour interventions, especially when behaviours are related to higher-level goals such as improved survivorship experiences following cancer. Based on social cognitive theory, initial success in one behavioural domain may lead to increased perceived self-efficacy and foster subsequent mastery and motivation for change in another domain. MBC may be ideal for informing behavioural counselling, as many cancer survivors accumulate multiple behavioural risk factors (i.e., not meeting physical activity [PA] guidelines and poor diet). A systematic review of randomized controlled trials ( $N = 25$  analyzed) was conducted using electronic databases to identify the MBC design approaches – sequential (one behaviour after the other) or simultaneous – and examined effectiveness on diet and PA in survivors. Post-intervention treatment effect sizes (standardized mean difference [SMD]) were calculated for fruit and vegetable consumption (F&V), fat intake (%fat), diet quality (DQ), and PA. Studies simultaneously targeting behaviours ( $n = 23$ ), SMD ranges: 0.14 to 1.66 (F&V), -2.29 to 0.28 (%fat) and 0.04 to 0.92 (DQ), and -0.43 to 1.22 (PA). Sequential interventions ( $n = 2$ ), SMD ranges: 0.21 to 0.22 (F&V), -0.41 to -0.07 (%fat) and 0.36 to 0.38 (DQ) and 0.11 to 0.24 (PA). Given study heterogeneity and low number of sequential studies, further research is needed to determine the most effective approach for improving health behaviours among cancer survivors. With more definitive information on intervention approach, behavioural counselling strategies can be tailored to the approach for maximal health benefit.

**Free papers: Psychological constructs and Exercise Behaviour; Friday, October 16, 1:30 – 3 pm**

## UNDERSTANDING EXERCISE-RELATED COGNITIVE ERRORS

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<sup>1</sup>University of Saskatchewan

Objective: Cognitive errors (CEs) reflect individuals' biased evaluations of context-relevant information. In the exercise domain, a valid form of exercise CE assessment is needed. The Exercise-related Cognitive Errors Questionnaire (E-CEQ) was developed to determine to what extent adults make cognitive errors regarding exercise decisions. The purpose of this study was to develop and provide initial validity evidence for the E-CEQ. Design: The current study used an online self-report survey. Method: First, 24 initial vignettes representing 6 types of CEs were created. Evidence of content validity is discussed.



Second, data from 364 adults was gathered to examine the E-CEQ's factor structure. Third, aspects of criterion-related validity were examined (e.g., the E-CEQ's utility in predicting physical activity and adherence cognitions). Results: Content validity was demonstrated. A 9-item, 1-factor ( $\alpha = .86$ ) model was retained as the final E-CEQ factor structure and had excellent psychometric properties ( $\chi^2=34.61$ ,  $df=27$ ,  $p>.05$ ; RMSEA=.028; CFI=.990; TLI=.987). Regarding predictive utility, individuals expressing higher levels of CEs exercised less and reported problematic cognitions (e.g., more struggle with exercise decisions, lower self-regulatory efficacy). Conclusions: These results link CEs to weaker social cognitions and inconsistent adherence perceptions, a novel form of bias related to limited exercise engagement. The steps taken to examine different forms of validity helped provide a platform from which to continue (a) to study biases linked to cognitive errors and (b) the E-CEQ validation process through ongoing investigation.

Acknowledgements: Social Sciences and Humanities Research Council of Canada (SSHRC) doctoral fellowship and from Canada Research Chair training funds.

### IS THE AFFECTIVE RESPONSE TO EXERCISE RELATED TO MOTIVATIONS AND FUTURE PHYSICAL ACTIVITY BEHAVIOUR IN SCHIZOPHRENIA

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Physical activity (PA) provides numerous health benefits, which may help manage physical comorbidity among people with schizophrenia. However, cognitive impairments are additional concerns for persons with schizophrenia that may reduce the usefulness of cognitive determinants commonly used in behaviour change models to predict and modify PA behaviour. In order to better understand non-cognitive (i.e. hedonic) motivations to engage in PA in this population, it is relevant to examine whether affective responses to PA are a determinant of PA behaviour. Therefore, the purpose of this study was to determine whether change in pleasure, as measured by the Feeling Scale at the midpoint of a 10-minute bout of moderate intensity treadmill exercise, is related to task self-efficacy, affective outcome expectancies, and intentions to engage in PA measured 1 week prior to the exercise session as well as PA measured by accelerometry 2 weeks after the exercise session. Twenty-eight participants completed the study.

Differences in self-reported pleasure from baseline to the midpoint in the 10-minute exercise session were correlated with task self-efficacy, affective attitudes and intentions, as well as average daily minutes of moderate-to-vigorous PA (MVPA). Pleasure during exercise correlated significantly with task self-efficacy ( $r=.40$ ,  $p=.035$ ) and intentions ( $r=.38$ ,  $p=.045$ ), but not with affective outcome expectancies ( $r=.05$ ,  $p=.80$ ) nor MVPA ( $r=.32$ ,  $p=.11$ ). Overall, findings support the hypothesis that the affective response to exercise relates to key motivational constructs and future physical activity. Interventions to manipulate affect during exercise require development and evaluation.

Acknowledgements: This study was supported by a CIHR Operating Grant and an Ontario Graduate Scholarship

### INVESTIGATING THE RELATIONSHIP BETWEEN AEROBIC ACTIVITY AND COGNITION IN OLDER ADULTS

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Alzheimer's disease and related dementias are becoming more prevalent with the growing aging

population. Physical exercise may improve aspects of cognitive function to decrease disease risk; however, the effects of moderator variables, such as exercise intensity, are still under investigation. We examined the dose-response relationship between aerobic exercise and cognitive function in sedentary older adults. Fourteen participants were randomized into a high-intensity, moderate-intensity, or low-intensity exercise group. Each group received supervised training three times per week for 12 weeks. Cognitive performance was assessed at baseline and at study completion to determine changes in executive function, reaction time, and memory. It was hypothesized that exercise would affect cognition in a dose-dependent manner, such that exercising at a higher aerobic intensity would elicit greater benefits for cognition. However, our preliminary data suggest a task-dependent dose-response relationship. High-intensity exercise led to the greatest improvement in performance on executive function tasks, moderate-intensity exercise led to the greatest improvement in memory, and low-intensity exercise led to the greatest reduction in reaction time. The results suggest that the optimal intensity of aerobic exercise for maximal cognitive benefit may depend on the cognitive domain. The examined cognitive domains recruit different brain regions for processing and physical exercise may elicit different mechanisms of action on the different regions of the brain. This research will inform physical activity guidelines for brain health to help reduce the risk of Alzheimer's disease and dementia.

#### LISTENING TO THE BODY FOR INSIGHT: SELF-FOCUSED ATTENTION DURING EXERCISE PREDICTS EXERCISING OVER TIME.

Elena Ivanova<sup>1</sup>, Sean Locke<sup>2</sup>, Myriam Gaudreault<sup>1</sup>, Barbel Knäuper<sup>1</sup>

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Self-focused attention (SFA) causes self-evaluation. Some studies report that self-evaluation predicts exercise outcomes while others do not. Few studies have applied SFA to predict exercise behavior. We argue that trait self-control may be a critical moderator of SFA and exercise over time. Trait self-control is the ability to control responses and to alter behavior to meet goals. We predicted that trait self-control moderates SFA and exercising, and we tested the hypotheses that: 1) SFA at baseline (t1) predicts exercise at eight weeks post-baseline (t3); 2) SFA and exercise are each moderated by trait self-control; and 3) exercise pattern (consistent, variable, or no exercise pattern in past four weeks) moderates SFA and trait self-control's influence on exercising. **METHODS.** 79 students (22.7±4.9 yrs) completed the following self-report measures: SFA was created for this study; exercise over time (t1 & t3; Godin LTEQ); and trait self-control (Self-Control Scale). **RESULTS.** SFA at t1 was positively associated with exercising at t3 ( $p < .05$ ). As expected, trait self-control moderated SFA and exercise at t3 (while controlling for t1 exercise), 95% CIs [.03, .49], such that SFA predicted exercise only when trait self-control was high, 95% CIs [1.73, 12.31]. Further, when exercise had no established pattern, then high trait self-control and high SFA were associated with increased exercise, 95% CIs [1.64, 21.45], while low trait self-control and high SFA was associated with lower exercise. **CONCLUSION.** High trait self-control individuals benefited from tuning-in to their body (i.e., SFA), especially if exercising were not yet an established activity for them.

#### THE LONG AND SHORT OF IT: EXAMINING THE PREDICTIVE UTILITY OF AFFECTIVE RESPONSE TO MODERATE-INTENSITY CONTINUOUS TRAINING AND HIGH-INTENSITY INTERVAL TRAINING ON FUTURE EXERCISE BEHAVIOUR

Mary E. Jung<sup>1</sup>, Jessica E. Bourne<sup>1</sup>, Anamaria S. Mangubat<sup>1</sup>, Jonathan P. Little<sup>1</sup>

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An inverse relationship has been suggested to exist between affect and exercise intensity. As a consequence, adherence to high-intensity exercise is posited to be lower than moderate-intensity exercise, although no study to date has prospectively assessed this hypothesis using objective measures of exercise behaviour. This trial examined the affective response to moderate-intensity continuous training (MICT; n = 14) and high-intensity interval training (HIIT; n = 16) in 30 previously inactive adults (Mage = 51), and its utility to predict exercise adherence 1- and 6-months after a 10-day intervention. Affect was assessed at 25%, 50%, 75% and 100% of workout completed during each exercise session using the feeling scale (FS). FS scores taken at the midpoint of all exercise sessions were averaged for analyses. Participants wore accelerometers for 7 consecutive days at baseline, 1-, and 6-months. As expected, affect was significantly higher in MICT (M = 2.7), as compared to HIIT (M = 1.5; p = 0.01,  $\eta^2 = 0.2$ ). Affect did not change significantly over the 10 days of training (p = 0.4,  $\eta^2 = .04$ ), and there was no condition x time interaction (p = 0.33,  $\eta^2 = 0.04$ ). Affect failed to predict exercise behaviour at 1-month ( $\beta = -0.01$ ; p = 0.97, AdjR2 = -0.04) and 6-month ( $\beta = -0.25$ , p = 0.25, AdjR2 = 0.02) follow-ups. These findings contradict the popular notion that in-task affect predicts future exercise behaviour, and is the first study to prospectively examine the relationship between affect and adherence using objective measures.

#### ESTABLISHING AN EXERCISE HABIT: A RANDOMIZED-CONTROLLED TRIAL

Navin Kaushal<sup>1</sup>, Ryan E. Rhodes<sup>1</sup>, John C. Spence<sup>2</sup>, John Meldrum<sup>1</sup>

<sup>1</sup>University of Victoria

<sup>2</sup>University of Alberta

Physical activity (PA) has largely been studied via reflective social cognitive approaches. Emerging correlational findings have shown the independent prediction of habit, which represents automatic behaviour from stimulus-response bonds (cued and repetitive action) with PA. Preliminary research suggests that habit during the preparation of exercise may be the most important predictor to enactment. An opposing view to habit is exercise variety which proposes that flexibility increases autonomy. Currently no experimental research has tested the effectiveness of incorporating habit or variety to promote PA. The purpose of this study was to conduct a randomized-controlled trial to examine the promotion of preparation habit formation compared with control and variety groups on PA behavior. New gym members (n=141) were recruited across Victoria, BC for this eight week, three-arm randomized-controlled trial. Participants in the habit and variety groups attended their respective workshops and received a phone call booster follow-up at week four. An ANCOVA controlling for baseline PA found the habit group to increase MVPA compared to the control and variety group for both accelerometry (control p<.05; d=.40; variety p=.07; d =.36) and self-report (control p<.05; d=.51; variety p<.05; d =.50). Manipulation checks showed that the habit group engaged in significantly more exercise consistency, cue use and demonstrated greater automaticity during preparation ( $\eta^2=.07$  to .16; p<.05). The findings support the utility of a habit building workshop on short-term PA change. Future research is needed to replicate these findings and extend the duration of assessment times to evaluate whether PA changes are sustained across time.

**Friday, October 16, 3:30 – 5 pm**

**Symposium: Implicit cognitions and exercise; Friday, October 16, 3:30 – 5 pm**

#### IMPLICIT COGNITIONS AND EXERCISE

David E. Conroy<sup>1</sup>, Ryan E. Rhodes<sup>2</sup> & Tanya R. Berry<sup>3</sup>; Discussant: Amy Latimer-Cheung<sup>4</sup>

<sup>1</sup> Pennsylvania State University; <sup>2</sup> University of Victoria; <sup>3</sup> University of Alberta; <sup>4</sup> Queens University

Health psychology researchers have begun to understand the importance of examining not only explicit cognitions, which have received the vast majority of research attention, but also implicit cognitions and their possible relationship to health behaviour. This reflects dual-processing wherein cognitive processing can be automatic and very fast (i.e., a ‘gut reaction’) or slower and reliant on reasoning about ideas or associations between concepts. The purpose of this symposium is to present research on automatic processes and exercise. Tanya Berry will start with a brief introduction to the topic. David Conroy will then present on discuss relationships between implicit attitudes and physical activity and sedentary behaviour. Ryan Rhodes will present on the role of habit in physical activity behaviour and Tanya Berry will discuss possible effects of media and messaging on implicit cognitions. Amy Latimer-Cheung will provide an overview of the key points from these presentations and will provide perspective regarding the implications of this work for physical activity promotion research.

Acknowledgements: Ryan Rhodes is supported by a Research Scientist Award in Cancer Prevention from the Canadian Cancer Society; Tanya Berry and Amy Latimer-Cheung are supported by the Canada Research Chairs Program

**Free papers: Performance Psychology; Friday, October 16, 3:30 – 5 pm**

#### INCREASING PLAYER EFFORT IN THE YOUTH SPORT SETTING: PERCEPTIONS OF TEAM UNITY AND HOW HARD TEAMMATES ARE WORKING

Jocelyn D. Ulvick<sup>1</sup>, Kevin S. Spink<sup>1</sup>

<sup>1</sup>University of Saskatchewan

Why might young athletes work hard in their team setting? From a group perspective, previous studies have linked individual effort to both team unity (Ulvick & Spink, 2014) and the perception that others on the team are working hard (descriptive norms; Spink et al., 2013). As those findings came from independent, non-experimental studies, the purpose of the current study was to explore how cohesion and descriptive norms would influence self-reported athlete effort when they were examined together using a between-subjects experimental design. Fifty-five female volleyball players (M=15.4 years, SD=.6) were randomly assigned to read one of four vignettes about a team varying in cohesion (high vs. low) and descriptive norms for teammate effort (high vs. low). Participants then rated how hard they would work if they were a member of the described team. Results from an ANOVA indicated that reported effort differed across the four conditions,  $F(3, 48)=3.89, p=.01, \eta^2=.20$ . Post hoc analyses revealed main effects for both team constructs. Participants who read about a team described as high in cohesion reported that they would work harder than those whose team was described as low in cohesion ( $p=.009$ , Cohen’s  $d=.72$ ). Participants’ reported effort scores also were higher for those who read about most players on the team working hard as compared to few players working hard ( $p=.05$ , Cohen’s  $d=.49$ ). In addition to supporting previous independent relationships, these findings provide initial evidence that, when considered together, perceptions about team unity and teammate effort both contribute to young athletes’ self-reported effort levels.

Acknowledgements: This research was supported by a Social Science and Humanities Research Council

(SSHRC) Canada Graduate Scholarship-Doctoral and a SSHRC/Sport Canada Sport Participation Research Initiative grant to the first author.

## SCORE-RELATED NONVERBAL GESTURES IN BASKETBALL: ARE AMATEUR BASKETBALL PLAYERS ABLE TO READ THEM ACCURATELY?

Margarita Limon<sup>1</sup>, Juan Carlos Madrid<sup>1</sup>

<sup>1</sup>Faculty of Psychology, University Autonoma of Madrid (Spain)

Prior studies (e.g. Furley & Schweizer, 2014) have shown that players' reading of score-related nonverbal gestures may influence their confidence estimations in winning or losing a game. But, do amateur basketball players read accurately their opponents' score-related nonverbal behavior? 90 players (n=42, 11-14 years-old; n=48, 17-21 years-old) were presented two series of 27 video clips (counterbalanced presentation). One presented professional players whereas the other one showed amateur players of similar age than ours. Each participant watched 54 video clips. Nine of the 27 video clips of each series showed the opponent team leading (>15 points, leading clips), another 9 showed the opponent team trailing (<15, trailing clips), and the last third showed a level game (+/-5, drawing clips). Each one of these blocks of 9 items included 3 face only items (only the opponent player's face appears), 3 body only items (only the opponent player's body appears), and 3 face plus body items (both the face and the body of the opponent player's appear). Participants were asked to estimate the game score after watching each video clip. Results showed that: -Older players read significantly better than younger players score-related opponent players' nonverbal gestures. -Drawing clips were the most difficult to read for both groups. -Score-related nonverbal gestures were identified better when professional players appeared in the video clips, but surprisingly, face was not the most informative part. Implications for training basketball players to read the opponent team nonverbal behavior, and how to use it to their advantage will be developed.

Acknowledgements: This study was performed thanks to grant DEP2011-27282 (Designing Multimedia Tools for Learning and Teaching Sports in curricular and non-curricular Contexts) awarded to the first author by MINECO (Spanish Ministry of Economy and Competitiveness, National Plan of i+D+i)

## WHY THE THREE-POINT RULE FAILED TO SUFFICIENTLY REDUCE THE NUMBER OF DRAWS IN SOCCER: AN APPLICATION OF PROSPECT THEORY

Bernd Strauss<sup>1</sup>, Dennis Riedl<sup>1</sup>, Andreas Heuer<sup>1</sup>

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

Incentives guide human behavior by altering the level of external motivation. We apply the idea of loss aversion from Prospect Theory (Kahneman & Tversky, 1979) to the point reward systems in soccer and investigate the controversial impact of the "three-point-rule" on reducing the fraction of draws in this sport (Moschini, 2011, Dilger & Geyer, 2009). Making use of the Poisson nature of goal scoring and applying the prospect theory, we compared empirical results with theoretically deduced draw ratios from 24 countries encompassing 20 seasons each (N=118.148 matches). The rule change yielded a slight reduction in the ratio of draws, but despite adverse incentives, still 18% more matches ended drawn than expected ( $t(23)=11.04, p<.001, d=2.25$ ), consistent to Prospect Theory assertions. Alternative point systems (e.g., in Bulgaria, and other leagues) that manipulated incentives for losses yielded reductions to or beneath statistical expectation. Surprisingly, in addition, an anticipation effect was found – effects in the expected direction were already found two seasons before the introduction of the rule change took place in the concerend league. The results provide support for the deduced concept of how arbitrary aims, like the reduction of draws in the world's soccer leagues, could be more effectively accomplished than currently attempted. Dilger, A., & Geyer, H. (2009). Are Three Points for a Win Really Better Than Two? A

Comparison of German Soccer League and Cup Games. *Journal of Sports Economics*, 10(3), 305–318.  
Kahneman, D., & Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk. *Econometrica*, 47(2), 263–291. Moschini, G. (2010). Incentives and outcomes in a strategic setting: The 3-points-for-a-win system in soccer. *Economic Inquiry*, 48(1), 65–79.

## “SUPERCRIIP” VS HUMAN INTEREST: EXAMINING STEREOTYPES TOWARDS PARALYMPIANS FOLLOWING THE VIEWING OF CANADIAN PARALYMPIC COMMITTEE VIDEOS

Celina H. Shirazipour<sup>1</sup>, Shane N. Sweet<sup>2</sup>, Marie-Josée Perrier<sup>3</sup>, Kathleen A. Martin Ginis<sup>3</sup>, Amy E. Latimer-Cheung<sup>1</sup>

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

<sup>2</sup>McGill University

<sup>3</sup>McMaster University

The media typically portrays Paralympians by emphasizing their superhuman qualities (i.e. a supercrip portrayal) or the characteristics of their disability (i.e. a human interest portrayal). While these portrayals may be of interest to people without physical disabilities (PD), they are perceived negatively by people with PD. No studies have examined the effect of different types of media portrayals on disability stereotypes. Therefore, the objective of this study was to compare the effect of these two portrayals on stereotype perceptions of individuals with and without PD. Participants (n=148 with PD; n=180 without PD) watched two Canadian Paralympic Committee videos, in counterbalanced order, that presented the same Paralympian using either a supercrip or human interest portrayal. After each video, participants rated Paralympians on measures of warmth and competence, two indicators of stereotypes. A 2(disability status) x 2(video) x 2(warmth and competence) mixed model ANOVA demonstrated that people without PD rated the human interest portrayal higher in warmth (M=4.12; SD=0.64) than those with PD (M=3.89; SD=0.80; p=.014), suggesting increased presence of stereotypes towards this portrayal amongst those without PD. Furthermore, regardless of group, warmth scores were significantly higher following viewing of the human interest portrayal (M=4.01; SD=.73) compared to ratings after viewing the supercrip video (M=3.87; SD=.77; p<.001). Nevertheless, both videos resulted in higher competence than warmth scores (ps<.001), signifying admiration towards Paralympians. These findings are the first to provide evidence for how an audience's perceptions towards Paralympians may differ as a result of disability status and type of media portrayal.

## ALL FOR ONE? COLLECTIVE RESPONSIBILITY AND PSYCHOLOGICAL CLIMATE

Kathleen S. Wilson<sup>1</sup>, Kevin S. Spink<sup>2</sup>

<sup>1</sup>California State University, Fullerton

<sup>2</sup>University of Saskatchewan

While attributing responsibility for an outcome has a long history in psychology (Heider, 1958), it has received much less attention in sport. This is surprising given that teams are typically lauded for their ‘all for one mentality’, yet, games are often ostensibly decided by the play of one or a subgroup of players. Further, if the perception is that all members are collectively responsible for a losing outcome, then what does that say about team climate? This study explored whether perceptions of differing levels of responsibility (individual or collective) by members would be associated with different perceptions of psychological climate (PC) within a sport team. Curlers (N=66) completed online measures of PC (Spink et al., 2012) and collective responsibility (designed for this study) near the end of their season. For the analysis, individuals were split into two responsibility groups: 1) those who reported that individuals were

more responsible for losses (individual responsibility,  $n=29$ ), and, 2) those who reported that the team was more responsible for losses (collective responsibility,  $n=37$ ). A MANOVA was performed with responsibility as the IV (individual vs collective responsibility) and the PC subscales as the DVs. Results revealed that PC differed across the levels of responsibility,  $F(4,61)=2.616$ ,  $p=.044$ ,  $\eta^2=.15$ . Post hoc analysis revealed that self-expression was the PC subscale that significantly differed between conditions ( $F(1, 64) = 4.61$ ,  $p=.036$ ). Those who perceived that it was primarily the team (versus individuals) who was collectively responsible for the loss reported being more able to express themselves around the team.

### **Free papers: Motor Control in Developing and Special Populations; Friday, October 16, 3:30 – 5**

#### END-STATE COMFORT ACROSS THE LIFESPAN: A CROSS-SECTIONAL INVESTIGATION OF HOW THE MODE OF ACTION EXECUTION INFLUENCES MOTOR PLANNING IN AN OVERTURNED GLASS TASK

Sara M. Scharoun<sup>1</sup> Dave A. Gonzalez<sup>1</sup>, Eric A. Roy<sup>1</sup> & Pamela J. Bryden<sup>2</sup>

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

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NASPSPA outstanding student paper award winner

Exemplified by the end-state comfort effect (ESC), young adults plan actions in advance to minimize the cost of movement (Rosenbaum et al., 1990). In children, the development of general cognitive control processes lead to improvements in anticipatory planning that forms the foundation for adult-like reaching by age 9 to 10 (Wunsch et al., 2013). Observing the other end of the lifespan, to our knowledge ESC has not been explored in older adults. The overturned glass task (Fischman, 1997) was used to investigate ESC with 5- to 12-year olds, young ( $Mage=24.38$ ) and older ( $Mage=72.50$ ) adults ( $N=116$ ). Engagement of participants in this study was in compliance with ethical standards. Participants picked up a glass as if to pour water in pantomime without a stimulus, pantomime using an image/glass as a guide and actual grasping. 5- to 6-year-olds displayed less ESC than older age groups. 7- to 8-year-olds displayed less ESC than young adults, who approached ceiling. These findings support adult-like patterns of ESC by age 9 to 10 (Wunsch et al., 2013). Interestingly, 5- to 6-year-olds displayed the most ESC in pantomime without a stimulus. It is argued that familiarity with the task influences planning. Pretend play is prominent between ages 3 and 5 (Singer & Singer, 1992); therefore, children may be more familiar with planning to re-orient a glass in pantomime (i.e., pretend) compared to actual grasping. Beyond familiarity, age related improvements in ESC can be attributed to the development of overall proficiency in state estimation (King et al., 2012). For older adults, more ESC was observed in actual grasping than pantomime without a stimulus. It can be argued that older adults are reliant on feedback to continuously and consciously modify movements to meet action requirements (Roy et al., 1996); therefore, physical interaction with an object is required to plan according to ESC. An advantage for tool use is consistent with differences in healthy aging and disorders like apraxia. Overall, findings have implications for understanding the development course of ESC.

Acknowledgements: The authors would like to acknowledge the Natural Sciences and Engineering Council of Canada (SMS, PJB, and EAR), the Ontario Ministry of Training, Colleges and Universities (SMS), and the University of Waterloo (SMS) for funding.

## THE EFFECTS OF SOCIAL INTERACTION ON THE KINEMATICS OF A REACHING MOVEMENT IN CHILDREN

Helen Protopapas<sup>1</sup>, Emma Hubbard<sup>1</sup>, Alana Boyczuk<sup>1</sup>, Lana Pfaff<sup>1</sup>, Sara Scharoun<sup>2</sup>, Michael Cinelli<sup>1</sup>, Pamela J Bryden<sup>1</sup>

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Specific kinematic patterns have been observed for adults when socially interacting in cooperative and competitive reaching tasks. Cooperative reaching tasks show longer movement times, decreased amplitude of peak velocity and a decreased maximum grip aperture compared to competitive reaching tasks. However, it is unknown when differences in the kinematic patterns emerge in children. The purpose of this study was to determine the effect of social interaction on the kinematics of a reaching movement in children. To date, right-handed participants between the ages of three and 13 (N = 16, 8 female), were tested. The task required the participant to move a block from a starting position located on desk in front of their right hand to the target location in the centre of the desk. The task was completed under four different conditions; 1) at a normal pace, 2) as fast as possible, 3) competitively against a confederate, and 4) cooperatively with a confederate. The confederate was a young adult female. Kinematic data (movement time, maximum grip aperture, resultant peak velocity) were recorded for each trial. Preliminary results showed that children had a significantly slower movement time, and a significant decrease in resultant peak velocity when completing the task in a cooperative setting compared to a competitive setting. Overall, these results support the hypothesis in showing that children, similar to adults, differ in their kinematic patterns depending of whether they are interacting cooperatively or competitively. Future directions aim to compare cross-sectionally children's performance as a function of age.

Acknowledgements: NSERC, FOSSA

## EXAMINING THE CONFIDENCE AND KNOWLEDGE BASE OF EARLY CHILDHOOD EDUCATORS IN PHYSICAL LITERACY AND ITS APPLICATION TO PRACTICE

E Jean Buckler<sup>1</sup>, Shannon SD Bredin<sup>1</sup>

<sup>1</sup>Cognitive and Functional Learning Laboratory, School of Kinesiology, University of British Columbia

Early childhood is a critical period for the development of physical literacy. An increasing number of children attend childcare facilities, where the majority of their day is spent under the care of an early childhood educator (ECE). To date, little is known about the confidence and knowledge base of ECEs in the area of physical literacy and its application to practice. Methods: An online survey was administered to ECEs in British Columbia to examine their confidence and physical literacy knowledge using multiple choice, likert-scale, and open-ended questions. The survey examined ECE knowledge of physical activity, fundamental motor skill patterns, and the capability to detect and correct movement errors. The ECE's were also asked to provide a confidence rating for this knowledge on a scale from 1 (not at all confident) to 10 (highly confident). Results: A total of 217 respondents were recruited and 78 completed the survey (77 F, 1 M). Most participants (82%) were employed currently at Early Childhood Education Centres and 49% of participants self-reported >16 years of experience. General knowledge for physical activity was high; however, the ECEs demonstrated low knowledge for identifying the source of common movement errors. Knowledge was also limited for identifying developmentally appropriate activities to correct the movement error. Overall confidence ratings were consistent across categories (mean = 6.5±1.9).

Discussion: Low performance for the detection and correction of common movement errors in early childhood support a need for physical literacy training, despite ECEs reporting moderate confidence in the



content area.

Acknowledgements: E Jean Buckler is supported by a CIHR Doctoral Research Award

## A COMPARISON OF CONSTRAINED AND UNCONSTRAINED REACHING MOVEMENTS BY PEOPLE WITH AND WITHOUT AUTISM SPECTRUM DISORDERS

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<sup>1</sup>Faculty of Kinesiology and Recreation Management, University of Manitoba; Faculty of Physical Education, University of Alberta

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Although not included in the definition of Autism spectrum disorder (ASD), motor performance differences are reported consistently. Specifically, individuals with ASD spend more time preparing movements. Currently there is a debate as to whether people with ASD require more time to execute reaching movements. The present study compared constrained and unconstrained reaching movements in order to determine if previous reports of a preference for proprioceptive feedback explains inconsistent movement time reports in the literature. Eleven ASD participants and 13 typically developing (TD) participants were recruited. All participants performed three types of reaching movements in the sagittal plane: 1) sliding along a track on a piece of Plexiglas (1D, constrained); 2) sliding along a smooth piece of Plexiglas (2D, constrained); and 3) aiming movements (3D, unconstrained). Movements were recorded using a 3D motion analysis system (3D Investigator, NDI) and muscle activity was recorded using surface electromyography (CED 1902 dual system amplifier). All dependent variables were submitted to a 2 Group (ASD, TD) by 3 Movement Type (1D, 2D, 3D) mixed analysis of variance. Results revealed a significant Group by Movement Type interaction for premotor reaction time, movement time, and time after peak velocity. The ASD group took longer to prepare and execute 3D (unconstrained) movements compared to the TD group. The current findings are consistent with previously reported behavioral and brain imaging research identifying altered brain connections in ASD participants indicative of a preference for haptic over visual feedback for movement control.

Acknowledgements: Funding: Research Manitoba; The present research was also made possible by funding from the Canadian Foundation for Innovation. The authors would like to thank Kelsey Brown and Brie Page for their help collecting data and all of the participants for their time.

## INSIGHT INTO DOPAMINE-DEPENDENT PLANNING DEFICITS IN PARKINSON'S DISEASE: A SHARING OF COGNITIVE & SENSORY RESOURCES

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<sup>1</sup>Wilfrid Laurier University/Psychology department/Sun Life Financial Movement Disorders Research & Rehabilitation Centre

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Attention and sensorimotor processes are needed for successful planning of footsteps during complex gait situations, but their response to dopaminergic treatment is poorly understood. In the current study, we evaluated walking and gaze behaviours while planning an approach toward an obstacle to be stepped over. The obstacle clearance task was completed both ON and OFF dopaminergic medication by individuals with Parkinson's disease (n=20) and compared to healthy age-matched control participants (n=19), as well as with and without an auditory digit monitoring dual task. Gait and gaze data were synchronized. Each trial was split into an early and late phase prior to the obstacle, providing a unique opportunity to examine

dopamine-dependent planning deficits in Parkinson's disease. Interestingly, only patients in the OFF medication state showed greater deceleration in the late phase (i.e. just before the obstacle), as well as an increase in step time variability (also in this late phase) with the additional demands of a dual task. Although there were differences in gait between groups, gaze behaviors were the same for all participants irrespective to phase and dual-task condition. Surprisingly, the gaze behavior of the PD OFF group showed no interactions with phase or condition suggesting that the deceleration and increased variability when approaching an obstacle is the result of a greater demand for online sensory feedback that cannot be compensated for with visual strategies. We conclude that dopamine influences planning by limiting sensorimotor processing capacity, especially in the presence of increased cognitive demand in Parkinson's disease.

Acknowledgements: CFI; CNPq

## DOPAMINERGIC INTERACTIONS BETWEEN ANXIETY AND PROCESSING OF THE ENVIRONMENT IN PD

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NASPSPA outstanding student paper award winner

Recent research has suggested that anxiety influences gait in PD, with an identified dopa-sensitive gait response in highly anxious PD. Sensory-perceptual deficits have been suggested to underlie gait impairments in PD, thus, it may be that in threatening situations anxiety acts like a dual task limiting one's ability to process information about the environment. The current study aimed to (i) evaluate whether anxiety influences information (visual) processing in PD while walking in threatening situations, and (ii) examine whether dopaminergic medication modulates anxiety's influence on information processing. Forty-eight participants (24 HC; 12 Low Anxious [LA-PD], 12 Highly Anxious [HA-PD]) were asked to walk across a plank in virtual reality that was either located: on the ground (LOW) or above a deep pit (HIGH). The plank varied in size from 60-100 cm, and after participants crossed the plank they were asked to judge the width of the plank they had just walked across. Both ON and OFF medication states were evaluated in PD, and judgment error as well as self-reported anxiety levels were measured. Overall PD had similar judgment error as HC. However, when examining the PD groups across both medication states, a condition x plank size interaction was found for constant error ( $p=0.011$ ), revealing that all PD participants judged the narrowest plank more accurately when walking across the HIGH plank (compared to LOW). The opposite was observed when PD participants walked across the widest plank, that is, participants overestimated the plank size after they had walked across the HIGH plank (compared to the LOW). Finally, medication state did not influence judgment error. In conclusion, the current study did not find evidence that dopamine modulates the influence of anxiety on processing aspects of the environment, nor was there evidence to suggest that anxiety interferes with accurate perception of the plank size in PD. Instead the current findings suggest that anxiety enhances threat-relevant processing when walking in extremely threatening situations.

**Friday, October 16, 5 – 6:30 pm**  
**Poster session #1 – Friday, October 16, 5 – 6:30 pm**

1. MOTIVATION FOR RESISTANCE TRAINING 3 VERSUS 2 DAYS PER WEEK IN PROSTATE CANCER SURVIVORS: A PILOT STUDY

Mary K. Norris<sup>1</sup>, Gordon J. Bell<sup>1</sup>, Kerry S. Courneya<sup>1</sup>

<sup>1</sup>Faculty of Physical Education and Recreation, University of Alberta

**Background:** We previously reported a pilot randomized controlled trial in prostate cancer survivors suggesting that resistance training (RT) 3 days/week versus 2 days/week may improve physical functioning but may also blunt psychosocial improvements. Here, we explore potential motivational explanations for this paradoxical effect. **Methods:** Prostate cancer survivors (N=30) were randomized to 12 weeks of supervised RT either 3 days/week (n=16) or 2 days/week (n=14). Using the theory of planned behavior, we assessed patient preference for group assignment, perceived difficulty (including specific barriers), perceived benefits (including specific benefits), perceived enjoyment, and perceived support for the RT program. **Results:** Patient preference for group assignment was balanced at pre-randomization and did not change after the intervention. At postintervention, there were potentially meaningful differences suggesting that the 3 days/week group perceived less support ( $d=-0.40$ ;  $p=0.27$ ), more difficulty ( $d=+0.36$ ;  $p=0.34$ ), and fewer benefits ( $d=-0.30$ ;  $p=0.37$ ) from the RT program. More specifically, the 3 days/week group reported less benefit for self-esteem ( $d=-0.92$ ;  $p=0.010$ ), physical functioning ( $d=-0.82$ ;  $p=0.012$ ), fatigue ( $d=-0.73$ ;  $p=0.041$ ), cardiovascular endurance ( $d=-0.67$ ;  $p=0.058$ ), and happiness ( $d=-0.64$ ;  $p=0.066$ ). Moreover, there were potentially meaningful differences suggesting the 3 days/week group perceived more barriers to the RT program including feeling sick ( $d=+0.42$ ;  $p=0.27$ ), traveling to/from the fitness center ( $d=+0.36$ ;  $p=0.32$ ), and other medical problems ( $d=+0.25$ ;  $p=0.49$ ). **Conclusions:** These preliminary data suggest that perceptions of less support, fewer benefits, and more barriers may explain why prostate cancer survivors experienced fewer psychosocial benefits from a 3rd day/week of RT. These motivational explanations should be investigated in larger trials.

**Acknowledgements:** Kerry S. Courneya is supported by the Canada Research Chairs Program

2. MY HEAD HURTS: INDUCING AND CONTROLLING MENTAL FATIGUE

Hannah Connon<sup>1</sup>, David Scott<sup>1</sup>

<sup>1</sup>Faculty of Kinesiology, University of New Brunswick

Mental fatigue is a psychobiological state induced by sustaining cognitive attention on one, or multiple, tasks (van der Linden et al., 2003). Mental fatigue has a negative effect on both cognitive and physical performance (Marcora, 2009). The quantifiable effect of mental fatigue on behaviour, performance, and mood is also still under investigation, and as of yet there is no gold standard for inducing the state and measuring it. The purpose of this investigation was to ascertain the effect of the AX-CPT cognitive task, and a common neutral control condition on mental fatigue. Forty-two participants (mean age = 21; males = 16,) were assigned either the experimental (AX-CPT) condition, or the control (neutral documentary) condition, each lasting 90 minutes. Mental fatigue was measured via the Brunel Mood Scale pre and post-test. Participants also completed a wall sit to voluntary exhaustion post-test. Results indicated a significant interaction of time and group ( $F(1, 40) = 14.965$ ,  $p \leq 0.05$ ), with participants in the experimental group reporting significantly higher levels of post-test mental fatigue ( $M = 11.71$ ,  $SD = 3.6$ ) than the control group ( $M = 5.81$ ,  $SD = 3.61$ ). A significant difference in wall sit times was also reported, with the experimental group performing significantly worse ( $M = 123.33$ ,  $SD = 42.85$ ) than the control group ( $M = 171.05$ ,  $SD = 90.51$ ). Conclusions include that the AX-CPT is a valid method for inducing mental fatigue, however some concerns regarding the

control condition arose. Many participants in the control group expressed elevated levels anger and tension, indicating that it may not be the best approach for the population.

### 3. POLE FITNESS AND POSITIVE BODY IMAGE: AN INTERPRETATIVE PHENOMENOLOGICAL ANALYSIS

Ariel J. Dimler<sup>1</sup>, Tara-Leigh F. McHugh<sup>1</sup>

<sup>1</sup>Faculty of Physical Education and Recreation, University of Alberta

In recent years there has been increased interest in studying positive body image; however, there is still a dearth of knowledge related to this construct. This study addressed some existing gaps in positive body image literature by exploring context-specific experiences of positive body image. The purpose of this interpretative phenomenological analysis was to describe and interpret the positive body image experiences of women actively involved in pole fitness. Seven women between the ages of 20-36 years participated in one-on-one interviews to discuss their experiences surrounding their bodies and pole fitness. Additionally, participant observation was utilized to provide context for data analysis, and follow-up interviews were utilized to engage in member checking with all participants. Interpretative phenomenological analysis was used to identify five superordinate themes representing the words and experiences of the participants: (1) accepting your body as it is, (2) inner confidence, (3) comfort with sexual expression, (4) supportive environment, and (5) appreciating your body's abilities. Findings are consistent with emerging conceptualizations of positive body image and provide insight into a specific context that may be useful in the promotion of positive body image. In addition, findings suggest that pole fitness provides a unique environment in which women can safely engage in sexual exploration. This research suggests that pole fitness may be an avenue by which women can develop and maintain positive body image.

### 4. BODY IMAGE CONCERNS FOR OLDER ADULT MEN AND WOMEN. CAN WE IDENTIFY CORRELATES OF EXERCISE ADHERENCE?

Rachel Gray<sup>1</sup>, Larkin Lamarche<sup>2</sup>, Kimberley L. Gammage<sup>3</sup>, Allan L. Adkin<sup>3</sup>

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Body image research has focused predominantly on younger populations; less is known about older adults. Given the health benefits of exercise and the declining rates of physical activity levels with aging, it is important to identify correlates of adherence to exercise. The present study (1) examined gender differences in body image in older adults, and (2) determined if body image could predict adherence to an exercise program in older adults. Participants were community dwelling men (n = 80) and women (n = 216) aged 55 years or older who were independent walkers with no neural impairments. There were significant gender differences reported for appearance and fitness evaluation ( $p < .001$ ), with men reporting feeling more positive and satisfied with their physical appearance and fitness compared to women. Exercise adherence data was examined for a subset of women (n = 133) and men (n = 51) who participated in the 12-week structured exercise program. Two hierarchical regressions were conducted to determine if satisfaction with fitness, health, appearance and body functioning could predict adherence. For women, controlling for BMI, satisfaction variables accounted for significant variance in adherence,  $F(5, 127) = 3.00$ ,  $p = .014$ ,  $R^2_{adj} = .07$ ; satisfaction with body functioning was the only significant predictor ( $\beta = .241$ ,  $p = .01$ ). For men, the overall regression was not significant. Future research should focus on designing exercise programs for older adults that emphasize body function as opposed to appearance.

## 5. RELATIONSHIPS BETWEEN PROXY RELIANCE AND EXERCISE SELF-MANAGEMENT PERCEPTIONS AMONG NOVICE CARDIAC REHABILITATION PARTICIPANTS

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Background: Regular physical activity (PA) aids recovery after a cardiac incident. Despite cardiac rehabilitation (CR) success, many participants fail to adhere to exercise six months after CR. Proxy agency (cf. social-cognitive theory; Bandura, 1997) identifies one potential adherence liability: participants' reliance on CR staff. Strong reliance on CR staff (proxies) has been inversely related to self-regulatory efficacy (SRE) for managing home exercise (Bray, Brawley, Millen, 2006). Purposes: (1) Compare novice CR participants high and low in proxy reliance with respect to (a) SRE for exercise, (b) perceived PA difficulty, (c) persistence, and (d) SRE for self-managed (SM) exercise. (2) Examine relationships between reliance and SRE; between SRE and persistence; between SRE for SM-exercise, task difficulty and satisfaction. Design and Methods: As part of the first year of a larger, prospective study, novices (Mage= 65), from two municipal health region CR sites were examined. Participants were examined over 12 weeks. Baseline and post-CR measures were obtained including perceptions about self-selected SM-exercise post-CR. Results: MANCOVA revealed significant main effects of high versus low proxy reliance for post-CR SRE and persistence after controlling for baseline SRE ( $p < .05$ ). Positive relationships were observed for SM-exercise SRE and satisfaction. Inverse relationships were observed between SM-exercise SRE and difficulty; satisfaction and difficulty. Baseline SRE predicted: (1) post-CR persistence and (2) post-CR SM-exercise bouts. All correlations and regression  $p$ 's  $< .05$ . Conclusions: Findings about the relation between reliance and exercise difficulty agree with Bandura's suggestions. New relationships were observed for individuals' self-selected SM-exercise post-CR.

Acknowledgements: SSHRC Canada Research Chair Training Funds

## 6. EXERCISE TRAINING IN PATIENTS WITH LOCALLY ADVANCED STAGE RECTAL CANCER: PAIN, FATIGUE, INSOMNIA, AND HEALTH PERCEPTIONS OUTCOMES

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The wait period between the completion of neoadjuvant-chemoradiation therapy (NACRT) and surgery can be challenging for patients with advanced rectal cancer who experience debilitating side effects. This can depreciate patients' perceptions of their health status. Thus, identifying strategies to reduce side effects and maintain patients' perceptions of their health status is a priority in the treatment of advanced stage rectal cancer. In this study, the effectiveness of a 6-week, in-hospital exercise intervention for promoting physical and mental health perceptions and reducing pain, fatigue, and insomnia in patients with locally advanced rectal cancer ( $n=24$ , Mage=63 years, SD = 9.7; 58% male) was examined. The intervention was delivered immediately after patients completed NACRT and prior to surgery. Participants completed questionnaires at three time points: pre-NACRT, post-NACRT/pre-exercise intervention, and post-exercise intervention. Data were analyzed using Wilcoxon matched-

pairs signed-rank tests, and the Simes procedure was used to correct for multiple comparisons. Fatigue decreased ( $p=.01$ ) and physical health perceptions increased ( $p=.004$ ) pre- to post-exercise intervention. Pain also decreased during this time, albeit not significantly based on the corrected critical  $p$ -value ( $p=.03$ ). There were no significant differences in insomnia or mental health perceptions across assessments ( $ps=.11-.73$ ). Based on these findings, pre-operative exercise training appears to effectively reduce fatigue and improve physical health perceptions in patients awaiting surgery for locally advanced stage rectal cancer. Including pre-surgical exercise within patients' cancer plan of care post-NACRT may be a critical strategy to reduce certain side effects, improve perceptions of physical health status, and ultimately promote recovery.

Acknowledgements: This study was conducted while the first author was supported by a Canadian Cancer Society Career Development Award in Prevention.

## 7. ARE WE REALLY MOVING PEOPLE TO MOVE? A SYSTEMATIC REVIEW OF PHYSICAL ACTIVITY INTERVENTION EFFECTIVENESS IN PERSONS WITH PHYSICAL DISABILITY

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Purpose: Among samples of persons with physical disabilities, the overall and relative effectiveness of theory-based, physical activity (PA)-enhancing intervention strategies is unknown. The purpose of this systematic review was to evaluate the empirical evidence and use of theory in interventions and their effects on PA behaviour in persons with physical disability. Methods: Medline, Embase, PsychINFO, and AMED databases were searched for randomized controlled trials that tested the effects of a PA intervention in persons with physical disability (spinal cord injury, multiple sclerosis, cerebral palsy, osteoarthritis, stroke, fibromyalgia, amputees, and Parkinson's Disease). A total of 22 articles met the inclusion criteria. Data were extracted regarding participant demographics, theories and interventions employed, and effects on PA behaviour were synthesized. Results: The majority of interventions were classified as behavioural ( $n=18$ ) and/or informational ( $n=15$ ). Social interventions ( $n=13$ ) were always delivered in conjunction with the former intervention types. No studies evaluated the impact of environmental interventions. More than half of the articles ( $n=14$ ) explicitly used a theory to guide intervention development. Less than one third of interventions demonstrated significant improvements in PA behaviour from control, all of which were guided by theory ( $n=6$ ). Conclusion: The literature examining the effects of PA interventions in persons with physical disability is limited. Future research should use theory to guide intervention development and carefully consider which behaviour change strategies are most likely to bring forth the greatest impact on PA behaviour.

## 8. EXPLORING HOW RECREATIONAL CYCLING PROMOTES THE QUALITY OF LIFE OF CHILDREN TREATED FOR CANCER

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After completing treatment, childhood cancer survivors are at an increased risk for a lifetime of health problems, which can impair their quality of life (QOL). These issues emphasize the importance of identifying strategies that improve the QOL of childhood cancer survivors. There is consistent evidence that physical activity (PA) interventions can enhance QOL, however, few studies have focused on unstructured PA or investigated the underlying mechanisms. Understanding the mechanisms that explain how unstructured PA enhances childhood cancer survivors' QOL will further our knowledge and enable the refinement of sustainable PA interventions to promote optimal QOL.

The objective of our longitudinal qualitative study was to explore how childhood cancer survivors' perceptions of QOL changed as a result of participating in unstructured recreational cycling for 3 months. We conducted semi-structured interviews with 4 childhood cancer survivors (Mage = 10.5 years; SD = 2.5) before they received a bicycle, and 4- and 8-weeks after. We analyzed the data using thematic analysis. Cycling enhanced participants' QOL over time by helping them: (a) Feel stronger and less tired, (b) Experience support from their social networks, and (c) Enhance feelings of self-efficacy and normalcy. Our study demonstrates that unstructured PA improves QOL in childhood cancer survivors. It also provides preliminary information about the mechanisms for how PA may promote these beneficial effects. If confirmed in larger studies, our findings suggest that PA interventions should explicitly aim to promote childhood cancer survivors' perceptions of their physical, psychological, and social functioning in order to optimize QOL.

## 9. USING DANCE TO INCREASE PHYSICAL ACTIVITY: A SYSTEMATIC REVIEW OF INTERVENTIONS

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**Purpose:** Reviews of physical activity interventions among children and adolescents span different settings of activity as well as types of activity. Dance may be one way to increase physical activity among youth. The goal of this study was to review physical activity interventions for youth using dance to understand both how dance is used as well as the outcomes of such interventions. **Methods:** Key databases (SportDiscus, PubMed, PsychInfo, CINAHL, and ERIC) were explored for studies using dance (in whole or part) as an intervention, published in English (peer-reviewed), between 2009-2014, and including an assessment of physical activity. Study quality was evaluated for included article. Relevant information was obtained from each included study. **Results:** Eight interventions (found in 10 papers) met the inclusion criteria. Study quality was 'weak' across all of the included studies. Different forms of dance were used across studies with many of the populations of youth being girls, overweight, and/or of an ethnic minority. The outcome (for physical activity) of the included interventions using dance was mixed. **Conclusion:** Dance is being used as a means to engage youth in physical activity. Study quality may be limiting what we know about the effectiveness of these interventions. Future studies should consider the appropriateness of dance interventions among other groups of children and adolescents including boys, those with disabilities, or cultural considerations.

## 10. JUST GOING TO DO IT: AN EXPERIMENTAL EXAMINATION OF THE EFFECTS OF SPORTS-RELATED TELEVISION CONTENT ON EXERCISE-RELATED COGNITIONS

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Television viewing is often portrayed as one of the key contributors to the rates of physical inactivity of young people; however, the relationship is a complex one. For instance, television-based mass-media campaigns have been successful in promoting physical activity by increasing exercise-related attitudes and knowledge. **PURPOSE:** The purpose of the current study was to examine the effects existing sports-related television content may have on the exercise-related cognitions of university students. **METHODS:** Undergraduate students (N=127, Mage=19yrs) completed pre-and post-measures before and after watching either a health-based control video or an experimental video that including clips of advertisements featuring high profile athletes engaging in intense training. Questionnaires assessed television viewing habits, physical activity, and exercise-related cognitions. **RESULTS:** Participants were highly active (M= 225 min/wk) yet reported watching an average of 3hrs of TV per day, most of which was viewed over the internet (80%). Results of a

MANOVA revealed a significant group by time interaction ( $p=.024$ ), in which participants who viewed the sports video condition reported a modest increase in intentions to engage in exercise whereas there was no change in intentions reported by the control group ( $p=.006$ ). A separate MANOVA showed significant time effects ( $p=.005$ ) in that scores for all types of motivation to exercise (extrinsic – integrated) were higher following video exposure ( $ps<.05$ ). **CONCLUSION:** Findings suggest that exposure to brief sports-related television content can increase exercise intentions among young adults. This further highlights the complex relationship between the viewing of television content and exercise-related variables.

Acknowledgements: This research was supported by the Acadia University Webster Undergraduate Research Award

## 11. WOMEN'S SELF-COMPASSION AND EXERCISE MOTIVATIONS

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To gain a further understanding of the role of self-compassion in women's exercise motivations the purpose of this research was to examine the relationship between self-compassion and women's exercise motivations. Participants were 72 women exercisers between 18 and 40 years ( $M = 24.18$ ,  $SD = 5.83$ ). The women completed an online questionnaire that included a demographic survey, the Behavioural Regulation in Exercise Questionnaire, the Rosenberg Self-Esteem Scale, the Self-Compassion Scale, the Self-determination Scale, the modified Drive for Muscularity Attitudes Questionnaire, the Drive for Thinness Scale, and the Body Appreciation Scale. The results showed that self-compassion was negatively correlated with introjected motivation ( $r = -.50$ ,  $p < .05$ ), drive for muscularity ( $r = -.30$ ,  $p < .05$ ), and drive for thinness ( $r = -.54$ ,  $p < .05$ ); and that self-compassion was positively correlated with body appreciation ( $r = .73$ ,  $p < .05$ ) and self-determined motives to exercise ( $r = .53$ ,  $p < .05$ ). Follow-up hierarchical regression analyses showed that self-compassion predicted unique variance beyond self-esteem on introjected motivation ( $R^2 = .25$ ,  $p < .05$ ;  $\Delta R^2 = .06$ ,  $p < .05$ ), drive for thinness ( $R^2 = .29$ ,  $p < .05$ ;  $\Delta R^2 = .05$ ,  $p < .05$ ), and self-determined motives to exercise ( $R^2 = .28$ ,  $p < .05$ ;  $\Delta R^2 = .05$ ,  $p < .05$ ). The current study highlights that self-compassion might play a role in the promotion of adaptive, healthy, and positive exercise motivations for women exercisers.

## 12. THE EFFECT OF STEREOTYPE THREAT ON MEN AND WOMEN'S ATHLETIC PERFORMANCE

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Stereotype threat occurs when performance suffers after an individual is reminded of negative stereotypes surrounding his or her in-group. In physical activity, women tend to be stereotyped as having poor musculoskeletal ability, but better cardiovascular endurance compared to men. The effect of stereotype threat on exercise performance has not been tested. The purpose of this study was to test the effects of stereotype threat on men and women's performance on an exercise task (jump squats) and to test theoretical moderators of performance (self-handicapping and athletic disengagement). Healthy young adults ( $N=142$ ) completed a jump squat task in pairs after being exposed to one of three scenarios: (1) men are stronger and should outperform women (2) women have better aerobic capacity and should outperform men or (3) the task was related to recovery time and was not gendered in any way. There was no significant effect of condition on women's performance, and athletic disengagement was lower in the threat condition for women. Performance on the jump squat task was better in the threat condition for men. Men in the threat condition also displayed more self-handicapping and athletic disengagement. Self-handicapping and athletic disengagement were not



significant moderators of the effects of condition on performance for either sex. These findings were not consistent with the hypotheses. These results suggest that gender stereotyping may be less relevant to women's athletic performance than literature suggests, and that gender stereotyping may motivate men towards improved performance.

### 13. EXAMINING SELF-REPORTED SEDENTARY BEHAVIOUR AMONG CHILDREN AND YOUTH WITH PHYSICAL DISABILITIES

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A growing body of research links time spent in sedentary behaviours (SED) with increased cardio-metabolic disease risk independent of physical activity (PA) levels. Current Canadian SED guidelines state that children and youth should reduce their recreational screen time (RST) to 2 hours daily. Limited research has quantified RST among children and youth with physical disabilities. Therefore, the current study examined self-reported RST among children and youth with physical disabilities living in the Greater Toronto Area. This project is part of a larger, cross-sectional study examining PA and SED within this population. The COMPASS (Leatherdale et al., 2014) SED questionnaire was administered (face-to-face or via mail) to eligible participants across a variety of recreational and rehabilitation organizations. Participants were recruited to recall (in minutes) the time spent in a range of SED (i.e., RST [watching television, texting, playing computer games, surfing the internet] and other SED [doing homework]) over the previous 24-hour period. Mean daily minutes spent in RST was calculated. Overall, 34 participants (Mage = 15.34 ± 3.2 yrs) completed the survey, with the majority (62%) of participants being male, and wheelchair users (47%). Most (91%) participants engaged in over 2 hours per day of RST, with an average of 6.2 hours/day. The majority of time (2 hours/day) was spent watching television. These preliminary findings demonstrate that children and youth with physical disabilities are exceeding the current SED guidelines. Further research is warranted to include objective measures of SED within this population. This will be important for examining relationships between engagement in SED and health, and to inform future intervention work.

### 14. PROMOTING PHYSICAL ACTIVITY: A REVERSAL THEORY PERSPECTIVE

Sarah Reaume<sup>1</sup>, Kathryn Lafreniere<sup>2</sup>, Ken Cramer<sup>2</sup>

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Research suggests tailored messages promoting physical activity are not always effective. In an attempt to explain the mixed results, the present study investigated the effects of message tailoring from a reversal theory (RT) perspective. University students (N = 189) were exposed to two video messages promoting exercise that were tailored to the interests of telic (i.e., goal-oriented) and paratelic (i.e., playful) state defined by RT. Participants' recall, involvement, attitude, intentions and behaviour toward the subject of exercise were recorded. Among participants who watched the telic message, those in the telic state had better attitudes toward exercise than those in the paratelic state. Among participants who watched the paratelic message, those in the paratelic state reported higher involvement with and intentions to exercise. Metamotivational dominance had no influence on responses to either message. In general, tailored groups responded more favourably than non-tailored

groups on a few variables. The results suggest that tailoring messages to recipient's metamotivational state may be an effective strategy to promote physical activity. Public health campaigns should take into account the state recipients are likely to be in when receiving a message.

#### 15. MEASURING IMPLICIT ATTITUDES FOR EXERCISE IN OLDER ADULTS WITH CHRONIC LUNG DISEASES: A FEASIBILITY STUDY

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**Purpose:** This research aims to determine the feasibility of the Go/No-go Association Task (GNAT) as an effective measurement of implicit attitudes for exercise in older adults with chronic lung disease. The GNAT is a paced computer response task, with typical response deadlines between 500 and 1000 milliseconds (ms), which may be too fast for older adults. **Method:** Sixteen regular exercisers who graduated from a pulmonary rehabilitation program (Mage=72) completed the GNAT (n=8 at 1000ms response deadline, n=8 at 1500ms response deadline) and a questionnaire assessing outcome expectations for exercise. **Results:** Examination of error rates and response times found that participants with the 1000ms response deadline timed out more frequently and were less able to inhibit responses on the no-go trials (where correct response is no response) than participants with the 1500ms response deadline. A repeated measures ANOVA showed a trend towards positive implicit attitudes for exercise for the 1500ms response deadline,  $p = .06$ ,  $\eta^2 = .41$ , and no effect of implicit attitudes for the 1000ms response deadline,  $p = .46$ ,  $\eta^2 = .07$ . Implicit attitudes were correlated to the likelihood and desirability of enjoyment, health, and appearance outcomes ( $r$ 's .30 to .77). **Conclusion:** Less timing out during response periods, better response inhibition, and generation of viable implicit attitude scores suggests the 1500ms response deadline is more suitable than the 1000ms response deadline in older people with chronic lung diseases. Planned future research will compare these results to a healthy aged-matched sample to discern age-related from disease-related differences in response times.

#### 16. IMPLEMENTING A COMMUNITY-BASED PHYSICAL ACTIVITY INTERVENTION: THE IMPORTANCE OF STAFF KNOWLEDGE AND ATTITUDES

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To promote widespread reach of health programs, initiatives must be implemented directly to the target population in need. The Healthy Together (HT) program is a community-based strategy designed to foster positive attitudes, cognitions and behaviour towards physical activity (PA) in children and their families at high risk of obesity. HT was designed to be implemented by existing community staff members in high needs areas. Staff familiarity and self-efficacy with the specific topic area is associated with the success of community-based programs. The purpose of this research was to examine staff members' thoughts and feelings towards PA. A mixed methods approach was utilized, including 1) observations conducted at staff training, 2) pre program open-ended qualitative questions completed by staff members, and 3) a focus group teleconference conducted with staff following completion of the program. Fifteen staff members facilitated HT at 5 implementation sites and each reported having no experience facilitating a PA program. This was confirmed through observations at training. Following completion of the program, the majority of staff expressed that they rarely engaged in PA, and struggled to engage participants in PA in general. Staff agreed that they

would have benefited from more program specific training in order to successfully implement the HT program. These findings highlight the importance of extensive training on topic content prior to dissemination of a program within a community setting. Staff must see value in the program and be aware of their position as a role model and content expert within the program.

#### 17. EXAMINING THE USE OF THEORY IN PHYSICAL ACTIVITY INTERVENTIONS TARGETING CHILDREN AND ADOLESCENTS: A SYSTEMATIC REVIEW

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The importance of conceptual development for the translatability of study findings is well established (Lewin, 1947). For complex behaviours, such as physical activity (PA) participation, applying a theoretical framework can promote an understanding of causal mechanisms (Brown et al., 2013). The purpose of this systematic review is to examine the use of theory in PA interventions targeting children (aged 5 to 11 years) and adolescents (aged 12 to 17 years). A systematic search for randomized and non-randomized controlled interventions identified 128 studies (78 children; 50 adolescent) that met the selection criteria. Studies were coded as theory-based or atheoretical, and for the presence or absence of PA-related psychosocial outcomes. In children and adolescents, 59% and 78% of interventions were theory-based, respectively. The application of theory ( $\chi^2(1, N = 128) = 4.94, p < .05$ ) and reporting on PA-related psychosocial outcomes ( $\chi^2(1, N = 128) = 4.39, p < .05$ ) were significantly more likely to occur in interventions targeting adolescents compared with those targeting children. Of studies that reported on psychosocial outcomes, theory-informed interventions were significantly more likely than atheoretical interventions to report positive changes in adolescents ( $\chi^2(1, N = 30) = 10.43, p < .01$ ) but not in children. Findings will be discussed within the context of PA-related psychosocial constructs and the paucity of data surrounding their measurement in children. This review supports a need for PA interventions targeting children to consider theoretical frameworks and theoretical constructs as mediators of PA behaviour change.

#### 18. A TEST OF BASIC PSYCHOLOGICAL NEEDS THEORY IN A PHYSICAL ACTIVITY PROGRAM FOR UNDERSERVED YOUTH

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NASPSPA outstanding student paper award winner

Positive staff-youth relationships in physical activity-based positive youth development (PYD) programs can develop assets that support well-being in youth. This study applied basic psychological needs theory to the PYD context and tested the theoretical pathways between autonomy support, involvement and structure in staff, and psychological need fulfillment and well-being in youth. 24 staff (75% women,  $M_{age}=20$  years, 50% White) and 379 youth (49% girls,  $M_{age}=10$  years, 44% Latino/a) in a four-week PYD program took part in the study. Staff were randomly assigned to a control or intervention condition, and youth were randomly assigned to age-stratified groups led by one staff member. The intervention condition completed training on implementing autonomy support, involvement, and structure. Staff behaviors were observed and youth were surveyed on their perceptions of autonomy support, involvement, structure, need fulfillment, hope, and self-esteem. Multilevel modeling showed no significant clustering of youth within teams. Therefore, hypotheses were tested using MANOVAs and follow-up ANOVAs. The intervention group engaged in more autonomy support ( $F(1,22) = 9.90, p < .01$ ), involvement ( $F(1,22) = 8.22, p < .01$ ), and structure ( $F(1,22) = 8.95, p < .01$ ) but, perceptions of staff and psychological outcomes in youth did not differ

across groups. Findings show that a basic psychological need theory based training can manipulate staff behaviors, and youth's perceptions of staff behaviors are critical to youth outcomes but, additional research is necessary to develop interventions to affect staff behavior and youth outcomes.

#### 19. UNDERSTANDING PREDICTORS OF GLUTEN-FREE DIETARY ADHERENCE AND PHYSICAL ACTIVITY: AN ORGANISMIC INTEGRATION THEORY APPROACH

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The objective of the present study was to examine behavioural regulations for gluten-free dietary adherence and PA consistent with Organismic Integration Theory (OIT; Deci & Ryan, 2002). Those currently consuming a gluten-free diet (N = 202; Mage = 42.35; SDage = 12.43) were asked to complete a series of online questionnaires on a single occasion. Overall, 72.3% of the sample adhered to a strict gluten-free diet across the previous 7 days. Participant PA scores were higher than normative values (p = .00; Godin & Shephard, 1985; Wilson et al., 2010). Behavioural regulations consistent with OIT to consume a gluten-free diet predicted 5% ( $\eta^2 = .08$ ) of adherence with integrated ( $\beta = -.32$ ) and identified ( $\beta = .30$ ) regulations emerging as significant predictors. Intrinsic and identified regulations ( $\beta_s = .28$ ) were found to be significant predictors of PA scores with the overall model accounting for 31% ( $\eta^2 = .33$ ) of the variance. Understanding predictors of gluten-free dietary adherence and PA are essential to the overall health for those living with a gluten-related disorder. These findings add to the existing literature, provide practical applications and offer insight into future directions for health-based researchers.

#### 20. EXPLORING THE BENEFITS OF CHILDREN'S ACTIVE PLAY IMAGERY

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The first purpose of the current study was to examine the relationship between children's active play imagery and two developmental outcomes, personal/social skills and cognitive skills. The second purpose was to examine the relationship between children's active play imagery and self-confidence in active play. A total of 105 male and female children (Mage = 9.84, SD = 1.41) were recruited from various summer programs, and completed inventories that assessed their active play imagery (i.e., capability, social, and fun), positive personal development (i.e., personal/social skills and cognitive skills), and self-confidence. Examination of the scales' psychometric properties indicated poor reliability for the cognitive skills subscale; therefore it was excluded from further analysis. Multiple regression analysis revealed that all three active play imagery types (capability, social, fun) were positively and significantly related to personal/social skills, accounting for 26% of the variance. Specifically, capability imagery and social imagery emerged as the strongest individual predictors of personal/social skills. Further, regression analysis showed that both capability imagery and fun imagery were positively and significantly associated with self-confidence, accounting for 18% of the variance. In particular, fun imagery was found to be the strongest individual predictor of self-confidence. This study highlights the usefulness of imagery in fostering important developmental outcomes and self-confidence among children. To this end, child practitioners should consider implementing imagery workshops in school, clinical, and community settings.

## 21. EXPLORING HORSEBACK RIDING AS A MEANS TO BUILD PHYSICAL COMPETENCE AMONG ADOLESCENT GIRLS

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Horseback riding is a novel, physically-based intervention that deemphasizes physical appearance and focuses on overall enjoyment. While evidence supports the effectiveness of riding in improving self-esteem and confidence in a number of special populations, there is little research into whether riding can help to improve the physical self-perceptions of adolescent girls. **PURPOSE:** The purpose was to explore the use of horseback riding to enhance physical competence in adolescent girls. **METHODS:** Participants included adolescent girls (N=3; Mage=13) engaged in a 12-week riding program, their parents (N=3), and their riding instructors (N=2). The girls and their parents completed pre- and post-program qualitative semi-structured self-reports while riding instructors completed post-program questionnaires. All measures explored the girls' riding experiences and how they related to their perceptions of physical competence, body image and self-efficacy. **RESULTS:** Thematic analysis was used and the child and parent reports were examined for convergent and divergent themes and then triangulated with the riding instructors' responses. All three sources highlighted an increased level of physical skill and confidence among the participants post program; this was directly related to positive experiences with the horse. While the girls' felt their physical skills had improved, the parents and riding instructors spoke to an improvement in self-confidence among the girls. Other notable themes were openness to new experiences, fun, and formation of new bonds. **CONCLUSION:** These findings provide initial evidence that horseback riding can help adolescent girls develop physical competence through mastery experiences, eliciting positive changes in confidence and body image.

**Acknowledgements:** This study was done in collaboration and with the help of the Free Spirit Therapeutic Riding Association

## 22. REEXAMINING THE IMAGERY AND EXERCISE DEPENDENCE RELATIONSHIP

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The benefits of regular exercise participation are well known, however, in more extreme cases, exercisers can become dependent, where exercisers feel compelled to continue despite physical injuries or psychological harm (Hausenblas & Symons-Downs, 2002a). One cognitive correlate of exercise dependence is exercise imagery. Previous research has assessed imagery using only three types of imagery and exercise dependence as a global construct. Assessing the five types of exercise imagery and their relationship with the individual exercise dependence symptoms would expand what we know about exercise dependence but also inform interventions to address exercise dependence. As such, the purpose of this study was to examine the relationship between imagery and exercise dependence using more comprehensive measures of both constructs. Participants included 339 male and female adults that completed measures of exercise dependence and imagery. Participants completed the Imagery Inventory – Revised (Giacobbi et al., 2010) and the Exercise Dependence Scale (Hausenblas & Symons-Downs, 2002). Results indicate that certain types of imagery are related to different exercise dependence symptoms. Appearance and health imagery are associated with more tolerance, reduction in other activities, and lack of control symptoms. Routines imagery is positively associated with intention effects, whereas technique imagery is negatively associated with intentions effects. Feelings imagery was associated with more withdrawal symptoms of exercise dependence. The

patterns of exercise imagery use may have important implications for interventions aimed at reducing/preventing exercise dependence.

### 23. ADOLESCENTS' PERCEIVED BARRIERS TO PHYSICAL ACTIVITY: ASSOCIATIONS WITH CURRENT AND FUTURE PHYSICAL ACTIVITY

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Due to high levels of physical inactivity during adolescence, it is essential to identify factors inhibiting adolescents' physical activity (PA) participation. While perceived PA barriers have been found to inhibit PA in previous research, an unresolved issue is whether specific types of PA barriers (i.e., internal, external) or PA barriers globally (i.e., a composite score of internal and external) better explain variations in adolescents' PA participation. Thus, we used a bi-factor model to examine whether internal and external PA barriers were uniquely associated with PA concurrently and 4 months later beyond global PA barriers. Adolescents (N=615; 12-15 years) participating in the MATCH study completed self-report questionnaires the Fall (T1) and Winter (T2) of 2014. Results from a bi-factor structural model indicated that the data were a good fit to the model ( $\chi^2(107)=203.33, p<.05, CFI=.99, RMSEA=.04, 90\%CI[0.03, 0.05], R^2=.37$ ). Controlling for age and sex, internal barriers ( $\beta=-.30, p<.05$ ) were negatively related to concurrent PA, over and above global barriers ( $\beta=-.25, p<.05$ ). PA at T1 was positively related to PA at T2 ( $\beta=.57, p<.05$ ). Bootstrapping procedures testing indirect associations revealed that internal ( $\beta=-.31, 95\%BcCI=-.53, -.14$ ) and global barriers ( $\beta=-.26, 95\%BcCI=-0.39, -.12$ ) were negatively related to PA at T2 indirectly through PA at T1. Findings suggest specific types and global barriers uniquely explained variance in adolescents' PA participation. Thus, specific types of PA barriers (i.e., internal, external) are important to consider alongside global PA barriers in interventions and future research.

Acknowledgements: The MATCH study is supported by the New Brunswick Health Research Foundation (#20130729) and by the Social Sciences and Humanities Research Council and Sport Canada through the joint Sport Participation Research Initiative (#862-2010-0001).

### 24. THE ROLE OF PSYCHOSOCIAL CORRELATES IN THE RELATIONSHIP BETWEEN BIOLOGICAL MATURATION AND PHYSICAL ACTIVITY AMONG KOREAN ADOLESCENT GIRLS.

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**Objectives.** To examine whether body fatness (i.e., body mass index and % body fat) and psychosocial correlates of physical activity (PA) mediate the relationships between biological maturation and PA and sedentary behaviour among Korean adolescent girls. **Methods.** Pubertal status, body fatness, sport competence, perceived barriers to PA, parental support, self-efficacy, PA, and sedentary behaviour were assessed among 236 Korean adolescent girls (mean age =  $13.56 \pm .08$  years). **Results.** A direct association was identified in all models between pubertal status and PA; more advanced pubertal status predicted lower PA among Korean adolescents ( $b = -.51 \sim -.57; p < .000$ ). Indirect effects on the pubertal timing-PA relationship were also found; body fatness, perceived barriers to PA, paternal and maternal support, and self-efficacy mediated the relationship between pubertal timing and PA. No relationship was found between pubertal timing and sedentary behaviour. **Conclusion.** This study found direct effects of body fatness, and psychosocial correlates of PA on the relationship

between pubertal status and PA among Korean adolescent girls. These results build on the current existing literature pertaining to the possible pathways between biological maturation and PA among adolescent girls.

25. UNDERSTANDING THE EFFECTS OF MESSAGE FRAMING ON PHYSICAL ACTIVITY ACTION PLANNING: A PRELIMINARY LOOK AT THE ROLE OF RISK PERCEPTION AS A MODERATOR.

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Action planning (AP) is a strategy for increasing physical activity. Persuasive messages could be useful in promoting AP and optimally framed messages could maximize effectiveness. Research suggests that message framing (i.e., presenting messages either in terms of benefits or costs associated with the behaviour), may be only minimally effective in promoting AP. However, researchers have overlooked the possible moderating role of individuals' risk perceptions regarding AP. The purpose of this study was to examine risk perception as a moderator of the effect of framed messages on AP. Preliminary data were gathered online from 88 inactive adults who read either a gain- or loss-framed AP message. Data were collected regarding perceived risks of AP (pre-message) and AP (post-message). Logistic regression analyses were conducted to examine perceived risk of AP as a moderator of framed messaging effects on AP. A medium to large interaction effect between the message frame and risk perception (emotional risk) approached significance [OR = 3.442, 95% confidence intervals (CI): 0.927, 12.778]. Post hoc analyses indicated that individuals with greater emotional risk perceptions (e.g., worried they could not stick to their plan) were 1.95 (95% CI: 0.718, 5.294) times more likely to AP when presented a gain-framed message. Individuals presented with the loss-framed message decreased their likelihood of AP when their emotional risk increased [OR = 0.563, 95% CI: 0.238, 1.331]. This study provides preliminary evidence that perceived risk may moderate the effect of framed messages on AP. Data are being collected from a larger sample to further explore this hypothesis.

26. RECEPTIVITY OF ADULTS WITH A SPINAL CORD INJURY TOWARDS VIDEOCONFERENCE-DELIVERED PHYSICAL ACTIVITY PEER SUPPORT PROGRAMS

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Background: Internet-based communication platforms (ICPs) provide a convenient and cost-effective medium for facilitating physical activity (PA) support. These resources can overcome time and space barriers reported by individuals with a spinal cord injury (SCI). Objective: To understand level of participation and receptivity towards videoconference-delivered PA peer support programs (VPAS) among PA intenders and actors living with a SCI. Methods: Participants (N=30; Mage = 45.27 ± 10.63 years; Myears post-injury = 20.50 ± 12.30 years; 73.3% male; 50% tetraplegia; 20% PA actors) completed an online questionnaire to assess: 1) general participation in ICPs; 2) attitudes towards using ICPs; and 3) preferences, barriers and needs about participating in VPAS groups. Descriptive statistics, independent t-tests and chi-square tests were used for analysis. Results: Email messaging was the most commonly used ICP (96.7%); videoconferencing was ranked fourth highest (50%). ICPs were perceived as somewhat (50%) or completely (33.3%) valuable and enjoyable. Frequently selected appealing and unappealing ICP attributes were real-time communication (63.3%) and lack of personal connection (46.7%), respectively. The majority (60%) of the sample reported interest in a VPAS

program. Most participants preferred the support group to include peers with similar PA goals (73.3%) and injury level (66.7%). No differences were found for sample demographics (e.g., injury level) on any videoconference platform preferences. Conclusion: Videoconferencing appears to be a potentially appealing approach for engaging in PA support among intenders and actors living with a SCI. The confirmation of receptivity is a key first step prior to a VPAS intervention.

27. EXAMINING THE CROSS-LAGGED RELATIONSHIP BETWEEN DIFFERENT TYPES OF SELF-EFFICACIES AND PHYSICAL ACTIVITY IN CARDIAC REHABILITATION PATIENTS: A LONGITUDINAL STUDY

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Physical activity (PA) is at the core of cardiac rehabilitation. Therefore, it is important to identify factors that contribute to the adoption and maintenance of PA in this setting. Different types of self-efficacy are hypothesized to be important at different phases of the behaviour change process such that task self-efficacy might have more prominence in PA adoption while self-regulatory types (e.g. barrier self-efficacy) more importance for maintenance. In addition, self-efficacy is theorized as an antecedent and an outcome of behaviour. The purpose of this study was to examine, through a longitudinal cross-lagged analysis, the relationship between three different types of self-efficacy (task, barrier and scheduling) and PA over six months. We hoped to shed light on the antecedent-outcome relationship between self-efficacy and PA. Participants (N =129) from two 4-month cardiac rehabilitation programs answered self-efficacy questionnaires and the Godin leisure time exercise questionnaire at four time points (Baseline, 2, 4 and 6 months). Three separate cross-lagged path analyses were conducted for each type of self-efficacy. For task self-efficacy, PA at baseline predicted task self-efficacy at 2-months,  $\beta = .186$  [95% confidence intervals(CI): .050, 0.33], and PA at 4-months predicted task self-efficacy at 6-months,  $\beta = .228$  (95% CI: 0.097, 0.24). Only PA at baseline predicted barrier self-efficacy at 2-months,  $\beta = .204$  (95% CI: 0.067, 0.35). No other relationships were found.

Unfortunately, results from this study do not clarify the phase specific PA – self-efficacy relationship as no types of self-efficacy predicted PA. In addition, partial support for self-efficacy as an outcome of PA was found; however, further investigation is required.

Acknowledgements: The project was funded by the Social Science and Humanities Research Council of Canada.

28. INVESTIGATING THE EFFECTS OF A SINGLE BOUT OF AEROBIC EXERCISE ON LONG-TERM MEMORY IN YOUNGER ADULTS

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Individuals who are more physically active tend to have better academic performance. Although the underlying mechanism is unclear, physical activity may improve academic performance by acutely activating the stress system: an acute stress response increases plasma cortisol levels, which increases memory consolidation for newly learned information. Thus, information learned immediately post exercise would be preferentially remembered. To test this, 55 participants viewed a video lecture before exercise, after exercise, or after rest. The exercise consisted of high intensity interval training on a cycle ergometer and their memory for the lecture material was assessed by a multiple-choice quiz conducted 14 minutes and 48 hours after the lecture for immediate and delayed recall, respectively. Better memory performance was expected for the participants who viewed the lecture after exercise



compared to those who exercised after the lecture or did not exercise. Preliminary analysis found a significant correlation between baseline aerobic fitness, as determined by a maximal aerobic exercise test (VO<sub>2</sub>max) and grade point average [ $r(48) = 0.28, p < 0.05$ ], suggesting that individuals with higher aerobic fitness also have better academic performance. The exercise and control groups did not differ in immediate recall of the studied material; however, recall scores improved for the exercise groups and declined for the control group following the 48-hour delay [ $t(45) = -1.80, p = 0.08$ ]. The preliminary findings suggest that a single bout of aerobic exercise can acutely improve long-term memory performance in younger adults.

## 29. USING BAYESIAN STATISTICS TO INTERPRET NON-SIGNIFICANT FINDINGS FROM AN INTERVENTION AIMING TO PROMOTE PHYSICAL ACTIVITY TO PEOPLE WITH SPINAL CORD INJURY

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**Background:** Evaluations of physical activity interventions for persons with disabilities are often limited by small sample sizes, thereby lacking statistical power. In classical null-hypothesis testing, the absence of evidence of a significant effect (i.e.  $p > .05$ ) is not evidence for the absence of an effect (i.e. support for the null hypothesis). Bayesian statistics can aid in determining whether non-significant findings support the null hypothesis or indicate data are insensitive. **Purpose:** Demonstrate the utility of Bayesian statistics for interpreting non-significant findings using data from an intervention that aimed to promote physical activity to people with spinal cord injury. **Method:** 25 participants with a spinal cord injury (Mean age =  $41.36 \pm 11.52$ ) were randomized or allocated to an experimental or control condition. Physical activity cognitions were measured pre and post intervention. Apart from social support, significant differences were not detected between conditions ( $ps > .05$ ). Bayes factors were used to interpret non-significant findings. A Bayes factor is a ratio of likelihood and represents the strength of support for the alternative hypothesis (H<sub>1</sub>) relative to the null (H<sub>0</sub>). A Bayes factor  $> 3$  indicates support for H<sub>1</sub>, 0, and .33-3 insensitive data. **Results:** For all non-significant findings, Bayes factors were between .33-3. **Discussion:** Bayes factors did not indicate support for the absence of an intervention effect (i.e. the data are insensitive). Bayesian statistics helped to address limitations of classical statistics for interpreting non-significant results and indicated that further research examining the effectiveness of the intervention is warranted.

## 30. BODY-RELATED CORRELATES OF PHYSICAL ACTIVITY AND SEDENTARY BEHAVIOUR IN COLLEGE WOMEN

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Increasing evidence suggests that sedentary behaviour is associated with a variety of negative health consequences, and that physical activity cannot eliminate the effects of sedentary behavior (Temmel & Rhodes, 2013). Thus, it is important to investigate the correlates of sedentary behaviour. Body-related variables are consistently related to physical activity, with greater levels of physical activity associated with a more positive body image (Campbell & Hausenblas, 2009). **Purpose:** To investigate whether body-related variables could predict both physical activity and sedentary behaviour. **Methods:** Participants (157 college females) completed measures of physical activity, sedentary behaviour and several body-related variables. **Results:** Sedentary behaviour and physical activity were unrelated. Self-presentational efficacy, drive for muscularity, body dissatisfaction and self-objectification were

correlated with physical activity. Social physique anxiety and drive for muscularity were correlated to sedentary behaviour. Regression analysis demonstrated that self-presentational efficacy and drive for muscularity were significant predictors of physical activity (accounting for nearly 11% of the variance), while a combination of social physique anxiety and drive for muscularity predicted sedentary behaviour, with social physique anxiety accounting for a greater amount of the variance. Conclusion: This study supports the contention that physical activity and sedentary behaviour are distinct constructs. Therefore, the ways in which we promote physical activity should differ from the ways in which we discourage sedentary behaviour. Body-related variables appear to predict both physical activity and sedentary behaviour. Future directions may involve investigating why the drive for muscularity was the only variable related to both sedentary behaviour and physical activity.

### 31. OLDER PHYSICALLY ACTIVE WOMEN'S PERCEPTIONS AND EXPERIENCES OF BODY SELF-COMPASSION

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The physical realities of growing older such as grey hair, sagging skin, weight gain, and wrinkles negatively influence the body image and identities of older women (Hurd Clarke, 2010). As such, self-compassion (Neff, 2003) may assist older women in managing their aging body related experiences. A hermeneutic phenomenological analysis of a series of semi-structured interviews with 21 women (42 interviews) aged 65 to 94 was employed to investigate the lived experience of body image and self-compassion in later life. Findings revealed that women experienced a sense of freedom in late life, as they no longer felt pressure to appear feminine, which they equated with the ability to be sexually attractive to the male, masculine other. However, participants simultaneously expressed disappointment and frustration as they perceived to no longer be able to conform to the young, thin, and physically active cultural female ideal. This ambivalence fostered self-criticism, self-doubt, and feelings of isolation, often rendering self-compassion for the aging body difficult and idealistic. At the same time, some women perceived that their embodiment of self-compassion enabled them to manage the inevitable age-related physical and social declines. Others, however, perceived that being critical of their body's appearance and function kept them motivated to be physically and socially active. The participants resisted self-compassion as they feared it would render them complacent and act as a barrier to their ability to stave off the aging process. Findings will be considered in relation to the extant literature on aging, body image, physical activity, and self-compassion.

Acknowledgements: This research was supported by the Social Sciences and Humanities Research Council of Canada.

### 32. BARRIERS, STRATEGIES, AND INFORMATION SEEKING: PARENTS' SUPPORT ROLES AND PERSPECTIVES OF SUPPORTING CHILDREN'S PHYSICAL ACTIVITY

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Parents are often considered “gate-keepers” and critical facilitators of children's physical activity (PA) participation. The Theory of Planned Behaviour (TPB) suggests that the proximal determinant of behaviour is the intention to engage in the behaviour (Arjan, 1991). Parents' perceived behavioural control (PBC) is a key factor in determining the amount of support they provide for their children's PA (Rhodes et al., 2013) However, there is a paucity of research regarding a) specific barriers that limit parents' PBC and b) possible strategies to overcome such barriers. The purpose of this study was threefold; a) enhance the current understanding of parental support in relation to children's PA, b)

identify specific barriers to parental support and possible intervention strategies, and c) identify parents' preferred sources of communication for information regarding children's PA. An adapted Theory of Planned Behaviour (Rhodes et al., 2013) and the Comprehensive Model of Information Seeking (CMIS; Johnson et al., 1995) provided frameworks to explore the objectives. Qualitative methodologies (i.e., focus groups) were employed to examine parents' experiences and needs for supporting their children's PA. Participants (n=21) included parents of at least one child (5 to 11 years). Preliminary findings suggest that cost, time, safety, and parent motivation are key barriers impacting PBC. Strategies included parental/family involvement and "community parenting" as potentially effective interventions. Responses were varied regarding preferred sources of information (e.g., other parents, doctor, media). This research provided some initial insights on barriers and strategies for parental support for PA which could be used to inform future TPB-based interventions.

### 33. EXAMINING THE INTERACTION BETWEEN DESCRIPTIVE NORMS AND POSITIVE OUTCOME EXPECTATIONS ON STUDENTS' EXERCISE BEHAVIOUR OVER A FINAL EXAM PERIOD

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Focus theory of normative conduct (Cialdini et al., 1990) postulates that individuals are more likely to perform a behaviour if they perceive that a majority of others engage in that behaviour (descriptive norm; DN). However, norms only influence behaviour if the information is salient to the individual. While norms have been examined in exercise, little attention has been paid to salience. One potential method to enhance the salience of normative messages involves outlining the benefits of engaging in exercise (i.e., positive outcome expectations; Bandura, 1986). The purpose of this study was to examine the interaction between DNs and positive outcome expectations (OE) on exercise behaviour during a final exam period. Regularly active undergraduate students (N=74) were randomly assigned to receive one of four messages, which included both a DN (how many students reported being active; high=63% vs low=13%) and a positive OE (those who exercise during exams experience enhanced academic performance; high=90% vs low=10%). Activity during the exams was self-reported retrospectively (MAQ, Kriska et al., 1990). Results from a 2X2 ANCOVA, controlling for initial physical activity levels, revealed a significant interaction,  $F(1,64)=4.17$ ,  $p=.04$ . Post-hoc analyses indicated that when the DN was high, those who received a high positive OE reported greater exercise compared to those who received a low positive OE ( $p=.01$ , estimated Cohen's  $d=0.85$ ). In line with focus theory, exercise during the exam period was highest for those who received a message that many others had been active during previous exams, and the norm information had been made salient (high positive OE).

Acknowledgements: Social Sciences and Humanities Research Council of Canada

### 34. PERFECTIONISM, OPTIMISM, AND PESSIMISM AMONG INTERCOLLEGIATE FEMALE VARSITY ATHLETES.

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This study examined the degree to which perfectionistic strivings and perfectionistic concerns were related to dispositional optimism and pessimism following poor performances in sport among 99 female intercollegiate team-sport athletes (M age = 20.15 years, SD = 1.78). Perfectionistic strivings were measured with a composite score derived from the Personal Standards and Organization subscales of the Sport-MPS-2 (see Gotwals & Dunn, 2009). Perfectionistic concerns were measured with a composite score derived from the Concern Over Mistakes, Perceived Coach Pressure, Perceived

Parental Pressure, and Doubts About Actions subscales of the Sport-MPS-2 (see Gotwals & Dunn, 2009). Optimism and pessimism were measured with a sport-modified version of the Life Orientation Test-Revised (Scheier & Carver, 1994). All subscales had acceptable levels of internal consistency ( $\alpha > .83$ ). Bivariate correlations revealed that perfectionistic strivings were not significantly correlated to optimism or pessimism. In contrast, perfectionistic concerns were negatively correlated with optimism ( $r = -.32, p < .005$ ) and positively correlated with pessimism ( $r = .49, p < .005$ ). Results of sequential regression analyses indicated that perfectionistic strivings were positively related to optimism ( $\beta = .20, p < .05$ ) and negatively related to pessimism ( $\beta = .22, p < .05$ ) when the overlap with perfectionistic concerns was controlled. Results provide further support for the adaptive role that heightened perfectionistic strivings can play in sport when the overlap with perfectionistic concerns is controlled (see Gotwals, Stoeber, Dunn, & Stoll, 2012).

Acknowledgements: This research was supported by a grant from the Sport Science Association of Alberta.

### 35. INVESTIGATING YOUTH SPORT EXPERIENCES THROUGH PROJECT SCORE!

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Youth sport is often cited as an avenue to support the growth of positive youth. Coaches have been found to be the most influential adult in a young person's life after that of a parent however many coaches are unsure of how to create positive sport experiences for youth. A recurring theme in this line of research is the need to train coaches to deliberately deliver themes relating to positive youth development (PYD) consistently in youth sport programs. Project SCORE! ([www.projectscore.ca](http://www.projectscore.ca)) is a series of 10 lessons to help coaches integrate PYD into sport. The purpose of the current study was examine athlete experiences before and after the delivery of Project SCORE!. Four coaches delivered the program to their respective youth athletes (35 females; 13 males; Mage = 14.1) in the sports of hockey, volleyball, and rugby. The Youth Experiences Survey for Sport (YES-S; MacDonald et al., 2012) was administered. Results from the t-tests found significant differences in three of the five subscales (i.e., personal and social skills, goal setting, and initiative) through the use of Project SCORE!. These results have important implications related to coaching education and youth sport program delivery. Other implications and future research directions are discussed. Keywords: coaching, positive youth development, online resource

Acknowledgements: This project was supported by funding from the Social Sciences and Humanities Research Council (SSHRC) and the Sport Participation Research Initiative (SPRI)

### 36. FRIEND, FOE, OR BOTH? A RETROSPECTIVE EXPLORATION OF SIBLING RELATIONSHIPS IN ELITE YOUTH SPORT

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With the abundance of literature focusing on parental influence in sport, it is important to identify family dynamics that extend beyond parents to include siblings. Research indicates that siblings have the potential to influence social, behavioral, and cognitive development across various achievement domains (Brody, 1998). In this study, sibling influence was explored through semi-structured interviews with previously identified elite youth athletes (N=4) and their sibling who participated in the same sport (N=4). Using a grounded theory and retrospective approach, the purpose was to discover how siblings influence elite youth sport participation. After data analysis of the two groups,

two main categories emerged from the data: positive experiences participating in the same sport (e.g., growth of sibling relationship, development of understanding between siblings) and negative experiences participating in the same sport (e.g., sibling competition, emotional response). The participants' descriptions coincide with observational learning theory (Mischel, 1966) and both deidentification (Ansbacher & Ansbacher, 1956) and divergence processes (Darwin, 1859; Sulloway, 1996). The data adds to the probable sibling experiences proposed in the Developmental Model of Sport Participation (Fraser-Thomas, Strachan, & Jeffery-Tosoni, 2013) and provides insight and suggestions for athletes, parents, and coaches on how to best manage sibling relations in sport.

37. **CONSIDERING (DIS)ABILITY AND IMPAIRMENT ONSET WITHIN THE ATHLETIC IDENTITIES OF HIGH PERFORMANCE WOMEN PARALYMPIC ATHLETES**

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The terms “double discrimination” and “double disadvantage” have been used in previous research to describe the sport context for women athletes with impairments. Being a woman and experiencing a disability are often understood as incompatible with the role of athlete. Despite increasing numbers of women competing in high level parasport, there remains a significant research gap in understanding their experiences and how doing so may contribute to greater insights and opportunities to support their involvement in sport. Purpose: The primary purpose of this investigation was to examine the athletic identities of high performance women parasport athletes. Particular attention was paid to the role of disability and impairment onset within the development of these identities and the athletes' journeys into elite parasport. Method: Using qualitative description, 10 current and former Canadian women Paralympic athletes were interviewed in combination with the Athletic Identity Measurement Scale (Brewer et al., 1993). Results: Four themes were captured following a thematic analysis of the data. These included: (a) personal sacrifice, (b) possibilities, (c) control and conflict, and d) perceptions and relevance of disability. Conclusion: The findings highlight the absence of disability in participant's self-perceptions as athletes through their commitment to sport and high performance but its' overwhelming relevance in the perceptions of outsiders. Consideration of the ways in which perceptions of disability and impairment onset impact opportunities for girls and women with impairments to gain entry into parasport, are also discussed.

Acknowledgements: Sport Science Association of Alberta

38. **RELATIONSHIP BETWEEN IMAGERY USE AND TEAM COLLECTIVE EFFICACY OF ELITE ATHLETES IN NIGERIA**

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Studies exploring the prediction between imagery and efficacy in sport are on the increase and research evidence has indicated that the cognitive and motivational functions of imagery are important determinants of collective efficacy. This study investigated the relationship between Imagery use and team collective efficacy of athletes in Nigeria. Elite male and female (60) team sport athletes sampled from volleyball, basketball, handball, football and hockey (Mean age= 22yrs;Sd 3.45) completed the Sport Imagery Questionnaire and Team Sport Collective Efficacy Scale. Multiple regression model which was used for analysis revealed a significant joint contribution ( $P<0.05$ ) of the five imagery sub-scales on the teams' collective efficacy. Further results revealed that 56.3% of the variance of the

Imagery sub-scales was accounted for in the scores of team collective efficacy. Relatively, Cognitive general ( $\beta=.2.62$ ,  $P<0.05$ ) and cognitive specific ( $\beta=.643$ ,  $P<0.05$ ) imagery sub-scales made significant contributions to team sport collective efficacy than motivational specific, motivational general mastery and motivational general arousal respectively. Findings suggest that cognitive specific and cognitive general imagery sub-scales are potential techniques that can be used to enhance collective efficacy of the team athletes in order to produce the desired level of attainment in team success.

Acknowledgements: Support from the Oyo state sport council

#### 39. A SYSTEMATIC EXAMINATION OF THE GAIN- AND LOSS-FRAMED CONTENT OF EDUCATIONAL RESOURCES AIMED AT PREVENTING DOPING AMONG ADOLESCENT ATHLETES

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Doping is a worldwide problem with researchers reporting a prevalence of doping that ranges between 6% and 34% of elite athletes. Primary doping prevention initiatives exist, and their effectiveness may be enhanced with the use of framed messages. Given that abstaining from using performance-enhancing substances is a low risk behavior with relatively certain outcomes, researchers suggest that gain-framed messages might have an advantage in promoting this behaviour; however, the degree to which prevention messages include gain- and loss-framed messages is unknown. The purpose of this study was to systematically identify and evaluate available educational health messages aimed at preventing doping among adolescent athletes to determine the degree to which they include gain- and loss-framed content. We systematically searched the internet through Google, Yahoo, Bing, and specific accredited sport and doping-prevention agencies for doping-prevention resources such as brochures, posters, and videos, in print or online. Our search yielded 60 resources which were reviewed by two separate members of the research team for their loss-framed, gain-framed, and non-framed content. The vast majority of the content (88.40%) was non-framed and the remainder was primarily loss-framed (11.37%). The resources included almost no gain-framed content (0.23%) despite suggestions that gain-framed messages may be effective in this context. Our findings suggest a need to test gain-framed messages as an alternative to the traditional loss-framed doping prevention messages as a means to enhance the efficacy of doping prevention initiatives.

#### 40. COACH PERCEPTIONS OF THE IMPACT OF A MENTAL TRAINING PROGRAM IN PREPARING SPECIAL OLYMPICS ATHLETES FOR COMPETITION

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The development of sport expertise is a complex and multidimensional process. Although it is well established that physical practice will impact the development of expertise in an athlete, it is also known that it is not the only determining factor. Researchers have argued that combining physical practice with mental skills training will better prepare athletes for competition compared to physical practice alone. However, most research has focused on generic athletes, implying that the role of mental training in athletes with intellectual disabilities is currently under researched. Special Olympics Canada have provided mental training to their high performance athletes, however the effectiveness of the program has not been investigated. Therefore, the purpose of this study was to investigate coach perceptions of the effectiveness of a mental skills training program offered to Special Olympics athletes prior to attending the 2013 World Games. A total of 9 coaches (Mage = 48 years; Myears coaching = 18 years) participated in structured telephone interviews aimed at understanding the role of mental training in the development and performance of athletes. Interviews were recorded, transcribed,

and analyzed using NVivo. Overall, results suggest that providing athletes with a mental training workshop prior to the World Games had a positive effect on athlete experience and performance. However, participants identified various components of the program that require adaptation and suggested recommendations for improving the quality of training provided to athletes. Conclusions and recommendations will be discussed to determine how to best deliver the program to maximize athlete training.

Acknowledgements: Thank you to Special Olympics Canada for support

#### 41. EXPLORING VISUALLY AND HEARING PRECLUDED FREE THROW TRIALS AMONG ELITE BASKETBALL PLAYERS: A PRACTICAL TRAINING METHOD?

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A free throw often appears as one of the most basic elements in the game of basketball, however the sudden change of pace can present unique challenges at even the highest levels of play. The majority of basketball is comprised of open skills (reactionary), while the free throw is classified as a closed skill (initiated by shooter) (Williams et al., 2010, p. 336). The primary purpose of the current study was to explore the effects of a free throw training method that consisted of free throw trials without the use of vision or hearing among higher skilled and lower skilled free throw shooters, as defined by free throw percentage. This procedure had the aim of impacting and possibly shifting focus of attention by significantly reducing external factors. All participants came from varsity university and college level basketball programs and therefore were considered elite level players. Vision was removed during the shooting motion using occlusion goggles, however was restored while the ball was in midflight to provide knowledge of results. All auditory factors were significantly reduced using hearing protection earmuffs. Focus of attention and imagery were explored using an exit survey completed at the end of the study.

#### 42. COPING WITH THE CUT: ATHLETES' AND PARENTS' EXPERIENCES WITH DESELECTION IN COMPETITIVE YOUTH SPORT

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An understanding of how athletes and parents cope with being cut from youth sport may help to reduce some of the negative consequences associated with deselection. The overall purpose of the study was to examine competitive female adolescent athletes' and their parents' experiences of deselection from provincial sport teams. Three research questions were addressed: (1) How do athletes cope with being deselected? (2) What role do parents play in helping their daughters cope with being deselected? (3) How do parents themselves cope with the deselection process? Participants were 14 female adolescent athletes (M age=14.6 years, SD=1.3) who were deselected from provincial soccer, basketball, volleyball or hockey teams and 14 of their parents (9 mothers, 5 fathers; M age=45.0 years, SD=5.8). Data were collected through semi-structured interviews with these athlete-parent dyads and analyzed using interpretive phenomenological analysis (Smith, Flowers, & Larkin, 2009). Results revealed that athletes used a range of coping strategies to deal with the challenges of deselection. They lowered their expectations prior to the try-out, used positive self-talk, and talked to their parents. Some athletes practiced harder to 'prove the coaches wrong.' Parents helped athletes cope by 'consoling first, talking later.' They listened to their daughters, put things in perspective, and tried to rationalize decisions. Parents themselves coped by talking to other parents, their spouses, and seeking validation from others. These findings identify specific coping strategies athletes and parents use individually, and how athletes and parents work together to cope with deselection.

Acknowledgements: SSHRC Doctoral Fellowship, Sport Canada

#### 43. SELF-COMPASSION AND WOMEN ATHLETES' BODY APPRECIATION AND INTUITIVE EATING EXPERIENCES

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Research has suggested that self-compassion may be a resource to protect against emotionally difficult sporting experiences; however, it remains unclear if self-compassion can directly benefit athletes who are affected by body and eating attitudes. The purpose of this qualitative collective case study was to explore the role of self-compassion in women athletes' experiences of body appreciation and intuitive eating. Six women athletes between 18 and 24 years, who identified being self-compassionate, appreciating their bodies, eating intuitively, and currently competing in a variety of team and individual sports at either local or regional level participated in a semi-structured one-on-one interview. Across three themes self-compassion was shown to help the athletes (1) recognize the uniqueness of sport contexts, (2) promote compassionate awareness, and (3) set realistic standards and expectations for themselves. Further, the women in this study suggested that the mindfulness and self-kindness components of self-compassion were particularly relevant and important to body appreciation and intuitive eating in their sporting experiences. The novel findings of this study suggest that self-compassion may play a role in promoting positive sport experiences related to the body and eating attitudes and behaviour for women athletes. Building on this study and others, future research could explore the effectiveness of self-compassion training on women's body image and eating.

#### 44. POSITIONAL COMPETITION AND INTRA-TEAM CONFLICT IN UNIVERSITY TEAM-SPORT ATHLETES

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In elite sport, athletes often engage in positional competition (i.e., teammates vying for the same, limited playing time under the awareness of the coach; Harenberg et al., 2015). This competition is unique to elite sports; it is an ongoing, selective process that involves various team members (i.e., teammates in the same position, coaches). Anecdotal evidence suggests that positional competition might lead to conflict — defined as an interpersonal experience of negative emotional reactions to perceived disagreements and interference with the attainment of goals (Barki & Hartwick, 2004). From a research perspective, the relationship between these two multidimensional constructs has yet to be explored. As such, the current project sought to examine the relationship between positional competition and intra-team conflict in university team-sport athletes. A total of 102 Canadian Interuniversity Sport athletes (Mage = 20.77; SD = 2.07; n = 78 females) completed the Positional Competition in Team Sport Questionnaire (Harenberg et al., 2014) and the Group Conflict Questionnaire (Paradis et al., 2014). Pearson correlation coefficients were calculated to examine the relationships between the constructs. Significant negative relationships were found between task and social conflict, and three dimensions of positional competition (i.e., push by teammates, coach recognition, coach selection;  $r = -.19$  –  $r = -.37$ ). The findings indicate that higher perceptions of positional competition may in fact be related to lower perceptions of intra-team conflict. Contrary to traditional perspectives of competition being predominantly destructive, positional competition within



sport teams is a group process that may be constructive in nature. Limitations and future directions are discussed.

#### 45. PARENTS OF CHILDREN IN SPORTS' PERCEPTIONS OF CONCUSSION INJURY AND INTENTIONS TOWARDS PROTECTIVE BEHAVIOURS

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Parents are major contributors in preventing and managing concussion injury in their children. How parents' attitudes and perceptions of concussion influence the promotion of protective behaviour in their children is not well understood. This study assessed concussion-related attitudes and beliefs of parents with children registered in various sports using Leventhal's Common Sense Model of Health Representations. One hundred and twelve parents (73 females, 39 males, mean age 42.12±6.61 years) of children (mean child age 10.08±4.27 years, average 4.54±2.29 total sports, 1.66±1.02 contact sports) sampled from rugby, hockey, judo and swimming organizations completed a survey about their concussion perceptions and attitudes and intentions towards concussion-protective behaviours. Concussion risk was an accepted feature of sport participation by 40% of participants. Participants were reluctant to discourage their children from playing contact and competitive sports. Participants with concussion education exposure perceived concussion as more likely and serious. Parents whose children had experienced concussion saw concussion as more likely, had lower beliefs that protective measures would reduce concussion risk or that treatment would be effective in managing concussion. Severity and likelihood perceptions were positively related to worry but not directly related to intentions. Protective measure efficacy was positively related to intentions towards personal protective behaviours and limiting involvement in contact sports and negatively related to risk perceptions. Among this sample, concussion injury was a recognized feature of sport participation and concussion education and direct concussion experience differentiated concussion beliefs. Parents need clear information on concussion-protection measure efficacy to form accurate risk perception beliefs. Acknowledgements: Thanks to Millbrook Minor Hockey, Peterborough Rugby and the Trent Sport and Recreation Complex for their support of this project.

#### 46. HOW EXPECTED VERSUS ACTUAL ROLE EXPERIENCES RELATE TO PERCEPTIONS OF GROUP COHESION

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Many athletes experience a discrepancy between the roles they expect to fulfil and the roles they actually occupy. In the present study, we draw from advances underscoring met expectations theory to consider how expected versus actual role experiences influence athletes' perceptions of group cohesion. To do so, we applied polynomial regression with response surface methodology to disentangle the independent and joint contributions of initial role expectations and actual role experiences on perceptions of group cohesion. In total, 153 Canadian Interuniversity Sport athletes participated across two time points. Role expectations were assessed at the onset of the competitive season, actual role experiences were assessed near the end of the season, and cohesion was assessed at both time points. In all analyses we controlled for tenure, team performance, gender, and initial perceptions of group cohesion. As predicted, when athletes surpassed their task-oriented role expectations, they reported higher perceptions of task cohesion ( $p$ 's < .001). Further, when athletes surpassed their social involvement expectations, they reported higher perceptions across all four group cohesion dimensions ( $p$ 's < .05). Notably, these response surface patterns—pertaining to both task and social cohesion—were primarily driven by the positive influence of actual role experiences ( $p$ 's < .01),

as initial role expectations had a negligible influence on cohesion. Together, these results reveal the interplay between athletes' role experiences and their perception of the broader group environment. Efforts to improve team dynamics may benefit from focusing on improving the quality of role experiences, in conjunction with developing realistic role expectations.

Acknowledgements: Preparation of this manuscript was supported by the Social Sciences and Humanities Research Council of Canada (SSHRC) Joseph-Armand Bombardier Doctoral Canada Graduate Scholarship.

#### 47. THE BURDEN OF THE BALANCE: ACTION-RESEARCH EXAMINING THE STRESS EXPERIENCED BY STUDENT-ATHLETES AT ACADIA

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Reports indicate that university student-athletes are experiencing increased rates of stress. As a consequence, athletics departments have begun to consider and implement programs and services to help student-athletes cope with the demands placed on them. **PURPOSE** : The objective of this collaborative action-research was to examine factors contributing to student-athletes' stress and burnout in order to inform efforts to improve the student-athlete experience at Acadia University. **METHODS**: Using a cross-sectional design, student-athletes (N=81, Mage=20yrs) across six varsity teams completed measures assessing perceived stress, mental health, burnout, confidence, coping style, perceived pressure, and support, as well as measures examining the primary contributors to student-athletes' stress. **RESULTS**: Student-athletes identified coaches as the highest source of pressure, and parents as the strongest source of support. The three most frequently identified factors contributing to student-athletes' stress were schooling (95%), time pressures/not enough time (91%), and personal relationships (61%). Bivariate correlations revealed that higher perceived stress was related to worse mental health ( $r = -.70$ ), higher burnout ( $r = .55$ ), and lower confidence ( $r = -.53$ ). A MANOVA revealed sex differences in that female student-athletes reported significantly higher levels of stress, pressure, and burnout, as well as lower team inclusion, and slightly poorer mental health compared to male student-athletes (all  $ps < .005$ ). **CONCLUSION**: These preliminary findings highlight the impact balancing both academics and athletics has on student-athletes. Further they suggest that future initiatives aimed to improve the student-athlete experience should work to prepare student-athletes for their demanding schedules, focusing in particular on the concerns of female student-athletes.

#### 48. UNIVERSITY STUDENT-ATHLETES' EXPERIENCES OF FACILITATORS AND BARRIERS TO CONTRIBUTION

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University student-athletes' contributions in the form of volunteering, community involvement, and civic engagement have been the subject of recent research; however, findings have frequently contrasted each other. The prevalence of contrasting findings indicates a need for research examining the facilitators and barriers to university student-athlete contributions. To date, no studies have specifically examined the facilitators and barriers to contribution in this population. Thus, the purpose of this study was to explore the facilitators and barriers to university student-athletes' contributions. Individual semi-structured interviews were conducted with eight university student-athletes (two males, six females) from two Canadian universities between 18 and 21 years of age ( $M = 19.25$ ). Initial analysis of interview transcripts led to the identification of two qualitatively distinct profiles regarding how facilitators and barriers to contributions were experienced. Further investigation of

these differences resulted in the identification of two groups of participants who differed in their lived experiences of contributions marked primarily by age and contribution experiences. The two profiles were subsequently labelled as first-year student-athletes and sustained contributors. Although both profiles identified teammates, coaches, and athletics department staff as facilitators to their contribution, they differed in their descriptions of how contributions were facilitated. First-year student-athletes were more reliant than sustained contributors on having facilitators create contribution opportunities or directly invite them to contribute. The profiles also differed in regards to how time constraints were overcome. First-year student-athletes utilized less complex individual time-management strategies, while sustained contributors collaboratively made use of more advanced time-management strategies to optimize their time.

Acknowledgements: Funded by a SSHRC Joseph-Armand Bombardier Canada Graduate Scholarship (Masters)

#### 49. THE USE OF BEHAVIOUR CHANGE THEORIES AND TECHNIQUES IN COACH DEVELOPMENT PROGRAMMES: A SYSTEMATIC REVIEW

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Coaches have long been recognized as an important target for intervention in the context of athletes' physical and psychosocial development, injury prevention, and health promotion. While coach development programmes (CDPs) are an important means of changing coach behaviour to enhance such outcomes, little is known about the theoretical foundation and techniques used to design and implement effective programmes. Examining the use of behaviour change theories and techniques (BCTs) can aid in understanding and improving the design of CDPs. Therefore, the purpose of this study was to conduct a systematic review of CDPs, using PRISMA guidelines, to examine the use of behaviour change theories and techniques in programme design and implementation. Following the initial search and article screening, 24 CDPs met the criteria for inclusion. Data were extracted using the Theory Coding Scheme and Behaviour Change Technique Taxonomy (v 1). Only 6 CDPs were explicitly based on behaviour change theory; among these, no single theory or a combination of theories was used more than once. All 24 CDPs used at least one BCT (range = 1-9, M = 3.83, SD = 1.74), and a t-test revealed no significant difference in the number of BCTs used in theory-based and non-theory-based CDPs. Theoretical frameworks and techniques that have the potential to effectively change coach behaviours are not being used frequently or consistently in the design and implementation of CDPs. In order to design CDPs that change coach behaviours and facilitate positive outcomes, further research examining theoretical influences on coach behaviours is needed.

#### 50. DIFFERENCES IN SELF-EFFICACY AND PERFORMANCE AS A RESULT OF ATTENTIONAL FOCUS IN A CONTINUOUS RUNNING TASK

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Although self-efficacy and performance are typically studied as a relationship within continuous sport tasks (i.e., LaForge-MacKenzie & Sullivan, 2014a, 2014b), the complex and multifaceted nature of this relationship may result in differential effects of sociocognitive factors (e.g., attention) on self-efficacy and performance as separate constructs (Sitzmann & Yeo, 2013). The purpose of the study was to examine self-efficacy and performance separately under three conditions of attentional focus. Participants ran continuously on an indoor track for one kilometer in one of three conditions: internal-

focus (n = 51), external-focus (n = 50), and control (n = 49). Self-efficacy was assessed simultaneously as performance using a one-item measure every 200 meters. One-way ANOVAs revealed significant differences in running performance at the start ( $F(2, 147) = 3.86, p < .05$ ) and end of the task ( $F(2, 147) = 3.56, p < .05$ ). The control group ran faster than the internal-focus group at the start of the task and faster than the external-focus group at the end of the task. Self-efficacy showed significant differences late in the task [Self-Efficacy 4: ( $F(2, 147) = 3.21, p < .05$ ); Self-Efficacy 5: ( $F(2, 147) = 4.74, p < .05$ )], with the internal-focus condition having higher self-efficacy than the external-focus condition. These findings support suggestions that attention may shift throughout sport tasks (i.e., Schücker, Anheier, Hagemann, Strauss, & Völker, 2013), becoming increasingly internally focused as the intensity of continuous endurance tasks progress (i.e., Lima-Silva, Silva-Cavalcante, Pires, Bertuzzi, Oliveira, & Bishop, 2012). As such, an internal focus of attention may be beneficial to both self-efficacy and performance late in a running task.

Acknowledgements: This research was made possible by the Social Sciences and Humanities Research Council of Canada

## 51. WHAT A COACH WANTS: COACHES' USE OF ONLINE SPORT PSYCHOLOGY RESOURCES

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Despite the plethora of research on the effectiveness of psychological skills for enhancing sport performance, coaches feel that this knowledge is not easily accessible (Pope et al., in press). This study was designed to investigate this knowledge translation gap, with a focus on coaches' current and planned use of online sport psychology resources. In particular, we examined how coaches of children/youth athletes differed from coaches of adult athletes in their current and anticipated use of online sport psychology resources, and the website features they preferred. Participants (N = 253) included a heterogeneous sample that coached children/youth (n = 141) and adult (n = 109) athletes. The study findings from ANOVA tests indicated a significant difference in how often coaches of athletes of different ages currently obtain ( $F(1, 231) = 17.91, p < .001$ ) and anticipate obtaining ( $F(1, 248) = 5.07, p < .05$ ) information from existing online sport psychology resources, with children/youth coaches utilizing and intending to use these resources less frequently than adult coaches. Additionally, study findings indicated that of the various psychological skills, coaches of children/youth reported a significant greater desire to obtain information pertaining to motivation in comparison to coaches of adults. Other popular sport psychology skills amongst coaches of children/youth included; communication, team-building, focusing, goal-setting, and mental toughness. These findings provide support for the need to inform coaches (especially youth coaches) of the existence of credible online sport psychology resources. Furthermore, the study findings were used to help inform the development of an online sport psychology resource we are currently developing, in particular, the section designated for coaches of children and youth.

## 52. EVALUATING RELATIONSHIPS BETWEEN CANADIAN UNIVERSITY ATHLETES' PERCEPTIONS OF FULL RANGE LEADERSHIP COACHING BEHAVIOURS AND THEIR PERSONAL AND SOCIO-EMOTIONAL DEVELOPMENT

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Although university coaches claim to prioritize athletes' personal and socio-emotional development

(Flett et al., 2010), a lack of empirical research exists on the degree to which athletes' developmental outcomes are influenced by coaches. The purpose of this study was to examine relationships between coaches' full range leadership behaviours (Avolio & Bass, 2004) and university athletes' personal and socio-emotional development. A total of 605 Canadian university athletes (237 male, 368 female) completed the Multifactor Leadership Questionnaire (Avolio & Bass, 2004) and the Personal Development Scale for University Sport (Rathwell & Young, 2015). Using AMOS 21 software, we tested a structural model where coaching behaviours predicted seven developmental outcomes from sport. Results showed good model fit, CFI = .908, RMSEA = .040 (90% CI: .038-.041), and SRMR = .089. Structural path results indicated athletes' ratings for their coach's transformational leadership behaviours were positively related to their perceived development of identity (SE= .62), initiative (SE= .44), and contribution (SE= .21), and negatively related to experiences of negative leadership (SE= -.18). No relationships were found between athletes' ratings for their coach's transactional behaviours and developmental outcomes. Coaches' laissez faire behaviours had significant positive relationships with athletes' perceived development of initiative (SE= .27) and contribution (SE= .29), as well as their experiences of stress (SE= .32) and negative leadership (SE= .44). The current results provide support for the benefits of transformational coaching behaviours (Vella et al., 2013), and suggest that university sport may be a unique setting where laissez faire leadership can produce positive outcomes.

Acknowledgements: This research was supported by the Social Sciences and Humanities Research Council (SSHRC) through a Joseph Armand Bombardier Canada Graduate Scholarship awarded to the first author.

53. SOCIAL IDENTITY AND MORAL BEHAVIOUR IN COMPETITIVE YOUTH ICE HOCKEY  
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Past research has identified important links between the identity youth form through membership on school sport teams (i.e., social identity) and their moral behaviour toward teammates and opponents (Bruner et al., 2014). However, to date researchers have not examined these links in competitive sport or examined group- and individual-level effects separately. As such, the aim of the current study was to investigate the hierarchical effects of social identity on moral behaviour in competitive youth ice hockey. Male and female adolescent athletes (N=376) from 28 competitive youth ice hockey teams completed measures of social identity (i.e., ingroup ties, cognitive centrality, ingroup affect; Bruner et al., 2014) and moral behaviour in sport (i.e., prosocial teammate behaviour, prosocial opponent behaviour, antisocial teammate behaviour, antisocial opponent behaviour; Kavussanu & Boardley, 2009). Multilevel analyses demonstrated: (a) at the individual level perceptions of ingroup ties and ingroup affect negatively predicted antisocial behaviour towards teammates, (b) at the group level ingroup affect positively predicted greater prosocial behaviour towards teammates and negatively predicted antisocial behaviour toward teammates and opponents, and (c) at the group level ingroup ties negatively predicted prosocial behaviour towards opponents and positively predicted antisocial behaviour towards teammates and opponents. The findings extend past research by investigating the hierarchical effects of social identity on moral behaviour in competitive sport.

Acknowledgements: This research was supported by a Social Sciences and Humanities Research Council of Canada (SSHRC) Insight Development Grant (430-2013-000950).

54. THE EFFECTS OF A SEASON-LONG IMAGERY INTERVENTION ON CURLING PERFORMANCE: A MIXED-METHODS EVALUATION

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The purpose of this study was to conduct an imagery intervention that spanned an entire competitive curling season. A junior women's curling team, consisting of four members (Mage = 17.50, SD = 1.00), participated in the study. Semi-structured interviews were conducted at the start and end of the team's competitive curling season based on Munroe and colleagues' (2000) 4Ws of imagery use to determine how the athletes used imagery in curling and how it changed following the intervention. Athletes practiced audio-recorded imagery scripts throughout the season that were developed in collaboration with the team's coach to match the team's changing needs. Statistical examination of athletes' imagery use scores revealed that the use of cognitive general imagery and motivational general-mastery imagery increased from pre- to post-intervention ( $p < .05$ ). At pre-intervention, athletes reported using imagery for all five functions, with cognitive general imagery and cognitive specific imagery being mentioned most often. At post-intervention, athletes reported using only four imagery functions, with cognitive specific imagery and motivational general-mastery imagery being mentioned most often. Athletes also discussed using imagery more frequently as a result of the intervention, as well as being able to identify their preferences (e.g., modalities and perspectives) when it came to using imagery. Based on the quantitative and qualitative results, athletes learned to target their imagery use to their specific needs throughout the intervention, compared to using it more generally at the start of the season. This has important implications for applied practitioners who are working with high-level athletes.

Acknowledgements: Research support provided by the Social Sciences and Humanities Research Council.

55. DOES SOCIAL IDENTITY PREDICT COGNITIONS, INTENTIONS, AND BEHAVIOURS IN YOUTH ATHLETES?

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Identity derived from group membership is termed social identity (SI; Tajfel & Turner, 1979), and is often conceptualized as involving three components: in-group ties (feelings of closeness and belonging), cognitive centrality (importance of membership), and in-group affect (feelings associated with membership; Cameron, 2004). Preliminary research in youth sport has demonstrated that the degree to which adolescents identify with their teams can influence both cognitions (e.g., perceptions of cohesion) and behaviours (e.g., pro- and anti-social behaviour; Bruner et al., 2014). In the current study, we sought to extend this literature by determining its predictability for cognitions (e.g., self-worth), intentions (e.g., commitment), and behaviours (e.g., effort) in youth athletes. In total, 303 athletes (Mage = 14.89, SD = 1.77; 133 females) from 26 interdependent sport teams (e.g., football, rugby, basketball, baseball, volleyball) completed questionnaires at two time points (T1 – social identity; T2 – self-worth, commitment, effort) during their athletic season. Multilevel analyses indicated that at level one (i.e., individual level), in-group ties predicted perceived effort ( $b = 0.14$ ,  $p = .01$ ) and commitment ( $b = 0.14$ ,  $p < .001$ ), whereas in-group affect predicted commitment ( $b = 0.25$ ,  $p = .001$ ) and self-worth ( $b = 0.96$ ,  $p = .04$ ). At level two (i.e., team level), team means for in-group ties

predicted commitment ( $b = 0.32, p < .001$ ) and self-worth ( $b = 2.40, p = .03$ ). Social identity accounted for an overall variance of 3% for self-worth, 4% for effort, and 15% for commitment. Results indicate the influential role that identifying with a team can have on individual cognitions, intentions, and behaviours.

Acknowledgements: Funding from the Alberta Centre for Child, Family, and Community Research

#### 56. COHESION AS A MEDIATOR BETWEEN FRIENDSHIP QUALITY AND ENJOYMENT AND INTENTIONS TO RETURN IN A CHILD SPORT POPULATION

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Motives for sport participation and adherence often involve friendships and affiliation (e.g., Ewing & Seedelft, 1996), and the quality of these relations is associated with enriched sport experiences (e.g., Weiss & Smith, 2002). Cohesion is a construct that is closely related to friendship, and has received recent attention in children's sport (e.g., Donkers et al., 2015). Whereas cohesion has often been used as a representation of friendship and togetherness, an important prerequisite to the benefits derived from a cohesive team may actually be quality relationships. As such, the current project sought to determine whether perceptions of cohesion mediated the relationship between friendship quality and enjoyment and intentions to return in a child sport setting. A prospective observational design was employed, whereby 92 children (Mage = 9.39 years; SD = 0.57) participating in a recreational minor hockey league completed questionnaires at two time points (T1– friendship quality, T2– cohesion, enjoyment, intention to return) during their athletic season. Overall, the R<sup>2</sup> values for the combined effects ranged from 14% (intentions to return) to 32% (enjoyment), and with regard to the indirect effects, social cohesion mediated the relationship between friendship quality and enjoyment ( $b = 0.11, p = .05$ ), whereas task cohesion mediated relationships with both enjoyment ( $b = 0.18, p = .004$ ) and intentions to return ( $b = 0.20, p = .03$ ). These findings suggest that a cohesive environment could facilitate important affective responses or motives for continuation in child sport participants that are derived from team member relations.

Acknowledgements: Funding provided by the Social Sciences and Humanities Research Council (SSHRC)

#### 57. CONCEPTUALIZING AFFECTIVE AND EMOTIONAL RESPONSES TO INCLUSION AND EXCLUSION: THE CASE OF SUBGROUPS IN SPORT TEAMS

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Feeling included is essential for achieving core social motives such as self-esteem (Fiske 2004) and as such, individuals closely monitor their integration within groups. Although sport teams provide opportunities to experience inclusion, they may nevertheless be a context for teammates to exclude one another. The purpose of this presentation is to explore the affective and emotional responses associated with inclusion within (and exclusion from) subgroups of athletes who form close bonds within teams. First, we re-analyzed qualitative transcripts generated through recently published research involving 22 interuniversity athletes (Martin et al. 2015) and 21 elite level coaches (Martin et al., under review) who reflected on their experiences with subgroups in sport. Through targeted thematic analysis, several themes emerged which were then paired with existing literature (e.g., Williams, 2007) to conceptualize

affective and emotional experiences in relation to experiences with subgroups. Through this process, we formulated several postulates regarding responses to inclusion within, and exclusion from, subgroups in sport teams. Consistent with previous research (e.g., Allen & Hecht, 2004), positive affective responses emerged in descriptions of inclusion within subgroups. Individuals who felt excluded from subgroups, on the other hand, reported distinct emotions according to the situation and the individual. This corresponds with literature involving the diverse emotional reactions to exclusion (i.e., anger, guilt, and shame). This presentation will explore how these postulates may generate future research, with the intention of further understanding how to facilitate optimal experiences within sport teams.

#### 58. THE ROLE OF APPEARANCE-RELATED SELF-CONSCIOUS EMOTIONS IN SPORT PARTICIPATION AMONG ADOLESCENT GIRLS

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Despite well-documented benefits of sport participation in adolescence, girls are less likely to participate, commit to and enjoy sport compared to boys. Due to the highly evaluative social nature of sport, body-related self-conscious emotions may be important yet understudied predictors of sport participation outcomes. The purpose of this longitudinal study was to (i) assess changes in appearance-related self-conscious emotions (e.g., shame, envy and pride) and (ii) predict changes to sport commitment, enjoyment, and competitive anxiety outcomes across 1-year and two competitive seasons. Adolescent girls participating in organized sport ( $n = 215$ ;  $\text{Mage} = 14.15 \pm 1.36$  years,  $\text{MBMI} = 19.91 \pm 2.82$ ) reported significantly higher appearance-related shame and envy and significantly lower pride ( $p < .001$ ) in the follow-up competitive season. Changes in appearance-related shame ( $\beta = -0.21$ ) significantly predicted sport enjoyment ( $R^2_{\text{adj}} = 0.05$ ,  $p < 0.05$ ). Similarly changes in appearance-related shame ( $\beta = -0.31$ ) predicted changes in sport commitment ( $R^2_{\text{adj}} = 0.13$ ,  $p < 0.05$ ). Meanwhile, changes in appearance-related envy ( $\beta = 0.25$ ) significantly predicted competitive anxiety ( $R^2_{\text{adj}} = 0.20$ ,  $p < 0.05$ ). Based on these findings, appearance-related self-conscious emotions are associated with poorer sport outcomes longitudinally for girls engaged in sport. Strategies are needed to reduce negative and increase positive self-conscious emotions in hopes of fostering adaptive sport outcomes in adolescent girls.

#### 59. AN INTERPRETIVE ANALYSIS OF THE SOCIAL FUNCTIONS OF EMOTIONS IN SPORT

Katherine Tamminen<sup>1</sup>, Tess Palmateer (Presenter)<sup>1</sup>, Michael Denton<sup>1</sup>, Mark A. Eys<sup>2</sup>, Peter Crocker<sup>3</sup>, Catherine M. Sabiston<sup>1</sup>

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There is increasing attention to interpersonal aspects of emotions and emotion regulation in sport (Friesen et al., 2013; Tamminen & Gaudreau, 2014), yet researchers have rarely explored athletes' perceptions of the functions of emotions within team and group settings. The purpose of this research was to explore athletes' accounts of the social functions of emotions in sport. Team ( $n = 9$ ) and individual ( $n = 5$ ) sport varsity athletes (50% female, age range: 18-26 years) each participated in two semi-structured interviews. Interpretive data analysis consisted of coding, categorization, and thematic organization (Mayan, 2009). Athletes reported individual and communal stressors, which were distinguished by: (a) the extent to which the stressor affected the entire team; (b) the role of the athlete(s) affected by the stressor; and (c) the origin of the stressor (e.g., academic vs. sport). Athletes described experiences of individual, group-based, and collective emotions, and they also reported



emotional conflict when they simultaneously experienced individual and group-based or collective emotions. With respect to the social functions of emotions, participants indicated that emotional expressions impacted team functioning and performance, communicated team values, and served affiliative functions among teammates. Emotions also prompted communal coping to deal with stressors as a team. Athletes' emotional experiences, expressions, and communal coping were influenced by social relationships with teammates, and by leaders and coaches. Based on these findings, framed within a growing body of literature, emotions are not 'individual' phenomena. Rather, emotions occur within the context of interpersonal relationships, and emotions have social and performance consequences in sport.

#### 60. TRAINED MOVEMENT DIRECTION INFLUENCES REACH ADAPTATION INDEPENDENT OF PROPRIOCEPTIVE RECALIBRATION

Basel Zbib<sup>1</sup>, Mohammad Abu-Shabaan<sup>1</sup>, Kiarash Akhavan<sup>1</sup>, Erin K. Cressman<sup>1</sup>

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Reaching with rotated visual feedback of the hand leads to reach adaptation and shifts in felt hand position (i.e. proprioceptive recalibration). We have previously shown that proprioceptive recalibration generalizes across a greater area of the workspace than reach adaptation (Lombardo et al. 2014). In the current study we looked to determine if these different generalization patterns are dependent on the movement direction (i.e. vector) experienced during reach training. Subjects trained to reach to a single target with distorted hand-cursor feedback from one of two start positions (S1 = aligned with body midline and S2 = 21 cm to the right of S1). Cursor feedback was rotated 30° clockwise relative to subjects' actual hand position. Subsequently, subjects reached without visual feedback to (1) the same target; (2) the same target from the other start position; and (3) a novel target. Subjects also estimated their felt hand position after moving out from both start positions in order to determine the position at which they perceived their hand was aligned with the reach targets. Results indicated that proprioceptive recalibration generalized to a greater extent than reach adaptation regardless of the movement vector experienced during reach training trials. Interestingly, generalization patterns of reach adaptation differed depending on the trained start position such that subjects tended to move to similar goal locations experienced during training from S1 but not from S2. Together, these findings suggest that the movement vector experienced during training does not influence proprioceptive recalibration but changes the processes involved in reach adaptation.

Acknowledgements: This study was supported by NSERC.

#### 61. THE ELICITATION OF THE STARTLE REFLEX AND STARTREACT EFFECT VIA UPPER LIMB STRETCH PERTURBATIONS

Christopher J. Forgaard<sup>1</sup>, Ian M. Franks<sup>1</sup>, Dana Maslovat<sup>1</sup>, Nicolette J. Gowan<sup>1</sup>, Jonathan C. Kim<sup>1</sup>, Romeo Chua<sup>1</sup>

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Perturbations applied to the upper limbs can elicit multiple responses in the stretched muscle [e.g. short latency (M1:25-50ms) spinal reflex, longer-latency (M2:50-100ms) spinal/supra-spinal reflex, and voluntary response (>100ms)]. Recently, Ravichandran (2013) delivered limb perturbations simultaneous with an auditory go signal on a small proportion of unexpected RT trials. It was found that perturbations elicited a startle reflex that acted to trigger the voluntary response at significantly shortened latency (~70ms; StartReact effect), resulting in superimposition of the voluntary response onto M2. The present study examined the conditions under which limb perturbations might elicit a startle reflex and trigger the voluntary response. In Part 1, participants (N=8) performed in a RT wrist flexion task in response to an 80dB auditory stimulus or a small wrist perturbation (0.5Nm). On

unexpected (20%) trials we delivered a large (1.5Nm) wrist perturbation or a 120dB startling acoustic stimulus (SAS). While the SAS evoked a startle reflex on 93% of trials, reflexive startle activation was only observed on 13% of perturbation trials. In Part 2, participants performed a RT task in response to an expected 1.5Nm perturbation and no incidence of a startle reflex was observed; however, the perturbation still elicited the prepared response at short latency (<100ms). The findings of this study suggest that upper limb perturbations can trigger rapid voluntary responses that superimpose onto M2. However, while unexpected upper limb perturbations can also evoke a startle reflex it is unlikely that the voluntary response is triggered by the same circuitry responsible for the auditory StartReact effect. Supported by NSERC

62. TIMMY AND LASSIE (AND CLYDE?): JOINT ATTENTION EFFECTS WITH HUMANS, DOGS, AND ORANGUTANS

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Social cues, particularly eye gaze, have a strong influence upon people and the interaction between humans (joint attention). The purpose of this study was to explore whether the social cues that exist between humans regarding eye gaze and corresponding attention shifts (joint attention) persist when humans observe the gaze shifts of non-human animals. Participants (n=12) performed a localization reaction time task after observing the gaze shifts of three animals: human, dog and, orangutan. Each trial began with a face in a neutral position with the eye gaze directed forward. After presentation of the neutral position, the head rotated and eye gaze shifted to either the right or left. A target appeared on either the right or left side of the space 100, 300, 600, or 1000 ms after the gaze shift. Participants pressed a corresponding left or right key as soon as the target was detected. The analysis of reaction times revealed joint attention effects – reaction times to targets presented at the location of gaze were shorter than reaction times to targets opposite the location of gaze. Interestingly, there were no significant differences in patterns of joint attention across the different animal stimuli (p=0.493). The findings from this study suggest that joint attention can exist between humans and animals, specifically when humans observe the visual gaze of orangutans and dogs. These findings suggest that a dog's and an orangutan's visual gaze have the ability to shift a human's attention, thus allowing humans to engage in joint attention with non-human animals. Keywords: Joint Attention, SOA  
Acknowledgements: Joel Sartore Photography Inc.

63. ADVANCE INFORMATION SUPPRESSES CO-REPRESENTATION IN A JOINT RESPONSE-CUEING TASK

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The purpose of this study was to examine whether social co-representation (joint action) effects (Sebanz et al., 2003), extended to a shared-task situation where response-relevant information was provided in advance to co-actors. Participants performed a modified version of the 4-choice spatial response-cueing task (Miller, 1982) in which the target could appear in one of four response positions normally assigned to the index and middle fingers of the two hands. A precue indicated full, hand, finger, ambiguous, or no information. Participants completed the task in either a solo or joint (“social”) condition. In the solo condition, participants were assigned to respond to targets that appeared in one of the two positions assigned to them. In the social condition, participants were paired with a partner who was responsible for the remaining two positions. In this condition, precues also specified whether one or both partners had to engage on a given trial. In the solo condition, targets that appeared in the

two unassigned positions were difficult to ignore. This difficulty in ignoring unassigned targets could explain why solo performance more closely resembled performance in a situation where the solo participant performed the entire 4-choice task. In the social condition, the other targets were assigned to a partner, making them easier to ignore. This resulted in performance that resembled completion of just half the task. We propose that co-representation was suppressed in the social condition because participants could "loaf" as the co-actor was responsible for, and responded to, the targets in the unassigned positions.

Acknowledgements: This research was funded by NSERC.

#### 64. SPATIAL-RESPONSE DISCRIMINATION CAN ELICIT A JOINT SIMON EFFECT IN AN INDEPENDENT TASK CONTEXT: A BEHAVIOURAL AND EEG STUDY

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One explanation for the joint Simon effect (J-SE) is the co-representation account, which claims that one represents their own and the co-actor's action in a functionally equivalent way (Sebanz et al., 2003). Using the response-discrimination hypothesis (Ansorge & Wühr, 2004) as an alternative, we examined whether spatially discriminated responses could give rise to the J-SE. In addition to the joint Simon task (JA) we introduced two independent tasks in which the co-actor simply initiated each trial by pressing the opposite (JOK) or same response key (JSK) to their partner. We collected behavioural (RT) and EEG (P3) data to examine how action planning and inhibitory control were affected in a complementary vs. independent task setting in a joint ("social") context. RT results showed a J-SE in the JA and JOK tasks. P3 data suggested that in the JA and JOK tasks, there was less conflict when selecting a response compared to a solo (go/no-go) condition where there was no partner. We propose that in both the JA and JOK tasks, the to-be-ignored stimuli (which specified a spatially distinct, potential response) were treated differently in the joint context. In the JA task, less inhibitory control was required because one can "loaf" while their co-actor responded to the to-be ignored stimuli. In the JOK task, less inhibitory control was required because the co-actor performed an independent task. When performing the task alone, increased inhibition was required to withhold potential responses because there was no one to "pick up the slack."

Acknowledgements: This research was funded NSERC.

#### 65. UNTANGLING THE CAUSES OF INTERFERENCE DURING A RANDOM PRACTICE SCHEDULE

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Motor learning involves a series of neurophysiological processes, regrouped under the term "consolidation" (McGaugh, 2000), which take place between practice sessions and are crucial for skill retention (Lohse et al., 2014; Walker, 2005). To optimize consolidation, recent results suggest that motor skills should be practiced in isolation from one another (Borragán et al., 2015; Krakauer & Shadmehr, 2006). Previous results from our laboratory supported this suggestion by showing that a random practice schedule can lead to anterograde interference (Neville & Trempe, SCAPPS 2014). Because interference is believed to occur when two tasks compete for shared resources in the brain (Ray et al., 2013), we hypothesized that this result was caused by a competition in networks either involved in movement execution and/or in acquiring the cognitive representation of the sequences. To test these two possibilities, participants learned to produce as fast and accurately as possible a 5-element sequence of fingers movements. Using a random practice schedule, participants also either

typed random key presses ( $n = 12$ ) or observed a novice model practice a different sequence of fingers movements ( $n = 11$ ). When retention of the sequence was assessed 24 hours later, participants of both groups failed to demonstrate an increase in typing speed ( $p > .26$ ) or accuracy ( $p > .40$ ) compared to their performance the day before, a result similar to what we reported when participants physically practiced two distinct sequences alternatively. Thus, our results suggest that the anterograde interference resulting from random practice has a cognitive and a motor origin.

Acknowledgements: This work was funded by NSERC through an Undergraduate Student Research Award (KM Neville)

#### 66. TACTILE VS. VISUAL FEEDBACK IN GRASPING AND ESTIMATION: EQUIVALENT SIZE RESOLUTION IN THE FACE OF INCREASED NEUROMOTOR NOISE

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The present investigation sought to compare the resolution with which visual and tactile feedback systems regulate object size for grasping (i.e., action) and manual estimation (i.e., perceptual) tasks. For all trials, participants placed their right (i.e., grasping) limb on a start location positioned 200 mm to the right of their midline, while their left (i.e., non-grasping) supinated palm was positioned 200 mm to the left of their midline and in the same transverse plane as their grasping limb. For the visual modality, the target object was placed on a raised platform 780 mm above the non-grasping limb and participants were instructed to grasp or manually estimate the target while being provided continuous visual feedback. For the tactile modality, the target object was placed on the palm of the non-grasping limb, providing continuous tactile feedback, and participants were again instructed to grasp or manually estimate the target. Results for both modalities showed that peak grip aperture (i.e., grasping tasks) and grip aperture (i.e., manual estimation tasks) produced equivalent scaling to target size. In other words, mean aperture values elicited comparable size resolution for visual and tactile modalities. In contrast, grasping and manual estimation tasks in the tactile modality produced larger just-noticeable-difference (JND) scores than their visual modality counterparts. Indeed, such results provide evidence that the sensorimotor transformations underlying the integration of tactile feedback for action and perceptual processes are associated with greater neural noise than their visual counterparts.

Acknowledgements: Supported by the Natural Sciences and Engineering Research Council of Canada Discovery Grant

#### 67. THE MODERATING ROLE OF A CO-LEARNER WHEN CONCURRENTLY PRACTICING A BALANCE TASK

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Research has shown that conditions which promote effort or interference in practice aid long-term retention. Our aim was to test how practicing in a social context could potentially improve the learning of a balance task, by increasing the effort in practice. There is evidence that observing an actor interferes with concurrent action production (Kilner et al., 2003), and the actor's orientation moderates this effect (Sebanz & Shiffrar, 2007). We tested 8 pairs and an alone group ( $n = 8$ ), across 10, 60-s practice trials on two stability platforms. Pairs practiced front-facing or with one partner back-facing (4 pairs/group). Supporting previous work, observing a partner from the front or back was associated with more imitative (same direction) or compensatory (opposite) movements, respectively. While the front-facing group showed more error (and interference) in practice, all groups improved, and did not differ in retention. However, within the pair groups, those who observed a partner during practice

outperformed those who did not on a paired front-facing transfer test. While practice with a partner (and increased interference) did not aid retention, we did see modulations of performance in practice as a function of the partner's orientation. It may be that these types of balance tasks do not benefit from a more effortful mode of practice (promoting a more reactive, than automatic mode of control), or that more sensitive transfer tests are needed to see benefits associated with this more effortful type of practice.

Acknowledgements: This research was supported by a Discovery grant from NSERC.

#### 68. A PRELIMINARY INVESTIGATION OF RELATIVE AGE EFFECTS IN A PROSPECTIVE COHORT STUDY OF PRE-ADOLESCENTS

Kristy Smith<sup>1</sup>, Laura Chittle<sup>1</sup>, Jess Dixon<sup>1</sup>, Sean Horton<sup>1</sup>, Mathieu Bélanger<sup>2</sup>, Patricia Weir<sup>1</sup>

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The Relative Age Effect (RAE), whereby individuals born closer to a registration cut-off date are over-represented in sporting contexts, has been associated with negative experiences for those who are relatively younger (e.g., dropout, issues with self-worth). Given the potential benefits of organized sport and regular physical activity, it is important to identify factors contributing to the RAE to promote participation for all members within an age grouping. The purpose of this study was to investigate whether relatively older individuals were more likely to participate in organized, team, and individual sports, and in sports requiring a structured setting. Data from the first ten cycles of the MATCH study were used for this analysis. At baseline, MATCH recruited Grade five and six students (n = 843) from 17 elementary schools in New Brunswick, Canada. Participants self-report physical activity three times each year. Four generalized linear mixed models with binary logistic regression were conducted to compare likelihood of participating in any organized sports, team sports, individual sports, and sports within structured facilities across birth quartiles. In comparison to those born in the last two quartiles, those born in the first two quartiles of the year were more likely to report participation in organized sports, team sports, and sports within a structured facility (all  $p < .05$ ). There was no apparent RAE with regards to participation in individual sports. The results indicate that a RAE is present for sport participation in this cohort. Factors contributing to this trend need to be investigated.

Acknowledgements: The data used in this analysis were drawn from the Monitoring Activities of Teenagers to Comprehend their Habits (MATCH) project, which was funded by the Social Sciences and Humanities Research Council and Sport Canada through the joint Sport Participation Research Initiative and by the New Brunswick Health Research Foundation. Support was also received through a Social Sciences and Humanities Research Council Doctoral Fellowship (K. Smith).

#### 69. ADMINISTERING TESTOSTERONE AUGMENTS ENDOGENOUS, BUT NOT EXOGENOUS VISUAL ORIENTING OF ATTENTION IN MALES

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Visual orienting of attention in healthy human males was examined following the administration of testosterone (T). In males, T has been found to influence the dopaminergic system which has been found to change the efficiency of various cognitive functions such as stimulus identification and inhibition of response output. Similarly, high levels of Estrogen associated with a female's ovulatory phase have been linked to higher dopaminergic activity and then larger inhibition effects during

paradigms involving reflexive orienting of attention. Overall, individual differences in visual attention are potentially due to both distinct neural structures and variations in hormone levels. In this study, the influence of T on reflexive and volitional orienting of visual attention was investigated. Sixteen participants completed both an exogenous and an endogenous cueing task on two days of testing that were separated by two weeks. On each day, participants were administered either T or a placebo. The expected inhibition of return (IOR) was observed in the exogenous task,  $F(1, 15) = 39.05$ ,  $p < 0.001$ . However, T did not moderate IOR ( $p = 0.266$ ). Participants also demonstrated the expected cueing effects during the endogenous task,  $F(2, 30) = 25.5$ ,  $p < 0.001$ . However, following T administration, there was a much longer delay responding to a target after an invalid cue,  $F(2, 30) = 5.65$ ,  $p < 0.008$ . The results indicate that hormone levels can influence visual orienting of attention in a state specific manner. The data support the notion that individual differences in inhibitory control are dependent upon hormonal levels and/or neural-structural variation.

Acknowledgements: SH supported by CFI. JMC supported by NSERC.

#### 70. THE DISPLACEMENT BIASES ACCOMPANYING THE “VIOLATION OF FITTS’ LAW”

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Numerous studies have revealed that movement times to the last target of a placeholder array are shorter than predicted by Fitts’ Law. Glazebrook et al. (2015) suggested that this violation of Fitts’ Law occurs because of re-accelerations following an optimal planning procedure biased toward the first target. The present study examined the planning and control procedures associated with this violation via a detailed analysis of amplitude biases and corrective submovements throughout the movement trajectory. Sixteen participants executed fast-and-accurate aiming movements toward one of five possible target locations within a placeholder array. Movement times were shorter for targets 1 and 2 compared to targets 3, 4 and 5, which were not different from each other. Movement times to target 5 were shorter than those predicted by Fitts’ Law. This difference was due to the time after peak velocity. Although there was no difference in overall error between targets, participants overshoot the centre of the target more for target 5. This bias can be partly attributed to greater proportional amplitudes at peak velocity. Further, corrective submovements were observed on 89.3% of the trials, with a greater proportion of these submovements involving velocity zero-crossings (i.e., reversals), and fewer acceleration zero-crossings (i.e., secondary accelerations) for target 5. Overall our results indicate that, in the face of target uncertainty, participants biased their movement planning in favour of target 5 (i.e., highest index of difficulty movement). This notion is consistent with the idea that performers prepare for the worst-case scenario (Elliott et al., 2010).

Acknowledgements: This research was supported by the Natural Sciences and Engineering Research Council of Canada (NSERC).

#### 71. INVESTIGATING ATTENTIONAL FOCUS CUES IN MOTOR SKILL FEEDBACK

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Research has shown that adopting an external attentional focus (i.e. focusing on the movement outcome on an apparatus or implement) enhances motor learning and performance by increasing the effectiveness and efficiency of movements, when compared to adopting an internal attentional focus (i.e. focusing on produced body movements) (Wulf, 2007; Wulf, 2013). Given such empirical findings,

the recommendations are such that instructors/coaches should guide learners via an external focus; however, previous work has failed to determine which type of attentional focus coaches predominantly rely on. The purpose of this study was to examine the information content of verbal feedback provided during practices to motor skill learners, with respect to attentional focus. Participants included one wrestling coach and one soccer coach. Both coaches wore an audio-recording device during two 30-minute practice sessions. Sessions were transcribed, and then coded by labeling pertinent verbal feedback as an internal or external cue. Results revealed that the wrestling coach delivered more internal (81%) than external cues (19%), whereas the soccer coach provided more external (53%) than internal cues (47%). Interestingly, the soccer coach used 76% external cues during one session; however, only 22% external cues throughout the other. This difference may be due to the nature of the soccer practices. More external cues were used in a goalkeeper training session, while more internal cues were provided during a general team practice. This exploratory research will lead to a greater understanding of how coaches use verbal feedback cues, and may guide evidence-based practice recommendations to improve coaching.

## 72. HAPTIC ASSISTANCE IMPAIRS LEARNING: ERRORS ARE FAVORABLE FOR LEARNING

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While it is generally accepted that experiencing errors during practice can facilitate motor learning, there is much attention on the development of devices such as rehabilitation robots and virtual reality surgical trainers that physically guide the learner through errorless practice. Our purpose was to examine the effect of error during learning on retention and transfer of a skill learned with haptic guidance. Participants learned a tracing task using a Geomagic Touch, which is a desktop haptic interface that can exert precise forces to the user through its end effector. A target line was displayed on a computer screen and this line was traced with the device's stylus. There were two haptic feedback modes: assistance (pulling the cursor back towards target) and disturbance (pushing the cursor off target). Participants generated the tracing movements as fast as possible, or with a goal time of 25 seconds, resulting in 4 practice groups (assistance/fast; assistance/slow; disturbance/fast; disturbance/slow). Participants practiced for 100 trials. Following this there were immediate (10 minute) and delayed (24 hour) retention tests, and a delayed transfer to a new target. ANOVAs showed significantly more error during practice for the error disturbance and fast conditions. However, during immediate retention, delayed retention and transfer there was more error produced by the group that practiced with haptic assistance compared to haptic disturbance. These findings support the notion that error during practice leads to better learning, and should be considered in the design of haptics- and robot-assisted training protocols.

Acknowledgements: This work was supported by NSERC.

## 73. DANCE KEEPS US YOUNG: OLDER ADULTS WHO PARTICIPATE IN DANCE CLASS DO NOT DIFFER FROM YOUNG ADULTS IN TIMING

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Aging is associated with vast neuromuscular and sensorimotor changes that may manifest in motor performance deficits (i.e., slowness and an increased variability in movement). The current study used a newly developed Hand Selection Complexity Task (HSCT) to compare timing and accuracy in older adults (OAs: n = 12, Mage = 77.2, 11F) from a retirement home (R-OAs: n = 6, Mage = 79.3, 5F) and

dance class (D-OAs: n = 6, Mage = 75.0, 6F) to young adults (YAs: n = 20, Mage = 22.65, 12F) from the university community. HSCT gradients were displayed on a table in front of the participant in ipsilateral and contralateral space. Starting with hands at the midline, participants performed 10 reciprocal tapping movements between two targets as fast and accurately as possible. The gradient in contralateral space was completed first, where participants were free to select whichever hand felt most comfortable. Three conditions enabled manipulation of: (1) target amplitude, (2) target width, and (3) both target amplitude and width simultaneously. Within each condition, six levels of difficulty, determined using Fitts' Law, were randomly presented. Timing and accuracy were recorded. A main effect of age revealed that OAs took significantly longer to complete the task; however no differences in the number of errors emerged. Interestingly, when separated into two groups based on recruitment location, D-OAs did not differ from YAs; however, R-OAs were significantly slower than both YAs and D-OAs. Previous work has demonstrated that physical activity can help prevent cognitive decline. The current study provides preliminary evidence to extend the benefits of physical activity, such as dance, to preserve motor functioning.

Acknowledgements: The authors would like to acknowledge the Natural Sciences and Engineering Research Council (PJB) for funding.

#### 74. "INSIDE OUT:" THE ACTION-SPECIFIC EFFECT OF EXECUTION ON IMAGINATION OF CONTINUOUS AIMING MOVEMENTS

Emma Yoxon<sup>1</sup>, Sandra M. Pacione<sup>1</sup>, Afshin Aheadi<sup>1</sup>, Joo-Hyun Song<sup>2</sup>, Timothy N. Welsh<sup>3</sup>

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

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The main principle of ideomotor theory is that neural codes for action are closely associated with neural codes for perception. These kinds of associations are built through experience with a given action-effect pairing. In action imagination, conceiving of an action's effects can activate the neural code for that action and facilitate internal motor simulation. Recent work has supported this notion; a stronger association between action and effect codes, acquired through experience, produces imagined movement times (MTs) that are more similar to actual execution MTs. The purpose of the current study was to determine if this effect of experience transfers to movement contexts that are similar to, but are not actually the movement contexts that were experienced. To this end, participants imagined themselves executing a continuous tapping task before and after execution of the task. Critically, the indexes of difficulty (IDs) experienced were manipulated such that participants were asked to imagine movements at levels of difficulty they did not experience. The critical finding was that execution experience at IDs above and below (ID = 2, 4) those that were non-executed (ID = 3) lead to a decrease in imagined MTs closer to actual MTs, whereas experience at lower IDs (ID = 2, 3, 4) did not lead to a decrease in imaged MT for IDs that were beyond those experienced (ID = 5-6). This result can be accounted for by differences in movement patterns between movements at lower and higher IDs, suggesting that experience-based action-effect binding is specific to a given action.

Acknowledgements: This research was supported by grants from the Natural Sciences and Engineering Research Council and the Ontario Ministry of Research and Innovation.



**Saturday, October 17, 8 – 9:30 am**

**Symposium: Positive Youth Development; Saturday, October 17, 8 – 9:30 am**

**SYMPOSIUM OVERVIEW: ENVISIONING THE FUTURE OF POSITIVE YOUTH DEVELOPMENT RESEARCH IN SPORT**

Katherine A. Tamminen<sup>1</sup>

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

Research in sport situated under the broad umbrella of positive youth development (PYD) has blossomed in the past decade, leading to a vibrant and diverse body of work. This expansion has led to a number of empirical and theoretical contributions and has positioned sport as a valuable and unique context for PYD research. As with any burgeoning area of research though, we run the risk of re-inventing the wheel if we do not take the time to pause and appraise our strengths and weaknesses, in order to identify key areas of importance for the future of PYD research. As such, it is timely to reflect upon the current state of PYD research in sport, its contributions to the broader field of PYD research, and to pose critical questions for researchers to tackle as we move forward in the area. Two significant issues that will be considered in this symposium are: (a) what might we learn about PYD from research in various settings beyond traditional competitive sport contexts? and (b) what role do theories play in shaping the field of PYD research? This symposium brings together theoretical and empirical presentations by established and early career researchers to examine ‘where we are’ and ‘where we might go’ in the field of PYD research in sport.

**POSITIVE EXPERIENCES AND OUTCOMES IN YOUTH SPORT: TOWARDS A GLOBAL FRAMEWORK**

Jean Cote<sup>1</sup>

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

This talk will present a global vision for sport that incorporates the necessary elements for a developmentally sound approach to youth sport involvement. The literature around three basic elements of youth sport that change throughout development will be discussed: 1) personal engagement in activities, 2) quality relationships, and 3) appropriate settings. When these three elements are adapted for specific sport contexts they create an engaging and positive environment that, when repeated on a regular basis, leads to changes in the personal assets of the participants involved. Changes in participants’ personal assets, such as Competence, Confidence, Connection, and Character (i.e., the 4 Cs; Little, 1993), have long been associated with positive sport experiences leading to long-term outcomes, including continued participation and higher levels of performance and personal development through sport (i.e., the 3 Ps). The enhancement of personal assets (e.g. the 4 Cs) through sport does not, however, occur automatically and needs to be explicitly integrated in the activities, relationships, and settings in which sport takes place. Research that has examined the three basic elements of youth sport (activities, relationships, and settings) and its association to personal assets and long-term outcomes will be discussed as a way to conceptualize development in sport through time. This global framework will also be used to introduce the different topics of the symposium.

## A HOLISTIC UNDERSTANDING OF PYD IN SPORT: THE CONSIDERATION OF DEVELOPMENTAL CONTEXT AND TIME

Matthew Vierimaa<sup>1</sup>, Mark W. Bruner<sup>2</sup>, Jean Cote<sup>1</sup>

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

<sup>2</sup>Schulich School of Education, Nipissing University

Despite the flourishing body of literature on young athletes' personal development through sport, there remains a lack of consensus on how to conceptualize and measure positive youth development (PYD). Indeed, youth sport programs can vary considerably in terms of their goals, structure, and consequently, in youth's sport experiences. It can also be argued that youth sport programs can help to facilitate PYD in many different ways; for example, equivocal evidence exists supporting both the implicit and explicit approaches to the transfer of life skills learned in sport (Turnnidge, Hancock, & Côté, 2014). The diverse nature of youth sport therefore calls for a developmental context that conceptualizes PYD as the interaction of three key elements: personal engagement in activities, quality relationships, and appropriate settings. This presentation will focus on the consideration of developmental context across time by reviewing findings from four studies of a community youth basketball program of approximately 500 boys and girls aged 8-14. These studies incorporate both quantitative (e.g., systematic observation) and qualitative (e.g., ethnography) methodologies, and collectively suggest that the mechanisms through which PYD occurs is dependent on the nature of a given developmental context. In addition, the specific PYD outcomes resulting from sport participation can be conceptualized on multiple timescales, and are again contingent on the developmental context in which sport take place. These concepts will be situated within the Personal Assets Framework for Sport (Côté, Turnnidge, & Vierimaa, in press), and implications for future research and practice in youth sport will be presented.

## FACILITATING POSITIVE DEVELOPMENTAL EXPERIENCES FOR YOUTH AT A SUMMER SPORT CAMP

Victoria Povilaitis<sup>1</sup>, Katherine A. Tamminen<sup>1</sup>

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

Positive youth development (PYD) has been examined in various youth sport and camp contexts (Jones et al., 2011), however there is little research that has examined how leaders effectively deliver PYD experiences among youth in non-competitive sport contexts, such as at a residential summer sport camp. Furthermore, there is a lack of research examining the structure and organizational context which enables leader to deliver PYD experiences for youth. Using an instrumental case study methodology (Stake, 1995), 57 participants (15 counselors, 15 coaches, 16 senior campers, 8 counselors-in-training, and 3 management staff) participated in individual interviews and focus groups during one summer camp season. Interviews, observations, and training documents were analyzed using Bronfenbrenner's Process-Person-Context-Time model (Bronfenbrenner, 1999) and the NRCIM's 8 settings features framework (NRCIM, 2002). Results indicated that leaders provided campers with opportunities for positive growth experiences by appropriately structuring social interactions, modifying games and activities to include campers of all ages and physical/developmental abilities, and forming supportive relationships by making connections with individual campers and encouraging them to move outside their social and physical comfort zone at camp. Management supported leaders in delivering PYD experiences by emphasizing a 'staff as one team' philosophy, encouraging staff to act as role models for campers, and through continual staff training session over the summer. Results from this study provide insight into positive youth development practices in non-competitive sport contexts and may help to contribute to staff and coach

training in order to facilitate positive development experiences among youth.

## TYKES AND TIMBITS: EXPLORING OBJECTIVES AND OUTCOMES OF PRESCHOOLER SPORT

Jessica Fraser-Thomas<sup>1</sup>, Parissa Safai<sup>1</sup>

<sup>1</sup>School of Kinesiology and Health Science, York University

In recent years, there appears to be a trend towards children participating in sport at increasingly early ages, yet developmental outcomes of sport participation have been examined primarily among older children and adolescents (Fraser-Thomas et al., 2005). This study explored the perceived objectives and outcomes of preschooler sport. Eight childcare providers, 19 parents, and 57 preschoolers (aged 2-5 years) from three urban centres in southern Ontario engaged in interviews and focus groups, centered on their experiences with preschooler sport. Content analysis was inductive and deductive, guided by key concepts of the Developmental Model of Sport Participation (Côté & Fraser-Thomas, 2015) and the Long Term Athlete Development Model (LTAD, Canadian Sport for Life, 2015). Findings reflect perceived objectives and outcomes paralleling those of youth sport. Participants spoke most prominently about preschooler sport as a platform for psychosocial and life skill development (i.e., interpersonal skills, confidence, competence, being a team player, learning to win and lose), in addition to being a pathway to physical health and motor skill development; however, there was often little consensus on whether developmental outcomes were actually attained, and what the mechanisms and processes were within preschooler sport, which facilitated such development. For example, it was suggested that most preschoolers were unable to cognitively process complexities of cooperative play required to be a team player. We conclude that while preschooler sport may facilitate positive development, policies, programming, and coaching modifications are required to consistently assure beneficial outcomes, while considerable research is necessary to assess the effectiveness of programs moving forward.

## RELATIONAL DEVELOPMENTAL SYSTEMS AND PYD IN SPORT: A METATHEORETICAL PERSPECTIVE

Karl Erickson<sup>1</sup>

<sup>1</sup>Department of Kinesiology, Michigan State University

The study of PYD in sport has utilized a broad range of theoretical orientations and conceptual approaches. While this variety has generated a wealth of productive research, it has arguably resulted in a relatively fragmented field, one that is also generally divorced from the wider discipline of developmental science. This presentation will present the relational developmental systems (RDS: Lerner, 2006; Overton & Mueller, 2012) concept as a comprehensive metatheoretical understanding of the human development process and how it relates to youth sport research. RDS understandings of development involve the relational integration of multiple levels of organization, with a focus on plasticity and intra-individual change driven by mutually influential individual-context relations as developmental regulations through time. As such, individual-context relations represent the fundamental units of analysis in human development research, necessitating both multidisciplinary and change-sensitive methodologies. I will suggest that RDS represents an umbrella under which to integrate a diverse array of existing youth sport research toward a more cohesive phenomenological understanding, as well as an opportunity to drive future research. Further, I propose that an RDS-informed conceptualization of PYD in sport can potentially help better link our field's work with the wider discipline of developmental science while showing where we, as youth sport researchers, can and are actually leading the way on a number of fronts.

## DISCUSSANT: FUTURE DIRECTIONS FOR PYD THROUGH SPORT

Nicholas L. Holt<sup>1</sup>

<sup>1</sup>Faculty of Physical Education and Recreation

This talk will be a discussion of some of the key points from the previous presentations. Then, drawing on PYD research trends in the field of applied developmental science, I will discuss some critical future directions for PYD through sport. These will include the need for improved measurement approaches to capture the quality of sporting experiences and creation of longitudinal studies to assess PYD over time.

### **Free papers: Physical activity and Sedentary Behaviour; Saturday, October 17, 8 – 9:30 am**

## CHANGES IN PHYSICAL ACTIVITY, SCREEN TIME, AND HOURS SLEPT OVER THREE YEARS ARE INDEPENDENTLY RELATED TO QUALITY OF LIFE IN YOUTH

Katie Gunnell<sup>1</sup>, Jennifer Brunet<sup>2</sup>, Mathieu Bélanger<sup>3</sup>

<sup>1</sup>Healthy Active Living and Obesity Research Group, CHEO Research Institute

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

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Physical activity, screen time, and sleep each represent important targets for health interventions. However, physical activity alone may not mitigate the harmful effects of excessive screen time or lack of sleep and vice versa. The purpose of our study was to examine the independent and combined effects of physical activity, screen time, and hours slept in grades 5/6, as well as the effects of change in these behaviours across 3 years, on quality of life in grades 8/9. Participants (N=918, 9-12 years old in grades 5/6) from the MATCH study completed self-report questionnaires 10 times across a 3-year period. A growth model including paths from physical activity, screen time, and hours slept in grades 5/6 and changes in these behaviours over 3 years to quality of life, provided a good fit to the data ( $\chi^2(316)=803.76$ ,  $p<.05$ , CFI=.92, RMSEA=.04, 90%CI[0.04, 0.05],  $R^2=.20$ ). After controlling for sex, higher physical activity ( $\beta=.12$ ) and hours slept ( $\beta=.19$ ) and lower screen time ( $\beta=-.20$ ) in grades 5/6 were associated with better quality of life in grades 8/9 ( $p's<.05$ ). Increases in physical activity ( $\beta=.22$ ,  $p<.05$ ) and hours slept ( $\beta=.15$ ,  $p=.058$ ) and decreases in screen time ( $\beta=-.20$ ,  $p<.05$ ) over 3 years were associated with better quality of life in grades 8/9. Youth who engaged in more physical activity, slept more, and spent less time engaging in screen-based activities during elementary school and upon entering high school experienced better quality of life in high school. Interventions targeting all three health behaviours may be more effective at promoting quality of life in youth than interventions targeting a single health behaviour.

Acknowledgements: The MATCH study is supported by the New Brunswick Health Research Foundation (#20130729) and by the Social Sciences and Humanities Research Council and Sport Canada through the joint Sport Participation Research Initiative (#862-2010-0001).

## ACCESSIBILITY ON THE MOVE: INVESTIGATING HOW STUDENTS WITH DISABILITIES AT THE UNIVERSITY OF MANITOBA EXPERIENCE THE BODY, SELF, AND PHYSICAL ACTIVITY

Fiona Moola<sup>1</sup>

<sup>1</sup>Faculty of Kinesiology and Recreation, University of Manitoba; Scientist, the Children's Research Hospital of Manitoba

The "ivory tower" is gradually beginning to open its doors to students with disabilities. Although

scholarship on the learning experiences of students with disabilities at university is burgeoning, there is an absence of qualitative craftsmanship that has investigated the physical activity experiences of these students, most particularly in the Canadian context. Purpose: The objective of this qualitative study was to explore the physical activity experiences of students with disabilities at the University of Manitoba. Methodology and Methods: Using Pierre Bourdieu's theoretical framework as a lens to consider the bodily and social effects of disablement, I adopted a thematic analytic methodological approach to describe the activity experiences of 12 disabled students at the University of Manitoba in Winnipeg, Canada. Qualitative interviews were conducted with each participant. Findings: The students described threatened body-self relationships and lacked confidence in their ability to be active at university. They also regarded on-campus physical activity as a site of both pleasure and pain, opportunity and constraint. Finally, the students explained what inclusive physical activity means to them within the context of higher education. Conclusion: By describing the movement experiences and desires of disabled university students at the University of Manitoba, this study contributes toward the ongoing struggle for inclusive higher education and physical activity. Acknowledgements: This study was funded by the University Research Grants Program at the University of Manitoba

## FACILITATING EXERCISE IN OLDER ADULTS: "THINGS CHANGE"

Jochen Bocksnick<sup>1</sup>

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

The intention of this research was to learn from the insights and life experiences of former Physical Education professors regarding the teaching and facilitation of physical activity for older adults. Twenty-one retired colleagues, 14 male and 7 female, from across Canada participated in semi-structured, audio-taped telephone or face-to-face interviews. Content analysis of the transcribed data revealed how "things changed" as they got older. Despite the participants' unanimous passion for movement, aging had taken its toll and resulted in adaptations to their personal perceptions of physical fitness and lifestyle choices. These personal life experiences combined with their academic and professional history contributed to them identifying disciplinary knowledge as a prerequisite, but communication skills, compassion and understanding as pivotal assets for effective exercise facilitation of older adults.

## RECRUITMENT, SCREENING, AND BASELINE PARTICIPANT CHARACTERISTICS IN THE WALK 2.0 STUDY: A RANDOMIZED CONTROLLED TRIAL USING WEB 2.0 APPLICATIONS TO PROMOTE PHYSICAL ACTIVITY

Cristina M Caperchione<sup>1</sup>, Ric R. Rosenkranz<sup>2</sup>, Mitch Duncan<sup>3</sup>, Corneel Vandelanotte<sup>4</sup>, Trevor N. Savage<sup>5</sup>, Anetta Van Itallie<sup>4</sup>, Cindy Hooker<sup>4</sup>, Anthony Maeder<sup>5</sup>, W. Kerry Mummery<sup>6</sup>, Gregory S. Kolt<sup>5</sup>

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Objective: To describe in detail the recruitment methods and participation rates, the screening methods, and the baseline characteristics of a diverse sample of inactive adults participating in the Walk 2.0 Study, a 3-arm randomized controlled trial of a Web 2.0 based physical activity intervention. Methods: A two-fold recruitment plan was developed and implemented, including a direct mail-out to an extract from the

Australian Electoral Commission electoral roll, and other supplementary methods including email and telephone and a study awareness advertising campaign. Physical activity screening involved two steps: a validated single-item self-report instrument and the follow-up Active Australia Questionnaire. Readiness for physical activity participation was also based on a two-step process of administering the Physical Activity Readiness Questionnaire and, where needed, further clearance from a medical practitioner. Results: Across all recruitment methods, a total of 1,244 participants were recruited for initial screening, of which 656 were deemed eligible. Of these, 506 were later enrolled in the Walk 2.0 trial (77% enrollment rate) and randomized to the Walk 2.0 group (n = 168), the Walk 1.0 group (n = 165), or the control group (n = 173). Conclusion: The results of this recruitment process demonstrate the successful use of multiple strategies to obtain a diverse sample of inactive adults eligible to take part in a web-based physical activity promotion intervention. The use of dual screening processes ensured safe participation in the intervention. This approach to recruitment and physical activity screening can be used as a model for further trials in this area.

Acknowledgements: This trial is funded by the National Health and Medical Research Council (Project number #589903). Duncan and Vandelanotte are supported by Future Leader Fellowships from the National Heart Foundation of Australia.

#### INVESTIGATING THE TYPE, INTENSITY, AND DURATION OF ACTIVITIES OF DAILY LIVING AS A POTENTIAL AVENUE FOR INCREASING PHYSICAL ACTIVITY PARTICIPATION AMONG PEOPLE WITH SPINAL CORD INJURY.

Matthew Stork<sup>1</sup>, Marie-Josée Perrier<sup>2</sup>, Kathleen Martin Ginis<sup>2</sup>

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

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Background: Despite the benefits of physical activity, most people with spinal cord injury (SCI) are insufficiently active to achieve fitness benefits. While most SCI and physical activity research has focused on leisure-time physical activity, few studies have examined activities of daily living (ADL). Purpose: To describe and compare 1) self-reported intensities and durations of specific ADL, and 2) minutes/day spent on ADL across key demographic groups. Methods: Participants were 695 adults with SCI (76% men, Mage=46.81±13.41, Myears-post-injury=15.19±11.10). ADL were assessed over the telephone using the Physical Activity Recall Assessment for People with SCI. MANOVAs were computed to test for differences in intensities and durations of different ADL (objective 1) and between-group differences in min/day of ADL (objective 2). Results: Overall, participants reported 127.92+142.79 minutes/day of ADL with significantly more time spent in mild intensity (78.93+104.62 minutes/day) than moderate (40.23+68.71 minutes/day) or heavy intensity ADL (8.75+24.53 minutes/day). Four patterns emerged with respect to ADL type, duration, and intensity, with some ADL being typically performed at lighter, or heavier, intensities than others. There were significant differences in minutes/day of ADL intensity and duration between groups based on education, injury severity, and mode of mobility (ps < 0.05). Conclusion: Given that some groups were more likely to engage in moderate-heavy intensity ADL, and some ADL are more likely to be performed at moderate-heavy intensities, interventions that target key groups to engage in specific ADL (e.g., wheeling) may be one strategy to enhance physical activity participation among people with SCI.

#### PREVALENCE OF OBJECTIVELY MEASURED PHYSICAL AND SEDENTARY BEHAVIOUR IN NOVA SCOTIAN BREAST CANCER SURVIVORS UNDERGOING ADJUVANT THERAPY

Cynthia Forbes<sup>1</sup>, Robyn Laczy<sup>1</sup>, Melanie Keats<sup>2</sup>, Daniel Rainham<sup>3</sup>, Tallal Younis<sup>1</sup>, Chris Blanchard<sup>1</sup>

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<sup>3</sup>Faculty of Science, Dalhousie University

**Purpose:** Physical activity (PA) and sedentary behaviour (SB) has been shown to impact overall and health related quality of life (QoL). Studies among cancer survivors have revealed low self-reported PA levels. The purpose of this study was to assess the prevalence of objectively measured moderate-to-vigorous PA (MVPA) and sedentary time among breast cancer survivors (BCS) currently undergoing adjuvant therapy. **Methods:** Participants completed baseline surveys and wore an accelerometer to measure MVPA during waking hours for nine consecutive days. Seven valid days were used by deleting the first and last day if nine were completed. 5-second epochs were used to provide a more sensitive estimate of MVPA levels. **Results:** BCS were recruited from the QEII Health Science Centre in Halifax, Nova Scotia. Of the 114 approached 77 (68%) agreed to participate. 70 (91%) participants provided accelerometer data for  $\geq 3$  valid days. Participants were 57 years of age, 71% married, 50% employed, and had a BMI of 28kg/m<sup>2</sup>. 29% were meeting PA guidelines. Average MVPA and sedentary minutes per day was 42 (SD=28.3) and 595 (SD=74.0), respectively. Those meeting guidelines had significantly higher perceived control ( $p=.042$ ), ease ( $p=.047$ ), confidence ( $p=.003$ ), and capability ( $p=.014$ ). **Conclusions:** The results of this study show that the majority of BCS are not getting enough MVPA to gain health benefits, consistent with previous research. Additionally, they are sedentary for nearly 10 hours/day. Having higher confidence and self-efficacy to engage in PA was associated with meeting guidelines. Future research should identify strategies to decrease sedentary time.

**Acknowledgements:** This project is supported by the Canadian Breast Cancer Foundation - Atlantic Division

**Free papers: Motor control in multisensory tasks; Saturday, October 17, 8 – 9:30 am**

INTERSENSORY FACILITATION EFFECTS EXPLAINED USING AN ADDITIVE ACTIVATION MODEL OF INITIATION.

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In a simple reaction time (RT) task, subjects must respond to a single stimulus with a response that is known in advance. However, RTs can differ depending on the stimulus modality whereby auditory RTs are typically faster than visual. Furthermore, combining modalities results in RTs that are faster than either stimulus alone produces. The mechanisms underlying this effect, known as intersensory facilitation, are currently unclear. Recent studies have hypothesized that activation related to initiation can sum under certain circumstances (e.g. startle). Of interest in the current study was whether a model of additive initiation-related activation could explain the intersensory facilitation effect. Twelve participants performed a RT task requiring a targeted wrist extension following either a visual go-signal, an auditory signal, or a combination of both with a varying stimulus onset asynchrony (SOA) (e.g. auditory stimulus presented either 0, 25, 50, 75, 100, or 125 ms after visual go-signal). Electromyography (EMG) from the wrist prime movers, as well as displacement was recorded from all participants. As expected, RTs were shorter when both stimulus modalities were presented concurrently. Importantly, as the SOA increased, the observed results closely fit RTs predicted by a model involving additive initiation slopes. Specifically, stimulus presentation times resulting in the largest amount of activation overlap resulted in the greatest relative RT speeding. These results indicate that the neural signals arising from the differing stimuli may converge at a common structure in the brain responsible for response initiation.

Acknowledgements: Supported by the Natural Sciences and Engineering Research Council of Canada

## COGNITIVE DEMAND AND SENSORY MODALITY INFLUENCE THE IMPACT OF A COGNITIVE TASK ON POSTURAL CONTROL

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To address the current variability in the posture-cognition data, the aim of the present experiment was to evaluate the modulating effects of cognitive demand and sensory modality on postural control in young adults. Seventeen healthy young adults ( $23.71 \pm 1.99$  years; 9 F, 8 M) were instructed to stand feet together on a force platform while concurrently performing cognitive tasks of varying difficulty (easy, moderate, and difficult) and sensory modality (auditory and visual). The auditory tasks consisted of silently counting the total occurrence of one or two letters in a sequence of individual letters or three-letter words and completing a string of words broken down into individual letters. The visual tasks consisted of silently counting the total occurrence of one or two numbers in a 3-digit and 5-digit number sequence. Increasing cognitive demand resulted in a significant reduction in area of 95% confidence ellipse and medial-lateral (ML) sway variability. Presenting the cognitive tasks visually resulted in a greater reduction in ML sway variability compared to auditorily presenting the tasks. Contrary to previous literature (Pellecchia, 2003; Prado et al., 2007), the present findings suggest that visually presented cognitive task of higher demand can facilitate greater postural stability. The observed improvement may be a result of a shift in attention and the establishment of a visual anchor.

## LONG TERM CONSEQUENCES OF CONCUSSION: SENSITIVITY AND SPECIFICITY MEASURES OF DEFICITS IN A DUAL TASK PARADIGM

Dave Gonzalez<sup>1</sup>, Anthony Tapper<sup>1</sup>, Ewa Niechwiej-Szwedo<sup>1</sup>, Alicia Capobianco<sup>1</sup>, Eric Roy<sup>1</sup>

<sup>1</sup>University of Waterloo

Background: Detecting long-term consequences of concussions is paramount for understanding the full implications of a concussion. Current neurocognitive tests, such as Immediate Post-Concussion Assessment and Cognitive Test (ImPACT), have shown to be very sensitive to acute (24h to 72h) deficits resulting from concussions; however, ImPACT does not dissociate between people who never had a concussion from those who did when administered years later. Other research has shown long term consequences of a concussion. Hypotheses: 1) There are no long-term consequences of concussions, or 2) more sensitive measures are needed to detect persistent problems. Method: Two separate cohorts of athletes were tested: 1) 26 non varsity hockey athletes (18 with history of concussion); and 2) 29 varsity collegiate ice hockey athletes (18 with history of concussion). All participants were tested using a dual task paradigm involving a visuospatial working memory task (Corsi task) and an auditory task. Results: Athletes with prior history of concussion perform worse in dual task performance (lower accuracy scores, greater drop in speed) than those without a prior history of concussion in both cohort groups. Sensitivity of the test is increased when testing the homogenous (varsity hockey players) cohort (from 24% to 94%). Conclusion: Individuals with a history of concussion have long lasting problems that can be measured with resource taxing tasks (i.e., complex tasks that require attention allocation skills needed for dual task performance). Further, sensitive measures such as those requiring dual task performance are greatly improved when comparing similar cohorts rather than across sports teams.

Acknowledgements: Partial funding provided through a grant from Chronic Disease Prevention Initiative, Propel Centre, and University of Waterloo



## ACTIVE TACTILE PERCEPTION MODULATES MOTOR OUTPUT AND PRE PLANNING

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Perceptual decision-making requires sensory detection and cognitive processing. Subsequent motor response preparation and execution reflect the decision made (Hegner, Lindner & Braun, 2015). Active touch yields tactile information through mechanical deformation of the skin, and is the conscious surface exploration of to-be-detected stimuli (Gibson, 1962). Perceptual decision-making via active touch is a skill practiced by clinicians who deliver manual therapies. Tactile features are extracted from the patient, and perceived by the clinician. A decision is made, and the clinician prepares a motor response that is executed with therapeutic intent. The purpose of this study was to determine how tactile perception influences manual therapist motor output. Experienced clinicians (N=10), in a within-participants design, palpated four low-fidelity models pressurized to 10, 15, 20 and 25psi respectively. Participants used tactile perception to prepare and deliver a spinal manipulative (SM) thrust motor response 12 times per model, yielding 48 total trials in a randomized order. Signals acquired from a force sensitive load cell and triaxial accelerometer were synchronized with a 3D motion analysis system and recorded for 5s at 300Hz. Dependent variables included preload force, thrust force, resultant displacement and resultant peak acceleration. Analysis of dependent measures utilized one-way repeated measures ANOVA models. Significant findings were compared using Tukey's HSD. We found that as model pressure increased preload force increased, while displacement and peak acceleration of the SM thrust hand decreased. In conclusion, manual therapists rely on active tactile perception to modulate appropriate regional contact tension, and for pre planning their motor output.

Acknowledgements: Funding for this project was provided by a Manitoba Health Research Council (now Research Manitoba) establishment grant.

## PERFORMANCE IN A WITHIN-MODALITY TEMPORAL ORDER JUDGMENT TASK REVEALS SUBOPTIMAL MULTISENSORY INTEGRATION FOLLOWING STIMULI PRESENTATION AT PEAK LIMB VELOCITY

Tristan D. Loria<sup>1</sup>, John de Grosbois<sup>1</sup>, Luc Tremblay<sup>1</sup>

<sup>1</sup>University of Toronto

Auditory and visual cues can be integrated in a statistically optimal fashion (e.g., Ernst & Bühlhoff, 2004). However, the weighting of auditory and visual information for multisensory integration appears to change as a function of limb velocity (Tremblay & Nguyen, 2010; Loria, de Grosbois & Tremblay, submitted). The current study was designed to assess whether audiovisual information is optimally integrated at peak limb velocity. Participants (N = 13) were required to "fling" their limb through the centre of a virtual target (i.e., right index finger to reach peak velocity as it intersected the target). Piezo-LED devices were affixed on both sides of the virtual target and provided two auditory, visual, or audiovisual cues when the participant reached their peak limb velocity, or while the participant remained stationary. After each trial, participants completed a within-modality temporal order judgment task (TOJ), reporting which side of the virtual target the first sensory cue was presented. When analyzing response accuracy at rest, it was found that participants were more accurate in judging the order of the events (i.e., TOJ) in the auditory and audiovisual condition relative to the visual condition. Also, performance in the audiovisual condition was significantly less accurate when the sensory cues were presented at peak limb velocity compared to at rest. Overall, the results from this experiment in conjunction with those reported previously (e.g., Loria et al., submitted; Tremblay & Nguyen, 2010) suggest that the central nervous system integrates sensory

information in a manner that may not always be optimal.

Acknowledgements: Natural Sciences and Engineering Research Council, Ontario Research Fund, Canada Foundation For Innovation

**Saturday, October 17, 9:30-11 am**

**Symposium: What the dinosaurs forgot to tell us about exercise psychology; Saturday, October 17, 9:30-11 am**

WHAT THE DINOSAURS FORGOT TO TELL US ABOUT SPORT AND EXERCISE PSYCHOLOGY

Kent C. Kowalski<sup>1</sup>, Leah J. Ferguson<sup>1</sup>

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

In the early 1960s, Physicist Richard Feynman gave a famous series of lecture on physics. In one of his lectures he posed the following question, “If, in some cataclysm, all of scientific knowledge were to be destroyed, and only one sentence passed on to the next generations of creatures, what statement would contain the most information in the fewest words?” In this symposium the above question is posed to a number of faculty in the field of sport and exercise psychology who are currently researching and teaching at Canadian universities. The symposium will start with a 10 minute overview of symposium, including an introduction to the question, in a presentation titled “All Things are Made of Atoms”, by Kent Kowalski (University of Saskatchewan). Twelve faculty will then each present their answers to the proposed question across a series of 5 minute presentations. Participating faculty include: Wendy Rodgers (University of Alberta), Catherine Sabiston (University of Toronto), Craig Hall (University of Western Ontario), Jean Cote (Queen’s University), Tara-Leigh McHugh (University of Alberta), Kim Dorsch (University of Regina), Nick Holt (University of Alberta), Diane Mack (Brock University), John Spence (University of Alberta), Katherine Tamminen (University of Toronto), Phil Wilson (Brock University), and Kent Kowalski (University of Saskatchewan). Leah Ferguson (University of Saskatchewan) will then provide a 10-minute response as a discussant in which she reflects on the value of the symposium and the answers provided by the participating faculty members. The symposium will conclude with a 10-minute question and answer period with the audience.

**Free papers: Youth Sport Psychology; Saturday, October 17, 9:30 – 11 am**

SOCIAL IDENTITY, GROUP-BASED SELF-CONSCIOUS EMOTIONS, AND CHANGE IN SPORT EXPERIENCES AMONG FEMALE YOUTH INVOLVED IN SPORT

Catherine M. Sabiston<sup>1</sup>, Katherine Tamminen<sup>1</sup>, Eva Pila<sup>1</sup>

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

Compared to males, adolescent females are less likely to be involved in team sport, drop out faster, and report lower perceptions of positive sport outcomes (e.g., enjoyment) and higher negative outcomes such as anxiety. Predictors of youth sport experiences need to be identified to help keep more females involved in sport. Based on theories of emotion and motivation, the social context - including social identity and group-based emotions - of youth sport may be important factors. This study examined the association between social identity in sport and change in perceptions of sport enjoyment, commitment, and anxiety over two years, and tested experiences of group-based (teammate) self-conscious emotions as mediators of the associations among adolescent females involved in team sport. Female youth participants (N = 212)

completed self-report surveys twice one year apart and data were analyzed using multiple mediation and residual change scores. Sport identity was a significant ( $p < .05$ ) predictor of change in enjoyment and commitment ( $R^2 = .38$  &  $.31$ , respectively) with the group-based emotion of pride as a significant mediator of the associations. The model for change in sport anxiety ( $R^2 = .14$ ,  $p = .01$ ) had no significant direct effect of sport identity yet teammate envy was directly associated with higher experiences of anxiety in sport over two years. Theoretically, these findings offer preliminary evidence linking the social context of sport frameworks of identity, collective emotions, and sport experiences. These findings also offer insight into practical strategies that may help foster positive experiences for female youth involved in sport.

Acknowledgements: This study was funded by a Social Sciences and Humanities Research Council of Canada grant

## A STORY OF LOSS AND GAIN: EXPLORING STUDENT-ATHLETES' EXPERIENCES WITH INJURY THROUGH PHOTOVOICE

Renee Matte<sup>1</sup>, Mindy Bouchard<sup>1</sup>, Ryan Hamilton<sup>1</sup>

<sup>1</sup>Psychology, University of New Brunswick

Athletes' experiences with injuries is a broad and widely studied topic (Granito, 2002; Lu & Hsu, 2013; Wadey et al., 2011). However, little is known about the impact injuries have on student-athletes. The unique experiences associated with student-athletes' need to balance both a strong athletic identity and an academic career provides a novel perspective in the area of athletic injury. Using the photovoice method along with semi-structured interviews, the aim of this study was to capture student-athletes' experiences of serious injury. The study looked at nine recently-injured, competitive athletes from various Varsity sports. Themes and patterns concerning loss of identity, balance, and freedom, as well as gaining new appreciation, a different perspective, and stronger social support emerged from both the pictures and interviews. These new insights on the emotional and psychological experiences of injured student-athletes will serve to fill the gap in the current literature as well as inform coaches, teammates, consultants, and clinicians on the deeper impacts of injury and how to help minimize the losses and maximize the gains.

## ISSUES AFFECTING ADOLESCENT PSYCHOSOCIAL DEVELOPMENT, BULLYING, AND SCHOOL SAFETY IN THREE APPALACHIAN COUNTIES

M. Ryan Flett<sup>1</sup>

<sup>1</sup>Coaching and Teaching Studies, West Virginia University

In order to reduce bullying and to foster psychosocial development in adolescents, schools benefit most from a holistic approach (Bowllan, 2011; Drake et al., 2003). The purpose of this study was to understand the beliefs held by high school decision-makers (HSDMs) regarding bullying, positive youth development, and limitations that schools and sports have in fostering a positive school climate. HSDMs included administrators, athletic directors, and counsellors from five high schools in Northern Appalachia. Nine HSDMs participated in the semi-structured interviews ( $M = 62$  min; Range = 49-76 min). Trustworthiness of the results was enhanced through the use of pilot interviews, verbatim transcription, independent coding, triangulation, a critical reviewer of the coding and analyses, and member-check procedures (Patton, 2014). The primary investigator conducted the interviews, trained the coders, critiqued open codes, and led the thematic analysis (Creswell, 2014). Participants described a number of Limitations to PYD and reducing bullying, including Barriers, and a Lack of Consistency in programming, messaging, values, etc. Barriers included: Student and athlete struggles (competition in sport, fitting in, esteem); Sport and leader barriers (negative effects of sport, wrong motivations in sport, lack of training for staff/coaches,

coach/teacher uncertainty); and School barriers (finances, student-teacher ratio, rapport with students). Lack of Consistency was organized into two categories: Within Schools (e.g., constantly changing programs, lack of standards, and disconnect between staff) and Outside of Schools (e.g., social influences, family problems, family values not inline with school's, and limits to the impact schools can have). Implications for the development of PYD programs in regional high schools are discussed. Acknowledgements: Funding for this study was provided by the Association for Applied Sport Psychology (AASP) and from the College of Physical Activity and Sport Sciences at WVU.

## DOES GENDER INEQUALITY MODERATE SEX DIFFERENCES IN SPORT ACROSS COUNTRIES?

Shea Balish<sup>1</sup>, Robert Deaner<sup>2</sup>, Daniel Rainham<sup>1</sup>, Chris Blanchard<sup>1</sup>

<sup>1</sup>Dalhousie University; <sup>2</sup>Grand Valley State University

Although sex differences in preferences for sport are well established, there are competing hypotheses regarding their origins. The Spectator Lek Hypothesis maintains that sex differences in preferences for sport are partly evolved and thus should be universal or near universal, whereas socio-constructivist hypotheses argue that such sex differences are entirely socially constructed and thus should vary as a function of a society's gender inequality. To test these competing hypotheses, cross-national nested data were acquired from the International Social Survey Program ( $ss = 49,729$ ,  $ncountries = 34$ ). Non-linear hierarchical Bernoulli modelling was employed to examine if sex differences in sport participation, fandom, and reasons for participating in sport are universal or near universal, and if there is a moderating effect of countries' gender inequality. Our findings indicate that gender inequality is associated with increased sex differences in sport, albeit marginally and only for some sport behaviours. However, even when accounting for the moderating effect of gender inequality, males are more likely to report general sport participation (OR = 4.09, 95% CI = 3.13-5.34), team sport participation (OR = 4.19, 95% CI = 3.13-5.34), watching sport on television (OR = 2.32, 95% CI = 1.69-3.17), to agree that they play sport to compete (OR = 2.03, 95% CI = 1.79-2.31), but not to attend sporting events (OR = 1.47, 95% CI = .94-2.31). These results highlight the possible role of countries' gender inequality while supporting the spectator lek hypothesis.

Acknowledgements: The authors would also like to thank Mark Eys and Laurene Rehman for helpful comments and criticisms of earlier drafts.

## EXAMINING THE IMPACT OF THE RESPECT IN SPORT PARENT PROGRAM AMONG MINOR HOCKEY ATHLETES

Katherine A. Tamminen<sup>1</sup>, Carolyn E. McEwen<sup>2</sup>

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<sup>2</sup>School of Kinesiology, The University of British Columbia

This study examined differences in minor hockey athletes' experiences according to the year their league implemented the Respect in Sport Parent Program (RiSPP). Athletes ( $N = 68$ ) completed online measures of spectators' behaviours (Omli & LaVoi, 2009), prosocial and antisocial behaviours (Kavussanu & Boardley, 2009), and parental support and pressure (Anderson et al., 2003). One way ANOVAs revealed significant differences in athletes' perceptions of parental support ( $F(2, 60) = 3.34$ ,  $p < .05$ ,  $\omega^2 = .07$ ), prosocial behaviours towards teammates ( $F(2, 61) = 4.60$ ,  $p < .05$ ,  $\omega^2 = .10$ ), and antisocial behaviours towards opponents ( $F(2, 61) = 3.88$ ,  $p < .05$ ,  $\omega^2 = .08$ ). Athletes in leagues that had adopted the RiSPP in 2011 reported significantly higher parental support ( $M = 3.88$ ,  $SD = .16$ ) compared to athletes in leagues which did not have the program ( $M = 3.53$ ,  $SD = .43$ ;  $p < .05$ ), higher prosocial behaviours towards

teammates ( $M = 4.58$ ,  $SD = .55$ ) than athletes in leagues that had adopted the program in 2014/15 ( $M = 4.06$ ,  $SD = .59$ ;  $p < .05$ ), and higher prosocial behaviour towards opponents ( $M = 2.57$ ,  $SD = 1.21$ ) than athletes in leagues that had adopted the program in 2014/15 ( $M = 1.68$ ,  $SD = .80$ ;  $p < .05$ ). Large effect sizes were found for all significant differences between groups. There were no significant differences in perceptions of parental pressure or spectator behaviours. These results suggest the RiSPP is associated with positive athlete experiences in sport; adoption of the program may also reflect leagues' prioritization of positive athlete experiences.

Acknowledgements: This research was supported by a SSHRC Partnership Development Grant awarded to the first author.

## THE CAR RIDE HOME: EXPLORING THE CONTENT AND STRUCTURE OF PARENT-CHILD SPORT CONVERSATIONS

Zoe A. Poucher<sup>1</sup>, Victoria Povilaitis<sup>1</sup>, Katherine A. Tamminen<sup>1</sup>

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

Past research has examined the experiences of youth athletes and their parents (Holt, Tamminen, Black, Mandigo, & Fox, 2009; Lauer, Gould, Roman, & Pierce, 2010), as well as preferences of athletes for parental involvement in sport (Knight, Neely, & Holt, 2011; Knight & Holt, 2014). However, researchers have not examined the structure of parent-athlete communication surrounding sport practices and competitions. The purpose of this study was to examine parents' and athletes' experiences of conversations during the 'car ride home' after games and practices. Specifically, this research aimed to examine both the content and structure of parent-athlete sport conversations. Seventeen pairs of parents and adolescent athletes participated in individual semi-structured interviews. Data were analyzed using thematic and structural narrative analysis (Reissman, 2008) to examine the content and the structure of parent-athlete sport conversations, and to explore how participants described these conversations within the context of a research interview. Results pertained to: (a) the content of parent-child sport conversations (e.g., positive and negative feedback; performance advice; motivational comments); (b) the structure of parent-child sport conversations (e.g., parent vs. child-initiated conversations; conversation length; conversational techniques including questioning, direct statements, and topic shifts); (c) the impact of parent-athlete conversations (affective, performance, and motivational outcomes); and (d) structural features of participants' descriptions of sport conversations (use of rationalization, extreme comparisons, contextualization). These findings are discussed in relation to the way participants performed the roles of 'sport parent' and 'athlete' within research interviews and we also discuss implications for qualitative youth sport research.

**Free papers: Cognitive Influences on Motor Control; Saturday, October 17, 9:30 – 11 am**

## AN INVISIBLE STIMULUS INFLUENCES POINTING TRAJECTORIES EVEN WHEN PRESENTED DURING MOVEMENT

Jenna C. Flannigan<sup>1</sup>, Romeo Chua<sup>2</sup>, Erin K. Cressman<sup>1</sup>

<sup>1</sup>University of Ottawa

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

In the masked priming paradigm, a small visual (prime) stimulus is briefly presented and quickly followed by a larger visible (mask) stimulus, which indicates the target location and prevents the prime from reaching conscious awareness. Previous studies in which participants were required to complete a pointing response in accordance with the identity of the mask have shown that the prime, when presented at

movement onset, initially results in deviations in the direction indicated by the prime. The purpose of the current experiment was to determine whether the prime is able to influence movement when it is presented following various delays relative to movement onset, as depending on movement velocity, the prime may be unable to influence the movement to the same extent when presented later in the trajectory. Twelve participants initiated 540 rapid reaches to a center target. The prime was presented 17, 33, or 50 ms after movement onset followed 50 ms later by the mask. On 66% of the trials, participants landed on the center target within 400-600 ms in response to a neutral prime and mask. In the remaining trials, a neutral, left or right-pointing prime arrow preceded a left or right-pointing mask arrow requiring participants to modify their movements to the respective target. Regardless of prime onset delay, movement deviations first occurred in the direction indicated by the prime. Consequently, the prime was still able to influence the movement despite the prime appearing later during the pointing trajectory.

Acknowledgements: OGS, NSERC

## THE INFLUENCE OF ENVIRONMENTAL CONTEXT IN INTERPERSONAL OBSERVATION-EXECUTION

James W. Roberts<sup>1</sup>, Simon J. Bennett<sup>2</sup>, Tim Welsh<sup>3</sup>, Digby Elliott<sup>4</sup>, Jim L. Lyons<sup>1</sup>, Spencer J. Hayes<sup>2</sup>

<sup>1</sup>McMaster University

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<sup>4</sup>Liverpool John Moores University; McMaster University

Cyclical upper-limb movements can involuntarily deviate from the primary movement axis and into a secondary axis when the performer concurrently observes incongruent biological motion. The current study examined the influence of the observed environmental context on movement interference. Participants executed continuous horizontal arm movements while observing horizontal (congruent) or curvilinear (horizontal with an incongruent vertical component) movements. The observed movements were executed with small or large objects posing as an obstacle or a distractor. For curvilinear movements, the obstacle was displayed within movement space preventing horizontal movement meaning the observed movement was rational. On the other hand, the distractor was displayed below movement space meaning the observed movement was irrational. For horizontal movements, the obstacle and distractor were located below movement space, but in the same relative location as the curvilinear movements. It was found that, overall, the incongruent curvilinear movements generated greater deviation into the secondary axis than the horizontal movements. Although there were no systematic differences between contexts for the curvilinear movement, there was greater deviation when observing horizontal movements with the large obstacle than for other contexts. This latter finding is interpreted to indicate that the performer recognized and internalized the potential collision that was being observed. These findings indicate the environmental context can modulate motor contagion. Moreover, the differential effects between congruent and incongruent movement deviations suggests a role of matching observed and executed actions, and supports the view of a dynamic interplay between action and movement intentions (Ondobaka et al., 2012).

Acknowledgements: We would like to thank Nathan Foster for his assistance in creating the visual stimuli. This research was supported by the Natural Sciences and Engineering Research Council of Canada (NSERC).

## DELTA BAND OSCILLATIONS PREDICT HAND SELECTION FOR REACHING

Pierre-Michel Bernier<sup>1</sup>, Audrey Hamel-Thibault<sup>1</sup>, François Thénault<sup>1</sup>, Kevin Whittingstall<sup>2</sup>

<sup>1</sup>Département de kinanthropologie, Université de Sherbrooke

<sup>2</sup>Département de radiologie diagnostique, Université de Sherbrooke

Current models emphasize that action selection is achieved by competitive interactions between co-existing motor plans afforded by target stimuli (Cisek and Kalaska 2010). We tested the hypothesis that action selection is influenced by the intrinsic excitability of the sensorimotor regions that encode those motor plans. We used a hand selection task in which subjects reached toward visual targets with the hand of their choice. We identified the target locations for which left and right hands were chosen equally often (see Oliveira et al., 2010), and then had subjects perform multiple trials toward these targets while recording electroencephalography (EEG). Data were binned according to the hand being selected. We measured delta band oscillations (2-4Hz) at electrodes overlaying the left and right primary motor cortices (M1), since excitability of neuronal ensembles fluctuates according to the phase of delta (Lakatos et al., 2008). Delta band inter-trial coherence at target onset was significantly greater over M1 contralateral to the selected hand than over ipsilateral M1 ( $p < 0.001$ ). Specifically, contralateral M1 was systematically in the delta through (mean=229°), which is considered the excitable phase of delta (Whittingstall and Logothetis 2009). Furthermore, delta phase of contralateral M1 predicted reach reaction times ( $p < 0.01$ ). These data demonstrate that the M1 in the most excitable phase of delta at target onset determines the hand to be selected, possibly by responding with greater gain to incoming target stimuli. This suggests that action selection is influenced by the instantaneous excitability of the sensorimotor regions in which motor plans are encoded.

Acknowledgements: NSERC; FRQ-S

#### DON'T GO CHANGING ON ME: CONSISTENT FEEDBACK IS NECESSARY FOR OPTIMAL ENDPOINT SELECTION IN THE CONTEXT OF CHANGING REWARDS.

Kevin LeBlanc<sup>1</sup>, Heather Neyedli<sup>2</sup>

<sup>1</sup>Psychology, Dalhousie University

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

When values - reward or penalties - change in the aiming environment, participants must adjust their endpoint to maximize their gain. Previous research has shown that participants need to consistent feedback to aim to an optimal endpoint in the context of changing penalties. Other research has shown that participants weight positive and negative values differently in cognitive decision-making tasks but no research has examined the effect of manipulating rewards on endpoint selection. The purpose of the present study was first, to determine if participants adjust their endpoint in the context of changing rewards and secondarily, whether participants need consistent feedback to do so. Participants aimed to a target that was overlapped by a penalty region. Participants gained points for hitting the target but lost points for hitting the penalty region. The reward was set at either 100 or 600 points and the reward changed trial-to-trial (Random Condition) or only between blocks of trials (Blocked Condition). If participants need consistent feedback to aim optimally, there should only be a difference in endpoint between reward values in the Blocked condition where participants receive consistent feedback from aiming in the same value context on each trial. There was a significant interaction between reward and blocking condition where participants adjusted their endpoints with changing reward in the Blocked but not Random condition. Further, there was a correlation between endpoint selection and participants' risk sensitivity as measured through a questionnaire. The results indicate that participants can adjust their endpoints to changing reward values but only with consistent feedback.

Acknowledgements: Research was funded through an NSERC Discovery Grant

## THE DECIDING HAND: HOW AN ANALYSIS OF HUMAN REACH MOVEMENTS REVEALS CHOICE BIASES

Craig S. Chapman<sup>1</sup>

<sup>1</sup>Physical Education and Recreation, University of Alberta

Decision making, or the resolution of competition, is one of the most central components of human cognition: from low-level, brief, sensory events that compete for cortical activation and amplification, to high level symbols and complex objects that compete first for recognition then later for influence over decisions. Despite its centrality to understanding human thought, the science of decision making is usually restricted only to an analysis of what decisions people make. This approach overlooks the very important component of how people execute their decisions. Here, I will show results from a variety of studies demonstrating that an analysis of the physical reach movements people make to indicate a decision, and careful manipulation of the timing of decision stimuli, can be used to reveal subtle aspects of decision making and the precise timelines over which they operate. I will present evidence from studies where decisions are driven by low level visual properties (e.g. luminance), where decisions are influenced by arbitrary, more cognitively driven properties (e.g. reward associations) and finally, where decisions are made based completely on participant driven properties separate from any specific stimuli features (e.g. personal preference). The analysis of the resulting spatial reach trajectories as participants physically interact with the choice options reveals decision biases including: an initial bias toward high luminance that decays with time, a bias toward gain and a delayed bias away from loss, and reaches that reflect an individual's decision difficulty. Notably, these biases would have been invisible using conventional research methods.

### Poster session #2 – Saturday, October 17, 11 am– 12:30

#### 1. MISSION ACCOMPLISHED?: PHYSICAL ACTIVITY, AFFECT, AND SELF-ESTEEM

Andrea Bedard<sup>1</sup>, Melanie Gregg<sup>1</sup>

<sup>1</sup>Department of Kinesiology and Applied Health, The University of Winnipeg

The homeless experience a variety of physical, psychological and social vulnerabilities; physical activity and sport may be one vehicle to help alleviate some of these challenges. Self-esteem can predict intention and moderate the level of control the individual perceives they have over a specific health behaviour such as physical activity. There is evidence that even a single bout of physical activity can positively change affective states. Patrons from a homeless shelter (N = 34) participated in one of four physical activity experiences. Four physical activity experiences were selected based on results from our previous research: bowling, yoga, war canoe and Atlatl, and ball hockey. Self-report exercise behaviour and intentions were assessed prior to activity participation. Self-esteem and physical activity affect were measured before and after each activity. There were no significant changes in self-esteem or affect following physical activity participation. No between group differences were evident for self-esteem or affect. Self-esteem was not a significant predictor of self-reported exercise behaviour. Exercise behaviour was a significant predictor of physical activity affect;  $F(1, 27) = 5.74, p = .02$ ; with an  $R^2 = .18$ . Participants who participated more regularly in physical activity had higher ratings of physical activity affect.

Acknowledgements: University of Winnipeg Major Research Grant

#### 2. EFFECTS OF THE QUALITY OF IMPLEMENTATION INTENTIONS FOR PHYSICAL ACTIVITY ON ACHIEVING WEIGHT LOSS

Farah Islam<sup>1</sup>, Zhen Xu<sup>1</sup>, Michelle Sasson<sup>1</sup>, Mélodie Chamandy<sup>2</sup>, Elena Ivanova<sup>1</sup>, Anastasiya



Voloshyn<sup>1</sup>, Virginia Rogers<sup>1</sup>, Kimberly Carrière<sup>1</sup>, Anaïs Ames-Bull<sup>1</sup>, Bärbel Knäuper<sup>1</sup>

<sup>1</sup>Department of Psychology, McGill University

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

The purpose of the current study is to investigate the effects of implementation intentions (IIs) for physical activity on weight loss in an overweight/obese population (BMI range of 28 to 45 kg/m<sup>2</sup>, waist circumference  $\geq 88$  for women,  $\geq 102$  for men) partaking in the McGill CHIP Healthy Weight Program, a lifestyle behaviour change program. We hypothesize that higher specificity of the IIs (i.e., degree of II detail) leads to greater weight loss. Furthermore, we will explore whether plans for unstructured physical activity will be more or less effective for weight loss than plans for structured physical activity. Specifically, structured plans require setting time aside specifically for the planned activity, whereas unstructured plans are plans where the physical activity done in conjunction within another daily activity. A total of 454 IIs from 35 participants who have completed at least 12 weeks of the program will be coded and analyzed. The study is in the coding phase, which is done by two separate coders who rate each II for degree of specificity and whether it refers to a structured or unstructured plan. The analyses will commence following the completion of the coding.

Acknowledgements: I wish to express my sincere gratitude to Dr. Bärbel Knäuper for giving me the incredible opportunity to pursue this project, and for her constant support and encouragement. I also wish to thank Elena Ivanova and Zhen Xu for their continuous guidance and generosity.

### 3. IS SOCIAL PHYSIQUE ANXIETY (SPA) ASSOCIATED WITH PHYSICAL ACTIVITY INTENTIONS AND BEHAVIOUR IN ADULTS WITH SCHIZOPHRENIA? A CROSS-SECTIONAL ANALYSIS

Ritu Sharma<sup>1</sup>, Kelly P. Arbour-Nicitopoulos<sup>1</sup>, Guy E. Faulkner<sup>1</sup>

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

**Background.** Most individuals with schizophrenia spectrum disorders (SSD) are inactive, however the factors influencing physical activity (PA) within this population are understudied. Social physique anxiety (SPA) has been shown to be a significant predictor of PA in healthy populations. Within the SSD population, social anxiety in general has been found to influence PA, but SPA remains unexplored. The purpose of this study is to examine the associations between SPA and PA intentions and PA in individuals with SSD. **Methods.** As part of a larger 4-week prospective study examining theory-based PA predictors in adults with SSD, participants (N = 111, Mage = 41.09  $\pm$  11.73 years, MBMI = 31.52  $\pm$  8.48 kg/m<sup>2</sup>, 60% male, 67% diagnosed with schizophrenia) completed a series of instruments at week 4, including the 9-item SPA Scale (Martin et al., 1997), the International Physical Activity Questionnaire (Craig et al., 2003), and wore an accelerometer over a 7-day period. Correlation analyses were conducted to determine the relationships between SPA and (1) intentions to engage in moderate-to-vigorous PA (MVPA) and (2) objective and self-reported MVPA. **Results.** No significant correlations were found between SPA and either MPVA intentions ( $r = -.03$ ), or objective ( $r = -.16$ ) and self-reported ( $r = -.01$ ) MVPA (all  $ps > .10$ ). **Conclusion.** This was the first study to examine the relationship between SPA and PA intentions and behaviour in persons with SSD. Further investigation is needed to understand the role of body image perceptions on the promotion of PA within the SSD population.

### 4. EXPLORING DIMINISHED OPPORTUNITIES FOR PHYSICAL ACTIVITY IN AN OLDER 'SPORTY' ADULT COHORT

Meagan L. Littlejohn<sup>1</sup>, Stacie Carey<sup>2</sup>, Bradley W. Young<sup>2</sup>

<sup>1</sup>Department of Human Kinetics, University of Ottawa

<sup>2</sup>University of Ottawa

Research has documented the personal and social/environmental conditions influencing physical activity (PA; Sallis & Owen, 1999), however, almost no research has inspected conditions in older sporting adults (Cardenas et al., 2009). This study explored self-reported conditions influencing PA in a sample of 75 (74.7% male; ages 55-82) 'sporty' adults who had participated in Canadian Senior Games events. Participants completed responses for PA (GLTEQ; Godin & Shephard, 1985), demographics, and 48 previously-validated measures surveying ecological influences on PA (Carey & Young, 2012). Following a median split on GLTEQ (at 41 METS), we conducted PA group (high, lower) MANOVAs separately for intrapersonal (three scales), interpersonal (seven scales), and environmental (five scales) conditions. Significant interactions were reported when post-hoc tests confirmed less-facilitative conditions for the lower PA cohort. The lower PA group reported less 'self-efficacy and motivation' ( $\eta^2=.13$ ). Post-hoc two-way ANOVAs showed this was especially true for females ( $\eta^2=.06$ ) and working adults ( $\eta^2=.08$ ). The lower PA group reported living in communities less conducive to PA, reflected in interactions on three scales ( $\eta^2>.12$ ). Specifically, post-hoc ANOVAs showed less 'opportunities near home' was constraining for rural ( $\eta^2=.11$ ) and working adults ( $\eta^2=.06$ ). Lacking 'facilities and clubs nearby' was specifically constraining for 55-64 year-olds ( $\eta^2=.06$ ) and workers ( $\eta^2=.07$ ). The lower PA group also reported less 'support from coworkers' ( $\eta^2=.15$ ), and 'family' ( $\eta^2=.13$ ), and perceived age-related 'social norms' as less enabling ( $\eta^2=.11$ ). We discuss the breadth of conditions to be considered in promoting activity among older sporty adults, and the significance of community type, gender, age, and work status. Acknowledgements: This research was supported in part by a Social Sciences and Humanities Research Council and Sport Canada Strategic Initiative Grant

## 5. PHYSICAL ACTIVITY MOTIVATION AND CONFIDENCE PREDICT PERFORMANCE ON EFFORTFUL TASKS

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The Canadian Assessment of Physical Literacy evaluates children across four core domains: physical competence, daily behaviour, physical activity knowledge, and motivation for physical activity. The motivation and confidence score is comprised of four characteristics of motivation: 1) choosing a physical activity over a sedentary activity, 2) feelings of adequacy towards physical activity, 3) comparing levels of physical activity and physical skills to peers, 4) perceived benefits versus barriers for physical activity. The physical competence domain is comprised of eight competencies; the present study focused on plank (muscular endurance) and beep test (aerobic endurance) results, as both would be partially influenced by effort rather than pure fitness or skill. Motivation and confidence were expected to influence kids' persistence and effort in tasks such as plank and beep test (PACER). Twenty-seven grade 6 children completed online copies of self-report questionnaires assessing their physical activity motivation and physical competence (HALO, 2013), performed the Fitnessgram 20m PACER (Progressive Aerobic Cardiovascular Endurance Run; Meredith & Welk, 2010), and the plank isometric hold (Boyer et al., 2013). A regression analysis predicted plank score by physical activity motivation and confidence (accounting for 44.6% of the variance);  $F(1, 25) = 20.15, p < .001$ . A regression analysis predicted PACER score by physical activity motivation and confidence (accounting for 56.3% of the variance);  $F(1, 25) = 32.25, p < .001$ .

Acknowledgements: Funding support from ParticipAction through CHEO.

## 6. INVESTIGATING THE ORGANIZATIONAL CULTURE OF CROSSFIT

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Schein (2010) proposed that any group's culture can be analyzed at three levels: artifacts, espoused beliefs and values, and basic assumptions. Given the exponential growth, popularity, and success of CrossFit (Helm, 2013), it is beneficial to explore and better understand its culture. The purpose of this study was to investigate the organizational culture of CrossFit using Schein's (1985) conceptual framework. Focus groups were conducted with 17 participants from a CrossFit gym in northern Ontario including five new members (under 6 months), six veteran members (over 1 year), four coaches, and the two owners. The interview questions were structured around Schein's three levels of organizational culture. Support for all three levels of Schein's model of organizational culture was found within the CrossFit gym. Perceptions of culture were not dependant on status within the gym as all groups of participants (new members, veteran members, coaches and owners) perceived a similar culture. Artifacts reported included the rugged, industrial appearance of the gym (visual structures and processes) and the social nature of members' prior to/following each workout (observable behaviour). Espoused beliefs and values identified by the participants included pride in the gym and their workouts, inclusion of all abilities, and a strong sense of community that extended beyond the gym. A shared underlying assumption by all members, coaches and owners was the common goal of improving their health and well-being. This research has helped us better understand CrossFit's organizational culture and the values that have made it a successful organization.

## 7. UNDERSTANDING THE ROLE OF GUILT AND SHAME IN PHYSICAL ACTIVITY SELF-REGULATION

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Control theorists suggest that negative emotions result when goal progress is thwarted and, in turn, motivates goal pursuit. Control theorists do not differentiate between negative emotions or their implications for self-regulation yet self-conscious emotion researchers recognize distinctions between guilt and shame with different self-regulatory influences. Guilt results when transgressions are attributed to lack of effort and motivates effort. Attributed to inability, shame leads to goal disengagement. We examined guilt and shame relative to recent exercise behavior, as well as each emotion's motivational properties. In this online study, 175 adults completed measures of recent exercise quantity and quality, attributions, and shame and guilt relative to a day when they did and a day when they did not engage in intended exercise. Participants experienced more guilt ( $t = -10.784$ ,  $p < .0001$ ) and shame ( $t = -7.075$ ,  $p < .0005$ ) after a missed than an engaged-in exercise session. Of these two emotions guilt was felt more intensely ( $t = -6.613$ ,  $p < .0001$ ). Regressions determined that exercise quality was negatively related to both guilt ( $\beta = -.429$ ,  $p > .001$ ) and shame ( $\beta = -.499$ ,  $p > .001$ ); these emotions were not related to exercise intentions. Guilt was associated with an internal locus of casualty ( $\beta = .393$ ,  $p > .05$ ) and shame with stability ( $\beta = .248$ ,  $p > .05$ ). Logistic regressions showed that shame ( $\beta = -.11$ ,  $p = .05$ ), not guilt, was (negatively) associated with exercise. Findings partially support, within an exercise context, propositions about shame and guilt in self-regulation.

## 8. IDENTIFYING SALIENT BELIEFS REGARDING PHYSICAL ACTIVITY AMONG PARENTS OF CHILDREN WITH DISABILITIES: AN ELICITATION STUDY.

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Background: Parental support is an important contributor to physical activity (PA) among children and youth with disabilities (CWD) (Antle et al., 2007), yet predictors of parental support are not well understood. Purpose: To examine salient beliefs related to parental support among parents of CWD. Methods: Parents of CWD (N=28; Mage = 39.7, 92.5% female) completed an online questionnaire designed to elicit behavioural, normative and control beliefs based on an adapted Theory of Planned Behaviour (TPB) (Ajzen, 2006; Rhodes et al., 2013). Content analyses identified parents' salient beliefs about a) PA participation and b) supporting PA for CWD. Results: Salient beliefs included: a) behavioural beliefs for PA such as health benefits, feelings of normalcy, social interactions; b) behavioural beliefs for supporting PA such as bonding, parent PA participation, safety, mood and effort; c) normative beliefs regarding the importance of school, families with CWD and doctors; d) control beliefs for PA regarding availability, quality and accessibility of programming, and e) control beliefs for supporting PA including time, cost and transportation. Conclusion: Findings suggested that parents hold a range of beliefs toward PA and supporting their child's PA. Control beliefs were most prominently discussed. These data will inform the development of a questionnaire to identify key predictors of parental support, preferred sources and methods of communication for information and interventions regarding CWD PA. Information gained from this study will contribute to our understanding of parental support and examine the applicability of the TPB in identifying predictors of parental support for PA among CWD.

9. ASPEN MOVES! EXPLORING SOURCES OF SELF-EFFICACY FOR EXERCISE IN A COMMUNITY-BASED EXERCISE INTERVENTION: PRELIMINARY RESULTS.

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This study examined sources of self-efficacy (SE) and their relationship to task, coping and scheduling SE during a 6 month, community-based exercise intervention. Eighty-eight adults (M age = 43.39 years, N = 30 men, N = 58 women) were recruited and results from the first month are reported here. Activity was assessed with a Fitbit Flex. Sources of SE were assessed with 18 items (Warner et al., 2014) representing mastery experience, vicarious experience, verbal persuasion by others, self-persuasion, negative affect and positive affect. Task, coping and scheduling SE for exercise were assessed with 9 items (Rodgers et al., 2008). Correlations showed that verbal persuasion ( $r = -.22$ ) and vicarious experience ( $r = -.23$ ) were related to task SE. Coping SE was related to mastery experience ( $r = .52$ ), self-persuasion ( $r = .42$ ), positive affect ( $r = .23$ ), and negative affect ( $r = -.22$ ). Scheduling SE was related to mastery experience ( $r = .69$ ), self-persuasion ( $r = .58$ ), and positive affect ( $r = .23$ ). Regressions showed that no source predicted task SE. Coping SE was significantly predicted by mastery experience ( $R^2 = .31$ ,  $B = .38$ ), and scheduling SE was predicted by both mastery and self-persuasion ( $R^2 = .46$ ,  $B = .58$  and  $.20$  respectively). Activity (steps) was predicted by scheduling SE ( $R^2 = .21$ ,  $B = .30$ ). Results suggest that early in an exercise intervention, encouragement from others does not foster positive task SE beliefs. Mastery experience and self-persuasion were key sources of SE, with scheduling SE prospectively predicting behaviour.

## 10. DO INCENTIVES INCREASE ACTION PLANNING IN A WEB-BASED WALKING INTERVENTION?

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**Objective:** Examining the use of incentives to promote action planning in university employees participating in the web-based RISE@Work walking intervention. **Methods:** Lower-active, full-time University of Toronto employees were invited to participate in RISE@Work. The 11-week program engages participants in evidence-based behavioural support strategies with the goal of increasing their daily step counts by 3000 steps over 5-Phases. Half of the recruited participants were randomly assigned to an incentive condition where they received a \$5 Starbucks e-gift card each week for completing at least 1 new action plan during weeks 3-7. Intention to treat was conducted and repeated measures ANCOVAs were used to analyze mean step count differences between the two groups, during the 4-week incentive period, controlling for baseline step counts. **Results:** The final sample (n=55; age=41.07 years±10.62; BMI=25 kg/m<sup>2</sup>±SD4.99; 85.5%Female) experienced a significant increase of 1728±2875 daily steps over baseline steps (p=.04). During the 4-week incentive period, 57% participants in the incentive group and 8% in the control group completed action plans; only 6% of the incentive group continued planning at post-intervention. At the end of the incentive period (Phase 3) the incentive group accumulated more steps, representing a small effect size (d=.37). Although there were no significant between group differences at post-intervention, 73% of the incentive group versus 43% of the control group increased from low-active (5,000-7,500 steps/day) to somewhat-active (7,500-9,999 steps/day). **Conclusions:** Offering incentives resulted in increased planning, but only short-term increases in steps. Research is needed in identifying the best way to incorporate incentives into the design of web-based physical activity behaviour change interventions. **Acknowledgements:** GEF is supported by a Canadian Institutes of Health Research-Public Health Agency of Canada (CIHR-PHAC) Chair in Applied Public Health. MM is supported by the Canadian Institutes of Health Research (CIHR) [grant number 305843].

## 11. EFFECTS OF PERFORMANCE FEEDBACK ON SELF-EFFICACY AND PHYSICAL PERFORMANCE ARE MODERATED BY SELF-CONTROL STRENGTH DEPLETION

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NASPSA outstanding student paper award winner

Self-control is a key determinant of physical endurance (e.g., Bray et al., 2008). According to control theory (Carver & Scheier, 2011), performance feedback influences self-control such that when people underperform (low feedback) they increase effort, while those who overperform (high feedback) withdraw effort. This perspective clashes with self-efficacy theory (Bandura, 1997) which proposes that positive performance increases self-efficacy and performance. The purpose of this study was to investigate the independent and interactive effects of self-control strength depletion (Baumeister, 2014) and feedback on self-efficacy and endurance performance. Participants (N = 78) performed two isometric endurance handgrip trials separated by a congruent (no depletion) or incongruent (depletion) Stroop task and a normative (high/low/no) feedback manipulation regarding their performance on the first handgrip trial. A 2x3 ANOVA of the change in endurance performance from trial 1-2 produced several significant effects. Of primary interest, there was a significant interaction between depletion and feedback (p < .001). In the no depletion conditions, high feedback led to lower self-efficacy and

performance while low feedback led to higher self-efficacy and performance. However, the reverse was seen in the self-control depletion groups. The effects of feedback on performance in the control conditions support control theory as well as self-efficacy theory insofar as self-efficacy was positively associated with performance. The results from the depletion conditions suggest performance feedback information is processed differently when self-control resources are compromised. Researchers and practitioners should be considerate of participants' level of self-control depletion when providing performance feedback to manipulate self-efficacy and exercise performance.

## 12. SELF-CONTROL STRENGTH DEPLETION REDUCES SELF-EFFICACY TO EXERT SELF-CONTROL, TASK SELF-EFFICACY, AND IMPAIRS RESISTANCE EXERCISE PERFORMANCE

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Recent research based on the strength model (Baumeister, 2014) showed self-control depletion led to a reduction in task self-efficacy, which was found to mediate the effect of depletion on physical endurance (Graham & Bray, 2015). However, because self-control strength reflects a generalized capacity, we reasoned that self-control depletion should lead to an overall reduction in self-efficacy to exert self-control (SESC), which then informs task self-efficacy. This study investigated the effects of self-control depletion on perceived SESC, task self-efficacy, and endurance performance of resistance exercise. We tested a sequential mediation model predicting self-control depletion --> SESC --> task self-efficacy --> task performance. Participants (N = 50) completed a baseline measure of SESC and then performed one set of maximum repetitions on bench press (at 60% of 1RM) and leg extension (at 40% of 1RM) followed by either an incongruent (depletion) or congruent (control) Stroop task. They then completed measures of SESC and task self-efficacy, followed by a second set of maximum repetitions. Participants in the depletion condition reported lower SESC and task self-efficacy, and performed fewer repetitions compared to controls ( $p < .01$ ). Mediation analyses revealed an indirect (mediation) effect for task self-efficacy in the relationship between self-control depletion and performance for bench press (95% C.I. = 0.28-1.98) and leg extension (95% C.I. = 0.19-1.38). However, the effects for SESC were not significant. Although sequential mediation was not evident, findings supported theorizing that self-control depletion should weaken SESC. Results also extend prior research and are the first to have used resistance exercise as a physical performance task.

## 13. SELF-EFFICACY AND OUTCOME EXPECTATIONS RELATED TO REDUCING SEDENTARY BEHAVIOUR AND INCREASING PHYSICAL ACTIVITY IN OLDER ADULTS WITH A MOBILITY LIMITATION

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Background: Few older adults with a mobility limitation achieve sufficient physical activity (PA) due to pain and physical dysfunction. In this population, reducing sedentary behaviour (SB) may be a more realistic starting point to modify activity behaviours compared to increasing PA. However, it is unknown how receptive this population is to this novel health intervention. We used social cognitive theory to examine receptivity of older adults with a mobility limitation to reducing SB relative to increasing PA. Specifically, we compared participants' self-efficacy and outcome expectations related to both behaviours. Methods: Pre-operative (n=39) and one-year post-operative (n=37) total knee

replacement patients completed self-efficacy (task and self-regulatory efficacy) and outcome expectation questionnaires related to reducing SB and increasing PA. Paired samples t-tests and Wilcoxon Signed Rank Tests (for non-normal distributions) were used for statistical analyses. Results: Independent samples t-tests (with Bonferroni corrections) showed no significant differences between pre- and post-op groups. Therefore, groups were collapsed for analyses. Patients reported greater task self-efficacy for reducing SB (Median=80.89, IQR= 34.71) compared to increasing PA (Median=71.43, IQR=40.00) ( $Z=-2.441$ ,  $p=0.015$ ). There was no difference between patients' self-regulatory efficacy for reducing SB ( $M=4.95$ ,  $SD=1.95$ ) compared to increasing PA ( $M=4.63$ ,  $SD=2.01$ );  $t(75)=1.802$ ,  $p=0.076$ . Increasing PA was more strongly expected to lead to positive outcomes ( $M=4.07$ ,  $SD=0.54$ ) than reducing SB ( $M=3.89$ ,  $SD=0.72$ ;  $t(74)=-2.89$ ,  $p=0.005$ ). Conclusion: Although patients were more confident to reduce SB than increase PA and were equally confident to manage both behaviors, educating this population about positive outcomes associated with reducing SB may enhance receptivity to SB interventions.

#### 14. COMPARING MOTIVATIONAL DIFFERENCES BETWEEN COMPETITIVE AND RECREATIONAL WEIGHT TRAINERS USING ORGANISMIC INTEGRATION THEORY: A REPLICATION AND EXTENSION STUDY

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Objective: Grounded in Organismic Integration Theory (OIT; Deci & Ryan, 2002), the purpose of this study was to examine differences in motives for participation behaviour reported by competitive (CWT) and recreational (RWT) weight trainers. Methods: CWT ( $n = 177$ ;  $M_{age} = 30.86$  years;  $SD_{age} = 11.35$  years) and RWT ( $n = 196$ ;  $M_{age} = 21.97$  years;  $SD_{age} = 6.05$  years) provided data using a cross-sectional, non-experimental design. Participants completed a multi-section questionnaire that included demographic items, habitual weight training behaviour items, and the Behavioural Regulation in Exercise Questionnaire-2 plus items assessing integrated regulation. Results: The CWT reported more weight training sessions during a typical week ( $t(367) = 3.58$ ,  $p < .01$ ,  $95\%CI = 0.20 - 0.69$ ; Cohen's  $d = 0.37$ ) and more days of weight training over the past week ( $t(371) = 3.85$ ,  $p < .01$ ,  $95\%CI = 0.23 - 0.70$ ; Cohen's  $d = 0.40$ ) compared to the RWT. Multivariate differences were evident in the motives for weight training reported by CWT and RWT ( $F(5, 362) = 43.58$ ,  $p < .01$ , Wilks' Lambda =  $0.62$ ,  $\eta^2 = 0.38$ ). Follow-up analyses indicated the CWT reported more identified, integrated, and intrinsic regulations for weight training compared to the RWT who reported greater levels of external regulation ( $\eta^2 = 0.09$  to  $0.34$ ; all  $p$ 's  $< .05$ ). Discussion: Overall, the results of this study make it apparent that motivational differences within the OIT framework exist between competitive and recreational weight trainers that may be important for understanding participation behaviour in this context.

#### 15. MODERATE-INTENSITY PHYSICAL ACTIVITY MODERATES THE RELATIONSHIP BETWEEN LIFE EVENTS AND DEPRESSIVE SYMPTOMS IN EMERGING ADULTS

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Emerging adulthood is an inherently stressful time characterized by instability and life change that may be linked to higher risk for depressive symptoms. Identifying potential mechanisms protecting

from the effects of stress on depression may inform stress management programs targeting an understudied population of emerging adults. Physical activity (PA) may be a modifiable strategy aimed at reducing depressive symptoms emanating from periods of high stress. The purpose of this cross-sectional study was to explore PA as a moderator of the relationship between stress and depression among emerging adults. A total of 790 young adults participating in the Nicotine Dependence in Teens (NDIT) study provided self-report data on depressive symptoms, stressful life events experienced in the last year, and time spent in light, moderate, and vigorous intensity PA at age 20 (SD= 0.7 years). Based on regression analysis controlling for sex, age, and socioeconomic position, life stress ( $\beta = 0.22$ ,  $p < .01$ ) was a significant predictor of depressive symptoms. Moderate intensity (but not light and vigorous intensity) PA moderated this relationship ( $\beta = -0.08$ ,  $p < .05$ ), such that engagement in more moderate PA was associated with fewer depressive symptoms among individuals with high stress, while there was no association among individuals with low stress. These results provide continued evidence of the benefits of moderate-intensity PA in stress and mental health outcomes, and highlight the need to investigate different exercise intensities when exploring PA as a moderator of life stress.

#### 16. EXAMINING BEST PRACTICES FOR IMPLEMENTING INCLUSIVE PHYSICAL ACTIVITY PROGRAMS FOR YOUTH WITH AND WITHOUT DISABILITIES: PARENT AND STAFF PERSPECTIVES

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Despite the benefits of physical activity (PA), inactivity rates among Canadian youth (with and without disabilities) are of great concern. Inclusive PA programming is one strategy to improve PA participation among youth, yet research examining the characteristics of successful inclusive programming targeting this population is limited. Therefore, this study qualitatively examined the perspectives on best practices for designing and implementing an inclusive, community-based PA program from two key stakeholders – parents of inactive youth with or without disabilities and community PA programmers. Individual, semi-structured interviews were conducted with parents (n=6) (2 with youth with disabilities), and staff involved in current inclusive PA programs (n=5). Interviews were audio-recorded, transcribed verbatim, and subjected to a thematic analysis. Parents of youth both with and without disabilities reported that engaging and encouraging staff members were the primary factor for successful programs. Additionally, a non-competitive environment that fosters goal-setting, fitness/sport skill development, and offers appropriate activities were listed by parents and staff as additional components of successful inclusive PA programs. Parents and staff alike discussed the value of recruiting through parents and local schools; social media, although popular among youth, may not be suitable for recruitment. Staff also highlighted that equipment availability and training resources are limitations for inclusive programming. Parents and staff emphasized that fitness is a focus for this population, which should be reflected in the program curriculum. These preliminary findings provide feedback for the development of future inclusive PA programs for youth as well as contributing to the limited research on inclusive PA programming.

#### 17. TRANSLATING PHYSICAL ACTIVITY RECOMMENDATIONS INTO STEPS PER DAY FOR CARDIAC REHABILITATION PATIENTS

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Background: It is recommended that people attending cardiac rehabilitation (CR) programs engage in  $\geq 150$  minutes per week of moderate to vigorous physical activity (MVPA). However, it is unknown how many steps / day are required to meet the MVPA recommendation. Methods: 208 patients were recruited within the 1st 3 weeks of attending 12-week CR programs across Nova Scotia. They also completed a comprehensive social ecological survey and wore an actigraph accelerometer and GPS unit ranging from 9 to 14 days. The same procedure was done at the end of CR; only baseline data were analyzed for the current submission. Results: 190 patients (45.3%  $\geq 65$ ; 76.8% male; 51.1% retired; 40.0% obese; 44.7% had a myocardial infarction) at baseline had  $\geq 3$  valid days (i.e.,  $\geq 10$  hours of wear time / day) were included in the analysis. Total minutes of MVPA for the week recorded in bouts  $\geq 10$  minutes were dichotomized into 0 =  $\leq 150$  minutes / week and 1 =  $\geq 150$  minutes / week. Receiver operating characteristic curve (ROC) analyses showed that 6998 steps per day produced a sensitivity of .94 and specificity of .21 with an area under the curve of .90. Discussion: CR patients who engage in 6998 steps per day are likely meeting the 150 minute / week MVPA recommendation. Future studies need to replicate the current findings and determine whether the 6998 steps per day recommendation holds true for various sub-groups (e.g., males vs. females). Acknowledgements: Nova Scotia Health Research Foundation

#### 18. AN EXAMINATION OF THE SYNCHRONY EFFECT IN A SHORT DURATION EXERCISE CONDITION.

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Individuals participating in vigorous activity, in synchrony with others have been shown to exhibit a significantly higher endorphin release than performing the same activity alone. This finding, dubbed the Synchrony Effect (SE), has been repeatedly found in studies involving rowing from 30-35 minutes (Cohen et al., 2010; Sullivan & Rickers, 2013). Synchronized activities of a much shorter duration have been shown to affect the behavior of participants (Vandesolo et al, 2010). The current study was designed to see if the SE could be seen in shorter rowing duration. A sample of 54 individuals rowed in pairs on ergometers in counterbalanced 10 minute sessions of individual and group (synchronized) exercise. Pain threshold was taken immediately prior to and after the exercise, using an algometer, to indicate endorphin activity. A paired samples t-test comparing pre to post changes in pain threshold showed no difference between the conditions ( $t(1, 53) = 0.87, p > .05$ ) failing to support the SE. It appears that activities longer than 10 minutes are needed to induce the SE, although shorter duration synchronized activities may still affect social outcomes. An alternative explanation may lie in the nature of the samples in the SE studies. Prior studies typically used samples of experienced rowers, who may be more capable of optimizing synchrony than the non-rowers in the current study. It may be that a finer degree of synchrony than the current sample of non-experienced rowers could maintain is required for the SE.

#### 19. THE PHYSICAL ACTIVITY MONITORING STUDY: EXAMINING PHYSICAL ACTIVITY PREFERENCES AMONG CHILDREN AND YOUTH WITH PHYSICAL DISABILITIES

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Children and youth with disabilities (CWD) are less physically active, and participate in less

community-based sport and physical activity programs than their typically developing peers. This is problematic because there are numerous health benefits associated with regular physical activity (PA) participation, including physical and social well-being and quality of life. The PA patterns of children and youth without disabilities has received some attention in the literature, however, little is known about the PA preferences of CWD. Purpose: The purpose of this study was to examine PA preferences of CWD. Methods: Participants (n=34; Mage = 15.35 ± 3.26 years; 62% male) completed a one-time, paper and pencil questionnaire consisting of a series of questions related to PA and sedentary behaviour and preferences related to types of PA, intensity, location, and timing of activity. Results: Participants were most interested in swimming (74.2%), basketball (41.9%), and soccer (38.7%). The most preferred time for taking part in PA programs was during the afterschool hours (41.9%). Participants were most interested in being active with their close friends (63.3%), in a gym setting (60%), and in PA that is perceived to be of moderate intensity (54.8%). Conclusion: Findings from this study shed new light on the desire of CWD to participate in community-based PA settings, alongside their close friends. The results of this study have implications for community settings which may have previously overlooked the opportunities to provide positive PA experiences for CWD.

## 20. BODY IMAGE, PHYSICAL ACTIVITY, AND VIEWING PATTERNS OF PHYSIQUE IMAGES AMONG WOMEN

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Exposure to media images of thin-ideal female physiques is linked to numerous maladaptive psychosocial outcomes, yet factors associated with propensity for media exposure have not been identified. This study examined the gaze patterns of women who were implicitly exposed to images of thin-ideal and average weight female models, and to test if behavioural (physical activity) and personal (body image and affect) factors differentiate viewing patterns. Healthy weight females (N=32) completed a computer-based experiment and self-report questionnaires on affect, perceptions, and behaviour. In the laboratory, one calendar depicting a thin-ideal female model and another depicting an average-weight female model were placed on either side of the participant. Unknown to participants, cameras recorded their gaze behaviour. The number of looks at each image was analyzed. A MANCOVA controlling for ethnicity and propensity for social comparison revealed that physically active women gazed at the average-weight image relatively more than at the ideal image, whereas inactive women did the opposite (physical activity x image interaction,  $F(1,28)=4.36, p<.05$ ). In addition, women with higher physical self-discrepancy gazed significantly more frequently at the ideal image compared to women low on self-discrepancy (attractiveness discrepancy x image interaction,  $F(1,30)=4.31, p<.05$ ). Positive and negative affect were not significant factors associated with gaze patterns. Consistent with social comparison perspectives, the present findings indicate that physical activity and body image cognitions may differentiate the way women view and interpret physique images. These results offer insight into factors that should be targeted to protect from the potential deleterious effects of media image exposure.

Acknowledgements: Funding for this study was provided by a Faculty of Kinesiology and Physical Education Internal Grant

## 21. THE EFFECTS OF GOAL-SETTING IN A SECONDARY PHYSICAL EDUCATION PROGRAM

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Purpose: The purpose of this study was to determine the effects of a goal-setting intervention on

students' fitness and achievement goals within physical education settings. Method: This study involved thirty-two (N=32) male and female participants in 9th-11th grade from a charter high school focused on the arts, science and engineering. Charter schools are independent public schools with focus on choice and control over their curriculum. Participants were taught about SMART-C principles and set short term SMART-C goals for 3 areas of the FITNESSGRAM including PACER, Push Ups, and Curl Ups during the course of a semester. The effects of goal-setting were determined through the use of questionnaires, focus group interviews, and fitness testing. Focus group interviews addressed students' past goal-setting experiences and perceptions of the intervention. Results: Thirty-three percent of participants met their goals, while 75% exceeded their initial score on the FITNESSGRAM. The two most common types of goals set by participants were Mastery Approach and Performance Avoidance indicating a mix of task and ego goal orientations. Results from the qualitative and quantitative data indicated that although high school students believed goal-setting was useful, they had difficulty setting and adhering to their goals. Discussion/Conclusions: This study adds to a small body of research supporting the use of goal-setting interventions for fitness among adolescents in charter school physical education programs. Further study is warranted in examining how best to maximize student engagement in goal-setting.

## 22. DOES SELF-COMPASSION MODERATE THE RELATIONSHIP BETWEEN GOAL IMPORTANCE AND ANTICIPATED EMOTION WHEN FAILING TO MEET A GOAL?

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Emotions have been shown to play an important role in goal pursuit (Carver & Scheier, 1990). Researchers (Neff et al., 2005) have demonstrated that self-compassion moderates emotional reactions after goal failure. However, little research has examined the role of self-compassion on anticipated emotions when failing to reach a goal. Adults (N = 130; Mage = 38.34, SD = 11.42 years) training for a marathon or half-marathon reported goals for the upcoming race, goal importance, anticipated positive and negative emotions when failing to reach the goal, and self-compassion. Separate moderation analyses were conducted using the SPSS macro PROCESS with anticipated emotions estimated from goal importance, self-compassion, and their product. Self-compassion was a significant moderator of the relationship between goal importance and the anticipation of negative emotions (R<sup>2</sup>adj. = .27; point estimate = -.1793; BC CI = -0.2782 to -0.0804). Simple slope tests revealed a positive association between goal importance and anticipated negative emotions, but goal importance was less strongly related to anticipated negative emotions for high levels of self-compassion (b = .25, p = .006) than for moderate (b = .43, p < .001) or lower levels (b = .61, p < .001). Goal importance (point estimate = -.2299; BC CI = -.3950 to -.0649) and self-compassion (point estimate = .2499; BC CI = .1067 to .3931) were significantly associated with anticipation of positive emotions when failing to reach the goal (R<sup>2</sup> = .12, p = .001), with no significant interaction. Based on these findings, self-compassion may promote persistence towards important goals as individuals anticipate experiencing fewer negative emotions if they fail to reach their goal.

Acknowledgements: This research was supported by the Social Sciences and Humanities Research Council of Canada.

## 23. PHYSICAL ACTIVITY AND BODY IMAGE AMONG MALES: A META-ANALYSIS

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Three meta-analyses conclude that physical activity (PA) is positively related to body image (BI).

Historically, PA and BI research has been disproportionately focused on women. For example, the most recent meta-analysis (Campbell & Hausenblas, 2009) extracted 56 effect sizes for women and only 12 for men. Although these authors reported no statistical differences in the effects of PA on BI between men and women, the relatively few studies of men limit the generalizability of the findings. Further, little is known about moderators of the PA-BI relationship among men as existing meta-analyses have failed to separate male and female samples for these analyses. This is noteworthy as many variables (e.g., drive for muscularity) may affect the PA – BI relationship differently between males and females. With increased research regarding male BI in recent years, the purpose of this study was to update meta-analytic evidence regarding the PA – BI relationship among men. A literature search returned 34,758 articles; 54 met inclusion criteria. A medium effect size was obtained across all studies (Hedges  $g=0.571$ ,  $p<0.001$ ). After excluding outliers and separating studies based on study design, there were medium-to-large effects for randomized controlled trials ( $k=13$ ,  $g=0.645$ ,  $p=0.001$ ), small effects for single-group studies ( $k=7$ ,  $g=0.229$ ,  $p=0.014$ ) and small-to-medium effects for correlational studies ( $k=27$ ,  $g=0.471$ ,  $p<0.001$ ). Moderator analyses were conducted to assess the impact of sample characteristics (e.g., age, BMI) and intervention features (e.g., type/amount of exercise, intervention duration). Overall, PA is positively related to BI among males with various moderator variables warranting further investigation.

#### 24. ASSESSING PHYSICAL ACTIVITY AND SEDENTARY BEHAVIOUR IN CARDIAC REHABILITATION: IMPLICATIONS OF USING UNIAXIAL VERSUS VECTOR MAGNITUDE ACCELEROMETER DATA

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**Purpose:** This study compared the minutes/day of moderate-to-vigorous physical activity (MVPA) and sedentary time (ST) using the vertical axis (uniaxial) vs. vector magnitude (VM: triaxial) counts per minute data in cardiac rehabilitation (CR) patients. **Methods:** Accelerometry data was collected on 46 (14 women, mean age 62) CR patients. Patients wore an accelerometer for 9 days at the beginning (i.e., within the 1st three weeks), end, and 3-months after completing CR. For the current abstract, data is only available for baseline data collection. **Results:** Separate paired sample t-tests were performed to examine whether there were differences in the minutes/day of MVPA and ST calculated using the uniaxial vs. VM data, respectively. Results showed there was a significant difference in both the minutes/day of MVPA [ $t(43) = -14.12$ ,  $p = 0.00$ ] and ST [ $t(43) = 10.46$ ,  $p = 0.00$ ] using uniaxial vs. VM data. Measurement of agreement between the minutes/day of (a) MVPA for the uniaxial vs. VM, and (b) ST for the uniaxial vs. VM, were examined using Bland-Altman plots. Results showed that the uniaxial data underestimated participants' daily time in MVPA by 24 (+ 15) minutes and overestimated ST by 72 (+ 34) minutes compared to MVPA and ST calculated using VM data. **Conclusion:** Utilizing either uniaxial or VM data was found to significantly impact MVPA and sedentary behaviour outcome measures in CR patients. These findings highlight the impact different accelerometer data post-processing procedures can have on outcome measures in this population.

#### 25. EXPECTATIONS, OUTCOMES, AND MOTIVATION IN NEW EXERCISERS

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Bandura's (1986) Social Cognitive Theory suggests that individuals' outcome expectations for a behaviour will affect motivation, such that when people's expectations are not met, their motivation to persist in the behaviour is negatively impacted. New exercisers often begin programs with high hopes

for change in many aspects of their lives, and when their actual outcomes fall short of their expectations, exercise participation may decline or cease altogether. The purpose of this study was to explore the outcome expectations of participants who had completed a one year exercise program. Semi-structured interviews were conducted with 17 participants (10 females), with an average age of 49.2 (SD = 10). Upon initial analysis using a qualitative description approach, six themes emerged. These themes included 1) weight loss and changes in appearance, 2) social support, 3) increased competence in exercise, 4) quality of life outcomes, 5) unexpected environmental and personal barriers, and 6) accountability and commitment to a structured research program. It is worth noting that after the completion of the one year program, the majority of these participants did not continue exercising at the same level of frequency or intensity. It may be important for new exercisers to regularly re-evaluate their expectations and adjust goals accordingly in order to maintain motivation for exercise. This research also reinforces the importance of imparting realistic expectations when “selling” exercise to a sedentary population.

Acknowledgements: This study was supported by the Canadian Institutes of Health Research.

## 26. THE EFFECTS OF AEROBIC EXERCISE ON COGNITION AND GAIT IN PARKINSON’S DISEASE: DOES BASELINE COGNITIVE STATUS MATTER?

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Aerobic exercise has been shown to improve both cognition and gait in Parkinson’s disease (PD). However, it remains unknown whether exercise selectively influences cognition and gait in cognitively intact and cognitively impaired individuals with PD. This study aimed to investigate whether cognitive status influences the potential benefits of aerobic exercise on cognition and gait in PD. Thirty-nine individuals with PD were randomly allocated into an aerobic exercise or a control group. Participants were classified at baseline as cognitively intact or impaired. The aerobic group attended 60-minute sessions, 3x/week, for 12 weeks, while the control group carried on with their typical daily activities. Assessments included ten neuropsychological tests, in addition to single and dual-task gait. An interaction between time and group found for processing speed ( $p=0.02$ ) showed that the aerobic group was faster after intervention ( $p=0.046$ ). A time by group by cognitive status interaction for processing speed ( $p=0.034$ ) revealed that cognitively impaired control participants worsened after 12 weeks. Another time by group by cognitive status interaction was found for inhibitory control ( $p=0.048$ ), showing that both cognitively intact ( $p=0.039$ ) and impaired ( $p=0.030$ ) participants improved inhibition after aerobic exercise, while only cognitively impaired control participants ( $p=0.006$ ) were better at post-test. In relation to gait, a time by task by group interaction was found for step width ( $p=0.029$ ), demonstrating that at post-test the aerobic group had wider steps ( $p=0.005$ ) while the control group had narrower steps (0.024) during dual-task walking. Results suggest that both cognitively intact and cognitively impaired individuals with PD may benefit from aerobic exercise.

Acknowledgements: Canada Foundation for Innovation, Sun Life Financial, and CNPq

## 27. ARE OBJECTIVE INDICATORS OF SEDENTARY BEHAVIOUR ASSOCIATED WITH SUBJECTIVE WELLBEING IN ADULTS AGED 75 AND OVER?

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Older adults, the fastest growing segment of the population, spend the majority of waking hours in sedentary activities, potentially declining wellbeing. While physical activity (PA) has been shown to positively influence subjective wellbeing (SWB), little is known about the association between sedentary behaviour (SB) and SWB, particularly in older adults. The purpose of this study was to investigate the relationship between SB and SWB in older adults, while controlling for PA. Twenty-nine older individuals (Mage=81) with a range of PA levels (n=15 athletes, n=14 non-athletes) participated in the study. Demographic data (age, sex, marital status, education) and SWB variables (optimism, positive affect, life satisfaction) were collected by self-report questionnaire. The total number of sedentary bouts/breaks per week and daily average time spent in sedentary bouts/breaks and PA were measured by 7-day accelerometry. Partial correlations were conducted to investigate associations between SB and wellbeing, while controlling for PA, group (athlete, non-athlete), and associated demographics. The total number of sedentary bouts/week was moderately associated with optimism ( $r=-.48$ ) and life satisfaction ( $r=-.37$ ), and weakly related to positive affect ( $r=-.17$ ). The daily average time spent in breaks from SB was moderately associated with optimism ( $r=.36$ ), and weakly linked with positive affect ( $r=.16$ ). The daily average time spent in bouts of SB was weakly linked to life satisfaction ( $r=-.17$ ). This study provides preliminary evidence of the relationship between SB and wellbeing, beyond that of PA, among older adults. This new area of research could ultimately inform the development of effective interventions to reduce SB and improve wellbeing in older adults.

## 28. EXPLORING THE LINK BETWEEN PARENTAL SOCIAL CONTROL FOR PHYSICAL ACTIVITY AND RELATIONSHIP QUALITY

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Parental social control (SC) has been associated with children and adolescents' physical activity behavior (Wilson & Spink, 2011). SC reflects one's regulatory attempts to prompt or persuade another to perform a desired behavior (Lewis & Butterfield, 2005). In adults, SC attempts also have been associated with relationship satisfaction (Reich & Olmsted, 2007). As such, this study explored the relationship between perceptions of parental SC and parents' and children's perceptions of relationship quality. Thirty dyads consisting of one parent (24 mothers & 6 fathers) and one child (15 girls & 17 boys, aged 8-15 years) completed an online questionnaire that asked about the social control the parents exerted (Wilson & Spink, 2010) and the parent-child relationship quality (Hair et al., 2008). Actor, Partner Independence Models (Kashy & Kenny, 2000) were specified using multilevel modeling (Cook & Kenny, 2005). Relationship quality was the outcome variable and a separate model was performed for each of the SC types (positive, collaborative and negative). Findings from the model with positive SC revealed that neither the actor or partner effects were significant ( $p > 0.1$ ) suggesting that positive SC use was unrelated to relationship quality. For collaborative SC, a partner effect approached significance ( $b=0.14$ ,  $p=0.1$ ). Parents who perceived higher collaborative SC had children who perceived higher relationship quality. For negative SC, there was a significant actor effect for the child such that when children perceived more negative SC, they reported a lower relationship quality ( $b=-0.14$ ,  $p=0.01$ ). These findings provide some support for the link between SC and relationship quality.

## 29. WHY DO YOU EXERCISE? PRELIMINARY FINDINGS FROM THE "ASPEN MOVES!" COMMUNITY-BASED PHYSICAL ACTIVITY INTERVENTION.

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Reasons for exercise (RE) were explored after the first month of initiating a 6-month community-based physical activity intervention. The objectives were to examine the importance of health-related and appearance-related RE after 1-month of the intervention; and to assess the role of sex, age, BMI and physical activity status (PA) on RE. Eighty-eight adults (M age = 43.39 years, M BMI = 25.89 kg/m<sup>2</sup>, N = 30 men, N = 58 women) completed baseline measures. Demographics and the RE Inventory (Silberstein, et al., 1988) were assessed. Participants rated the importance of 24 items representing seven RE domains (weight control, body tone, attractiveness, mood, health, fitness, and enjoyment). Descriptive statistics were assessed. Separate one-way between-group MANOVAs were conducted to investigate sex (male/female), age (above/below 50th percentile), BMI (healthy/overweight-obese) and PA (active/inactive) according to the seven RE domains. Follow-up ANOVAs were conducted when MANOVAs were significant. Differences between age ( $F(7,73)=4.40$ ,  $p=.001$ ; Wilks'  $\lambda=.70$ ; partial eta square=.30) and BMI ( $F(7,73)=2.64$ ,  $p=.02$ ; Wilks'  $\lambda=.80$ ; partial eta square=.20) were statistically significant according to RE. Follow-up analysis indicated health ( $F(1,79)=6.85$ ,  $p=.01$ ; partial eta square=.08) was more important to older (M = 6.17) than younger participants (M = 5.65). After applying a Bonferroni correction to the follow-up ANOVAs, RE was not significantly according to BMI. Health and appearance RE will be examined across the intervention to assess changes over time according to physical activity and demographic factors. Understanding RE over an exercise initiative supports goal-setting, program development and recruitment for both research and practice.

30. "YOU GOT A FRIEND IN ME": THE EFFECTS OF AN EXERCISE INTERVENTION ON PEER AND EXPERT SOCIAL SUPPORT IN OLDER ADULTS

Jermel Pierre<sup>1</sup>, KL Gammage<sup>1</sup>, L Lamarche<sup>1</sup>, AL Adkin<sup>1</sup>

Social support is a key component in facilitating initiation and adherence to physical activity, as it may provide increased motivation (Eyler et al., 1999). The purpose of this study was to investigate the effect of a 12-week exercise and balance training program on social support in older adults.

Participants (women = 212, men = 81; Mage = 68.3  $\pm$  6.42 years) were community dwelling older adults free from neuromuscular conditions. They were randomly assigned to either an exercise group or control group. The exercise group completed a 12-week exercise program, consisting of 3 weekly exercise sessions in accordance with Canadian physical activity guidelines; the control group was instructed to continue their normal activities. Social support was assessed at the beginning and end of 12 weeks. The exercise program was based on social cognitive theory, designed to foster self-efficacy and social support through both peers and student trainers. Two separate repeated-measures ANOVAs were conducted to determine if there were group differences in social support from baseline to follow-up testing. There was a significant group-by-time interaction for both peer social support,  $F(1, 292)=11.87$ ,  $p<0.01$  and expert social support,  $F(1, 292) = 12.65$ ,  $p<0.01$ . Paired sample t-tests showed that both peer and expert social support significantly increased in the exercise group, with no change in the control group. These findings indicate that both peers and trainers can be effective at fostering social support in older adults, which may be a simple and inexpensive way to positively impact exercise behaviours in seniors.

31. EXAMINING ASSOCIATIONS BETWEEN DIFFERENT HEALTH BEHAVIORS AND MENTAL HEALTH IN HOCKEY PARENTS

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School of Human Kinetics, University of Ottawa

In line with recent concerns about the negative impact of competitive sports on families (Bean, Fortier, Post & Chima, 2014; Merglen et al., 2013) and as part of a larger research project on hockey, extracurricular activities and mental health in youth (Fortier et al., 2015), we examined relationships between health behaviors and mental health in hockey parents. Sixty one youth hockey parents responded to online surveys composed of validated scales via FluidSurveys. Results of the study indicated a strong, negative correlation between total number of physically active days per week and number of junk food days per week ( $r = -.523, p=.009$ ). There was also a medium, positive correlation between strenuous physical activity and mental health ( $r = .486, p=.012$ ). These findings are in line with previous research (Mammen & Faulkner, 2013; Pereira et al., 2014), shed light on an overlooked population, that of parents of competitive sport youth and point to the importance of hockey parents maintaining their own physical activity.

### 32. SELF-REACTION AMONG ATHLETES: EXPLORING THE CASE FOR AN UNDER-STUDIED ASPECT OF SELF-REGULATION

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Self-reaction processes are important for self-regulation (Bandura, 1986; Zimmerman, 2000); however, no research has examined them in relation to sport expertise development. Sixty-eight athletes (31 m, 37 f, ages 13-18; involvement = 16.6 hrs/wk, SD = 9.3) completed 16 survey items representing five self-reaction variables (i.e., self-reward, self-punishment, task satisfaction, self-withholding, and natural rewards; Anderson & Prussia, 1997), questions on skill level (local to international), amounts of deliberate practice, and variables reflecting long-term striving. Exploratory factor analyses (direct obliminal) were performed on the 16 item pool, and after iterative deletion of problematic items (2 for natural rewards, 1 for self-punishment), a four-factor solution resulted (cumulative variance 63.3%): self-withholding (3 items; 32.9%;  $\alpha = .85$ ), self-reward (3 items; 9.7%;  $\alpha = .88$ ), self-punishment (3 items; 7.3%;  $\alpha = .80$ ), and a factor wherein natural rewards merged with task satisfaction (4 items; 13.5%;  $\alpha = .75$ ). We conducted initial tests of validity on scores for these factors. Skilled and less-skilled groups did not differ on any scale,  $ps > .07$ , and no scale showed an association with amounts of deliberate or physical practice,  $ps > .31$ . However, task satisfaction was associated with future sport self ( $r = .57, p < .001$ ), suggesting that athletes focused on satisfying conditions related to practice also report a higher drive to reach the upper echelon of sport in the long-term. Task satisfaction ( $r = .37$ ) and self-punishment ( $r = .31$ ) correlated ( $ps < .01$ ) with consideration of future consequences, with the latter relationship indicating that athletes who are harder on themselves following underachievement also report a greater focus on the long-term outcomes of their practice efforts.

Acknowledgements: This research was funded by a grant from the Research Development Program and the Faculty of Health Sciences at University of Ottawa.

### 33. DIFFERENCES IN MENTAL TOUGHNESS ACROSS TYPES OF CONTACT

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<sup>1</sup>University of Calgary

Objective: To determine differences in mental toughness between sports involving differing types of contact. Background: Mental toughness is a concept that has been linked with superior performance. It is considered a multidimensional construct that allows competitors to generally cope better than their opponents with many sport related demands. Research Design: This study utilized an observational cross-sectional design. Participants: The sample for this study included 159 varsity



and club athletes (males = 77, females = 82) aged 18-33 ( $M = 20.23$ ,  $SD = 2.05$ ) from a variety of sport teams. Independent Variable: This investigation used type of contact as an independent variable. All sports were classified according to three levels: non-contact, contact, and collision. Outcomes: Mental toughness was measured using the Sport Mental Toughness Questionnaire (SMTQ). It consists of 14 items relating to three subscales of confidence, control, and constancy, and a global score consisting of all 14 items. Analysis: A one way ANOVA was used to assess differences between types of contact on all scales of the SMTQ. Results: Significant differences were found for the control ( $p = 0.002$ ), confidence ( $p = 0.002$ ), and global ( $p < 0.001$ ) scales. On all of these scales, collision and contact sports scored significantly lower than non-contact sports. No significant differences were found between contact and collision sports. Conclusion: It appears that athletes engaging in collision and contact sports demonstrate less control, confidence, and overall mental toughness, than their non-contact counterparts while no differences in constancy were found.

Acknowledgements: Dr. Tak Fung

#### 34. A META-METHOD ANALYSIS OF QUALITATIVE RESEARCH EXAMINING POSITIVE YOUTH DEVELOPMENT THROUGH SPORT

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For this study we examined the methods used in qualitative studies of positive youth development (PYD) through sport. A meta-study comprised of four components: meta-method analysis, meta-theory analysis, and meta-data analysis was conducted, resulting in a meta-synthesis (Paterson, Thorne, Canam, & Jillings, 2001). Results of the meta-method analysis are presented. We used a custom-designed keyword search with a qualitative filter to search databases. Initial searches returned 1,089 citations. Following removal of duplicates, gray literature, reviews, and other irrelevant papers, 455 abstracts were retained. Abstract screening yielded 129 articles that were subjected to full text review. Fifty-nine qualitative articles were retained. Studies had a combined total sample of 1,999 participants, comprised of 342 children (aged 8-12 years), 1,216 adolescents (aged 13-18 years), 137 parents, 240 coaches, and 64 other adults. Studies were conducted in eleven different countries and focused on school, after-school, competitive sport, and summer camp settings. Interviews were used in 52 of the studies, and 34 studies used multiple data collection techniques, including journals, surveys, and participant observation. Methodologies most frequently used were case study (7), general qualitative (6), grounded theory (5), and phenomenological (4). Named methodologies were not reported in thirty-one studies. Forty-six studies reported validity techniques (e.g. rapport building, triangulation, and reflexivity). Strengths across studies included the use of purposeful sampling techniques and checks establishing analytical validity. More use of named methodologies may improve the sophistication of qualitative research in this area.

#### 35. DEVELOPMENTAL SOCCER EXPERIENCES AND SELF-DETERMINED MOTIVATION: A FOLLOW-UP STUDY OF ELITE YOUTH PLAYERS.

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In this 2.5 year follow-up of elite youth soccer players from the UK, we assessed changes in indices of self-determined motivation and their relationships with various soccer activities (practice & play). Participants from two age categories (under 15 yr,  $n = 20$ ; under 17 yr,  $n = 11$  at T2) completed the behavioural regulation in sport questionnaire (BRSQ) and retrospective soccer activity questionnaire at time 1 (T1 = Oct, 2011) and time 2 (T2 = Jan, 2013). Accumulated hours in soccer practice during the

last 2.5 years (range 552 – 1503) was negatively correlated with global self-determined motivation (SDI;  $r = -.32$ ,  $p < .05$ ) and positively correlated to external motivation ( $r = -.49$ ,  $p < .01$ ) and amotivation ( $r = -.37$ ,  $p < .05$ ). Hours in play were not related to SDI. A series of 2 (Age category; U15, U17) x 2 (Time; T1, T2) repeated measures ANOVA's showed that intrinsic motivation generally decreased from T1 to T2 ( $p = .01$ ). Motivation for older age group players became less self-determined and more controlled over time (Age X Time interaction,  $p < .05$ ). Since the older players had just been awarded, or were just about to be offered, adult-professional contracts, these data highlight the changing nature of motivation as a function of rewards associated with Professionalism. The younger players did not show the same relationship between practice and motivation over time, SDI did not decrease.

### 36. INVESTIGATING SOCIAL IDENTITY AND TESTOSTERONE REACTIVITY IN COMBATIVE SPORTS ATHLETES

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Testosterone concentrations change rapidly in the context of athletic competition (Archer, 2006). Also, simply watching one's team compete has similar effects on testosterone concentrations (Carré & Putnam, 2010). Despite these findings, there remains widespread variation in testosterone responses to competitive interactions. One potential factor that may underlie such variability is an athlete's social identity - identity formed through membership on a team. The purpose of this study was to examine the relationship between social identity and testosterone responses in male combative sports athletes' watching video footage of their teammate competing (win/loss). Male combative sport athletes ( $n=28$ ,  $Mean = 29.43$ ,  $SD=1.11$ ) completed a questionnaire assessing three dimensions of social identity (ingroup ties, cognitive centrality, and ingroup affect) and provided saliva samples before and after watching video footage of teammates competing. Multiple regression analysis indicated that perceptions of ingroup ties moderated the relationship between competition outcome and testosterone response,  $F(1,20)=6.00$ ,  $p=.02$ . Simple slopes analyses revealed that athletes who identified strongly with their team and teammates had an increase in testosterone when watching a teammate win, and a decrease in testosterone when watching a teammate lose. However, the opposite pattern of neuroendocrine response was observed in athletes who had low identification with their team. Specifically, a decrease in testosterone was observed when watching a teammate win, and an increase in testosterone was observed when watching a teammate lose. These findings indicate that social identity may play a salient role in moderating one's testosterone response when watching their teammates in a competitive performance.

### 37. EXPLORING THE RELATIONSHIP BETWEEN PSYCHOLOGICAL CLIMATE AND ATHLETE SATISFACTION ACROSS SEX AND COMPETITIVE SPORT LEVELS.

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Researchers in organizational psychology report that team environments perceived as psychologically safe and meaningful (positive psychological climate [PC]) are associated with greater levels of job satisfaction (e.g., Brown & Leigh, 1996). While PC has been examined in the sport setting with respect to player effort, its relationship to player satisfaction has yet to be examined. Our purpose was to study the relationship between PC and satisfaction in sport, while examining sex and competitive level as possible moderators. Athletes ( $N = 343$ ) from 24 intact sport teams completed a sport-adapted PC

measure (Spink et al., 2013) and satisfaction with how teammates contribute to the individual as a person (i.e., social contribution; Riemer & Chelladurai, 1998) near the end of a competitive season. Given the nested nature of the data ( $ICC = .10$ ), HLM was used to predict satisfaction from 4 dimensions of PC (i.e., supportive management, role clarity, self-expression, and contribution). The overall model was significant,  $\chi^2 = 55.05$ ,  $p < .001$ , with role clarity ( $\beta = .22$ ) and self-expression ( $\beta = .46$ ) emerging as significant predictors ( $ps < .01$ ) of satisfaction with social contribution. Neither sex nor competitive level emerged as significant moderators of the PC/satisfaction relationship. While in need of replication, these results provide a preliminary suggestion that athletes with a clear indication of role responsibilities and the ability to express individuality within the group also report greater social satisfaction. Further, it appears that the relationship is robust across males and females and more versus less competitive sport levels.

### 38. EXAMINING THE RELATIONSHIP BETWEEN INTRA-TEAM COMMUNICATION AND TEAM COHESION IN COMPETITIVE YOUTH SOCCER ATHLETES

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It is recognized that the group property of cohesion can be assessed through the perceptions of group members (Carron et al., 1985). Further, this requires members to consider the social exchanges that take place around them when forming perceptions of cohesiveness (e.g., McGrath, 1978). In terms of exchanges, youth athletes acknowledge effective communication among members as an indicator of a cohesive team (Eys et al., 2009a). While research with adults (Sullivan & Short, 2011) revealed relationships between different types of intra-team communication (acceptance and positive conflict) and group cohesion, this relationship has not been examined with youth. This study was designed specifically to test the relationship between different types of communication and cohesion in a sample of youth athletes. Participants ( $N = 160$ , age range 14-17) completed measures of intra-team communication (Sullivan & Short, 2011) and group cohesion (Eys et al., 2009b) in the middle of a competitive soccer season. Results from canonical correlation revealed a significant overlap in the variability of the two construct sets, Wilks'  $\lambda = .51$   $F(8, 266) = 13.37$ ,  $p < .001$ , accounting for 46% of the variance. Examination of the relationships revealed perceptions of acceptance- and positive conflict-related communication among members was positively associated with task cohesion perceptions ( $.72 \leq r \leq .87$ ). When communication between teammates demonstrated greater acceptance of teammates, and when differences in opinion (i.e., conflicts) were met with constructive communication, individuals perceived greater task cohesion. While needing replication, this suggests unique relationships between these two multidimensional constructs.

### 39. HOME ADVANTAGE WITHOUT BEING HOME: THE EFFECT OF PERCEIVED ADVANTAGE OR DISADVANTAGE ON BASKETBALL PERFORMANCE

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Across sports home teams win 60.4% of games (Jamieson, 2010). The causes of this home advantage are still unclear, mainly due to the fact that most of the studies were archival, and / or focus on the influence of external potential factors (like spectators, referees), but not on the information processes of the athletes. The main aim of this study was to assess the impact of perceived advantage (home condition) or disadvantage (away condition) on physical coordination and endurance in a basketball course while keeping the actual conditions objectively equal in an experimental design. After performing the course for the first time (baseline) basketball players ( $N = 36$ ) were randomly assigned to one of two conditions. Through an information sheet perceptions of advantaged ("It is like a home

game.”) or disadvantaged (“It is like an away game.”) conditions for the second run of the course were induced keeping the actual conditions equal. The players filled in a questionnaire on their self-efficacy and external efficacy expectations and performed the course again. Players of the home condition enhanced their endurance performance in the second course more ( $M = 1.66$  rounds,  $SD = 0.87$ ) than away participants ( $M = 0.29$  rounds,  $SD = 1.13$ ),  $t(34) = 4.10$ ,  $p < .001$ ,  $d = 1.41$ . , although the actual conditions were equal. However, no significant difference between groups was found for the reported expectations (all  $p > .10$ ). Further studies are needed to investigate the psychological processes underlying home advantage with experimental research designs.

#### 40. INVESTIGATING THE IMPACT OF YOUTH HOCKEY SPECIALIZATION AND PSYCHOLOGICAL NEEDS (DIS) SATISFACTION ON MENTAL HEALTH

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There has been a wealth of research in recent years on the positive and negative aspects of youth sport participation. The Developmental Model of Sport Participation (Côté & Fraser-Thomas, 2007) describes three separate pathways that youth can follow in their development: recreational participation, late specialization and early specialization. Many competitive sport programs are promoting early specialization in hopes that their athletes will gain an advantage over others; however, research indicates that youth who wait until adolescence to specialize in a given sport achieve greater performance (Moesch et al., 2011), experience less burnout and injury (Jayanthi et al., 2013) and less emotional stress (Gould, 2010). Therefore, the purpose of this study was to examine the relationships between youth hockey players’ level of specialization, psychological need satisfaction (PNS) and dissatisfaction (PND), mental health and mental illness. Sixty one youth hockey players responded to online surveys composed of validated scales via FluidSurveys. Results indicated a significant difference between PNS according to specialization with early specializers reporting the lowest PNS and recreational athletes reporting the highest PNS ( $F = 6.28$ ,  $p = .001$ ). Further findings revealed a positive medium correlation between PNS and mental health ( $r = .39$ ,  $p = .002$ ) and a positive strong correlation between PND and mental illness ( $r = .65$ ,  $p < .0005$ ). There were also medium and negative correlations between PND and mental health ( $r = -.42$ ,  $p = .001$ ) and between PNS and mental illness ( $r = -.48$ ,  $p < .0005$ ). These results suggest that sport specialization may have an impact on psychological need (dis)satisfaction which is related to mental health and mental illness.

#### 41. FEMALE VARSITY ATHLETES PERCEPTIONS OF THE DEVELOPMENT OF OPTIMISM

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This study examined female athletes’ perceptions of how they became optimistic. In order to identify optimistic athletes 83 members of Pandas teams at the U of A completed a sport-specific Life Orientation Test (LOT; Dunn, Causegrove Dunn, & Lizmore, 2015). Nine participants ( $M$  age = 19 years) who scored high in optimism ( $M$  score = 9.22) were purposefully sampled and were interviewed using semi-structured interviews. Seven of these participants also completed a member checking interview. Data analysis was done following Interpretative Phenomenological Analysis (Smith, Flowers, & Larkin, 2009). Results were organized across a developmental framework documenting shared aspects of participants’ perspectives of experiences that contributed to development of optimism over childhood, adolescence, and adulthood. During childhood participants perceived that their parents were supportive, provided feedback, and allowed them to have choice over the sports in which they participated. During adolescence coaches began to play a more important role in

developing optimism and participants were able to learn about being optimistic through experiences, particularly negative experiences. Finally, during early adulthood participants developed personal narratives about the ways in which they approached sport with optimism. Practical implications arising from these findings include increasing parents' coaches', and athletes' understanding of how to increase the development of dispositional optimism by utilizing a similar developmental framework.

42. A CONFIRMATORY ANALYSIS OF THE SHORT FORM YOUTH EXPERIENCE SCALE FOR SPORT WITH A SAMPLE OF CANADIAN UNIVERSITY ATHLETES

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<sup>1</sup>University of Ottawa

<sup>2</sup>Brock University

Efforts have been made to validate an assessment tool for positive youth development (PYD) in younger sporting cohorts (MacDonald et al., 2012; Sullivan, LaForge-MacKenzie, & Marini, in press). MacDonald et al. created the Youth Experience Scale for Sport (YES-S), a five factor instrument with 4 positive developmental dimensions (i.e., personal and social skills, cognitive skills, goal setting, and initiative) and one negative dimension. Sullivan et al. ran confirmatory factor analyses (CFAs) on the YES-S with a sample of 350 youth athletes and found support for a modified, 22 item Short Form YES-S. Rathwell and Young (2015) called for an assessment tool of PYD in the university sport domain. In this study, we explored the fit and factor structure of the Short Form YES-S with a sample of 605 Canadian university athletes (237m, 368f; Mage:20, range:17-25) from 26 different sports. Using AMOS software, CFAs were conducted to fit data to Sullivan et al.'s proposed 5 factor model. Results yielded a measurement model with good fit, CFI=.908, RMSEA=.058, and SRMR=.057. No modifications were made; factor composite reliability coefficients indicated strong reliability (CR  $\geq$  .70) and all factor loadings, except one, exceeded .5. This is the second confirmation for the Short Form YES-S factor structure, and a positive step towards creating a strong quantitative measurement tool for PYD. To improve the empirical evidence for the Short Form YES-S, factors that could affect PYD in a sport setting (e.g., specific age, sport type, individual vs. team sport, and gender) should be explored.

Acknowledgements: SSHRC

43. ELITE HOCKEY MOMS: EXAMINING MENTAL AND PHYSICAL HEALTH IMPACTS OF THE DEMANDS OF COMPETITIVE MINOR HOCKEY

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Research has begun to examine the impact of the youth sport experience on parents; however, there has been limited research conducted solely on mothers of youth athletes exploring their mental and physical health. The purpose of this study was to investigate the various impacts of the demands of the youth sport experience, specifically boys' elite hockey, on mothers' mental and physical health including their physical activity (PA) participation and healthy eating practices. Thirteen mothers of male competitive hockey players participated in an online questionnaire and a semi-structured interview, which included questions about mental and physical health during the hockey season and the off-season. Results indicated that some mothers' mental health was impacted by the hockey season, while others indicated little impact. Furthermore, some mothers found it more difficult to be active during the hockey season due to the busy schedule, while other mothers were consistently active throughout the entire year. Various strategies for maintaining PA levels and incorporating PA in their daily lives were identified including being physically active with their friends/partners and working

around their son's hockey schedule. The mothers also indicated that they tended to eat more junk food and ate together as a family less during the hockey season. While this research identified preliminary results, more research in this area would be beneficial. Findings from this study can provide practical recommendations for hockey mothers to incorporate PA and healthy eating strategies during the hockey season in addition to opening discussion about the positive and negative mental health impacts.

#### 44. PARENT AND ATHLETE PERCEPTIONS OF THE RESPECT IN SPORT PARENT PROGRAM

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<sup>1</sup>Department of Exercise Sciences, University of Toronto

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The Respect in Sport Parent Program (RiSPP) is an educational program that seeks to promote positive behaviours among sport participants. The RiSPP has recently been implemented as a mandatory program among several youth sport leagues across Canada. The purpose of this study was to examine parent and athlete perceptions of the RiSPP. Minor hockey athletes (n = 56) and parents (n = 189) completed open- and closed-ended online questions regarding their use and perceptions of the RiSPP. Descriptive statistics were used to examine participants' use of the RiSPP, and open-ended comments were subjected to content analysis (Patton, 2002). 55.2% of parents reported they had a 'neutral' view of the RiSPP, and 30.9% of parents reported that their perception of the program improved after taking it. 45.5% of parents reported that they discussed the program with their child, 26% reported discussing the program with their spouse/significant other, and 18% discussed the program with other hockey parents. The three most frequently reported aspects of the program that parents discussed with their child included treatment by coaches, officials, and other player; 'being the best player you can'; and bullying, harassment, or abuse. However athletes reported that their parents most frequently discussed proper hydration; 'being the best player you can'; and proper nutrition. Open-ended comments pertained primarily to the content of the program, the cost of the program, implementation and policy issues, concerns that the program would not 'fix' problem parents, and suggestions for program improvement. There was a greater proportion of positive comments about the content of the program compared to negative comments.

Acknowledgements: This research was supported by a SSHRC Partnership Development Grant awarded to the last author.

#### 45. CAN MIXED MARTIAL ARTS FACILITATE LIFE SKILLS? EXPLORING MMA'S PROMOTION AND PROCESSES OF LIFE SKILL DEVELOPMENT AMONG YOUTH

Theresa Beesley<sup>1</sup>, Jessica L. Fraser-Thomas<sup>1</sup>

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The legalization of mixed martial arts (MMA) in Canada and growing popularity of Ultimate Fighting Championships have prompted increased participation in the sport. MMA gyms have marketed programs as avenues to develop essential life skills, with much anecdotal support (Kim, 1991; Seabrook, 2003; Vitali & Brouillard, 2007); however, limited empirical evidence exists to support these claims (Theeboom, et al., 2009). This study first examined potential life skills that can be developed through MMA, according to MMA gym promotional materials. A content analysis drew upon the websites of 25 MMA gyms in Toronto offering youth programs, to identify the life skills they claimed to be developing. Results indicated key outcomes related to self-control, self-confidence, self-esteem, co-operation and social skills. The study's second purpose was to determine how MMA programs may be facilitating life skill development. Instructors (N=7) completed interviews focused on their MMA history, current practices, values and beliefs, the MMA environment, and their

facilitation of MMA classes. Findings revealed that coaches valued and aimed to facilitate slightly different outcomes related to patience, focus, resiliency, discipline, and self-control through the practice of MMA. Coaches primarily used deliberate techniques to facilitate life skill development. However, less direct approaches such as values-based programming were also employed. Coaches also highlighted co-operation with parents and the unique competition and program structure as key criteria in enhancing youths' life skill development. Results will be discussed within the broader context of positive youth development through sport; potential implications and future directions will be highlighted.

Acknowledgements: Social Sciences and Humanities Research Council and Sport Canada

#### 46. PRELIMINARY EVIDENCE FOR DIFFERENTIAL EFFECTS ASSOCIATED WITH IDENTIFIED AND INTRINSIC REGULATIONS WITHIN COMPETITIVE SPORT: A REPLICATION AND EXTENSION STUDY

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Objective: Grounded in Self-Determination Theory (SDT; Deci & Ryan, 2002), Burton et al. (2006) have advanced the differential effects hypothesis noting that identified regulation has stronger links with performance whereas intrinsic regulation has stronger links with positive affect. The purpose of this study was to partially replicate and extend the work of Burton et al. (2006) by testing the differential effects hypothesis in sport. Methods: University-based female rugby players (N = 112; Mage = 20.59 years; SDage = 2.09 years) completed the Behavioral Regulation in Sport Questionnaire (BRSQ), the Positive Affect Negative Affect Schedule (PANAS), and a modified version of the Game Performance Assessment Instrument (GPAI) specific to rugby using a non-experimental, cross-sectional research design. Results: Identified regulation ( $\beta = 0.17$ ) rather than intrinsic regulation ( $\beta = 0.06$ ) was a stronger predictor of self-rated performance assessed with the GPAI ( $R^2 = .05$ ;  $F(2, 109) = 2.61$ ,  $p = .08$ ). Conversely, intrinsic regulation ( $\beta = 0.40$ ) was superior to identified regulation ( $\beta = 0.28$ ) when predicting positive affect in sport measured with the PANAS ( $R^2 = .38$ ;  $F(2, 107) = 32.98$ ,  $p < .01$ ). Discussion: Overall, the results of this study extend the work of Burton et al. (2006) within SDT to the realm of competitive sport and imply positive affective responses while playing sport and enhanced performance may have different motivational signatures in athletes.

Acknowledgements: Funding Source: Social Sciences & Humanities Research Council of Canada

#### 47. YOUNG SPORTSMEN'S PERCEPTION OF UNSPORTING BEHAVIORS IN SOCCER

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Our aim was to study young sportsmen and not sportsmen's perception of unsporting common situations in soccer games. Participants were 180 individuals (16-18 years old, 90 male, 90 female) distributed in three groups: amateur soccer players (n=60), amateur basketball players (n=60) and not sportsmen (n=60, participants that did not practice sports regularly). A questionnaire presenting 18 common unsporting situations in a soccer game was developed. The unsporting behavior was initiated by a member of the local team/supporter in half of the situations, and in the other half by a member of the rival team. Participants were told these situations occurred in a regular amateur soccer game. Participants judged (Likert scale, 1-5) to what extent they considered each situation as an example of a violent behavior. The second part of the questionnaire introduced the same situations, but both protagonists and victims of the unsporting behavior were well known soccer players of Real

Madrid, Barcelona & Atlético de Madrid (half of them considered as examples of high fair play, the other half as often showing poor fair play). Results showed that soccer players perceived the unsporting behaviors significantly as less violent than the other groups. Male participants also judged the unsporting behaviors as significantly less violent than female participants. Unsporting behaviors initiated by high fair play famous soccer players were rated as less violent than those ones initiated by low fair play soccer stars. This effect occurred significantly more in the female group. In-group bias was found only in the soccer players group.

Acknowledgements: This study was performed thanks to grant DEP2011-27282 (Designing Multimedia Tools for Learning and Teaching Sports in curricular and non-curricular Contexts) awarded to the first author by MINECO (Spanish Ministry of Economy and Competitiveness, National Plan of i+D+i) for the period 2012-2015

#### 48. A QUALITATIVE EXPLORATION OF ADOLESCENT ATHLETES' PERSPECTIVES, AWARENESS, AND EXPERIENCES RELATED TO DOPING

Jamie N. Rebner<sup>1</sup>, Laura Hallward<sup>1</sup>, Lindsay R. Duncan<sup>1</sup>

<sup>1</sup>McGill University

Doping is a prevalent problem in sport, with athletes reporting using performance-enhancing substances (PES) as young as age 12. Adolescence is a high-risk period for initiating PES use because attitudes about doping are formed at this age. The purpose of this study was to explore adolescent athletes' perspectives, awareness, and experiences related to doping. Sixteen athletes (n = 7 male and n = 9 female), in grades 7 through 11, attended one of four focus groups. Verbatim transcripts were analyzed and coded into common themes. Our data revealed five main themes. First, the participants spoke about their prior knowledge about doping, which is mostly restricted to awareness of doping among professional athletes. Second, many did not consider doping to be a relevant issue for their age group or level of competition. Third, the athletes reported that their coaches and trainers seldom discuss doping and its associated risks. Fourth, adolescents viewed pressure from teammates or coaches as a significant reason for an athlete to start using PES. Finally, the athletes spoke about their perceptions of the primary deterrents to doping including; (a) the moral, emotional, or social consequences (mainly guilt) associated with doping or getting banned from sport, (b) the severe health consequences, including the development of tumours, heart problems, and death, and (c) the physical consequences associated with appearance, such as acne or gynecomastia. These findings provide insight about adolescent athletes' perspectives on doping, which has implications for developing primary prevention programs and educational resources for adolescent athletes.

Acknowledgements: This research has been funded by the World Anti-Doping Agency: Social Sciences Research Grant

#### 49. UNDERSTANDING THE NEGATIVE OUTCOMES OF SPORT PARTICIPATION – A MOTIVATIONAL MODEL

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Sport psychology research, using the Self-Determination Theory (SDT) framework, has extensively examined athletes and the factors that lead to their success and continued participation in sport. In reality, athletes can also experience a number of negative outcomes such as burnout that undermine the positive outcomes. The relationship between the environment, psychological needs, goal content, motivation, and negative outcomes in sport is somewhat ambiguous. The purpose of the present review is to examine existing research that has looked at SDT and negative affective, behavioural, and cognitive outcomes in sport and to organize this literature into a coherent model for understanding



negative outcomes. The proposed model suggests that a non-supportive environment will directly influence need-dissatisfaction, low quality motivation, and negative outcomes for athletes. When it comes to need dissatisfaction specifically, athletes can either engage in compensatory behaviours to satisfy their needs, or they can become chronically dissatisfied which also leads to extrinsic goals, lower quality motivation and negative outcomes. Negative affective, behavioural, and cognitive outcomes serve as ends in and of themselves; however, cognitive outcomes also serve as a mediator between psychological needs and motivation with affective and behavioural outcomes. In these instances, the athletes' cognitive experience serves to either enable or prevent other negative outcomes. Implications and directions for future research are discussed.

Acknowledgements: This research was conducted while the first author was supported by a doctoral scholarship from the Social Sciences and Humanities Research Council of Canada (SSHRC).

## 50. THE INFLUENCE OF GOAL PROFILES ON POSITIVE YOUTH DEVELOPMENT

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Positive Youth Development (PYD) concentrates on the positive aspects of youth development, with an outcome-based focus towards fostering positive outcomes and reducing negative maladaptations (MacDonald et al., 2012). Researchers have started to shift focus onto how different internal factors such as dispositions and/or personality characteristics could influence levels of PYD for youth participating in organized sport. Research has found that differences in task and ego orientation can influence changes in motivated behaviours (Duba 1989), which could further influence how an athlete perceives, behaves and participates within youth sport. The current study examined the potential influence of goal profiles on PYD. A sample of 100 youth sport participants (mean age = 16.8) completed the short form Youth Experiences Survey for Sport (Sullivan et al., 2013) to measure PYD, and the Task and Ego Orientation in Sport Questionnaire (Duba 1989) to assess each athlete's goal profile. A TwoStep Cluster Analysis classified individual's personal goal profile into 3 clusters: high task/low ego (n = 45), high task/moderate ego (n = 31), and moderate task/low ego (n = 22). A MANOVA of the YES-S factors revealed significant differences between the clusters with respect to Initiative [ $F(2,95) = 10.86, p < 0.001, h^2 = 0.19$ ] and Goal Setting [ $F(2,95) = 4.31, p < 0.05, h^2 = 0.08$ ]. Post-hoc analyses showed that the moderate task/low ego cluster was significantly lower than the high task/low ego cluster for Goal Setting and both of the high task clusters for Initiative. These results suggest that athletes who are more task-oriented may experience more positive outcomes from sport.

Acknowledgements: SSHRC

## 51. PREDICTORS OF EUDAIMONIA AND HEDONIA IN ORGANIZED SPORT

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This study was designed to identify the predictors of eudaimonia and hedonia in organized sport at varying levels of competition (from recreational to elite levels). These complimentary aspects of subjective well-being may influence athlete persistence and satisfaction in their sport. Eudaimonic well-being involves pursuing activities that reflect one's personal values and hedonic well-being is seeking comfort or enjoyment (Huta, 2013). The potential predictors examined included team environment, coach strategy and feedback, and components of self-determination. A secondary focus of this study was to examine the differences between the level of play an athlete participates in and hedonia and eudaimonia. Participants (N=55) completed a 133-item self-report questionnaire comprised of validated measures of hedonia and eudaimonia, intrinsic motivation, positive and

negative affect, autonomy, athlete and coaching behaviour, and basic need support (autonomy, relatedness, and competence; Ryan & Deci, 2000). Significant correlations were observed between eudaimonia scores and personal dedication scores ( $r = .324$ ) in the Athlete Satisfaction Questionnaire (ASQ; Riemer & Chelladurai, 1998). For hedonia scores, a significant correlation was observed with the team integration ( $r = .179$ ) portion of the ASQ. No relationships were found between an athlete's level of play and eudaimonia or hedonia. The results of this study suggested that optimal well-being for athletes that play organized sport lies in their personal dedication to their sport, as well as being a contributing member to the progress of their respective team.

## 52. EXPLORING THE INFLUENCE OF RELATIVE AGE AND SPORT PARTICIPATION ON ACADEMIC ACHIEVEMENT.

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Relatively older youth within age group cohorts typically experience advantages in both education and sport. Separate bodies of research have found that i) older relative age is associated with higher grades in school, ii) older relative age predicts sport participation, and iii) sport participation influences academic achievement. However, research has not considered whether relative age and sport participation interact to influence academic achievement. Through a secondary analysis of the baseline wave of the COMPASS data, this project explored relationships between relative age, sport participation and academic outcomes among a Canadian sample of grade 9-12 students ( $N = 22930$ ; 50% female). The dependent variables were categorical measures of academic achievement in Math and English (90-100%, 80-89%, 70-79%, 60-69% and  $< 59\%$ ). Independent variables included relative age (quartiles 1 to 4), sex, sport participation (within and outside of school) and school grade. Results of adjusted multinomial logistic regression found no consistent influence of relative age on academic achievement in Math or English among males and females. Participating in school sport increased the likelihood of higher academic achievement in both Math and English for both sexes (OR range: 1.12 to 2.19), although this relationship was less consistent for participation outside of school. There were no significant interactions between relative age and sport participation (within school or outside of school) on academic achievement. Overall these results suggest that a more variable relationship exists between relative age and educational outcomes than previously reported, and that sport participation does not moderate the relationship between relative and academic achievement.

## 53. SPORT PARENT SIDELINE BEHAVIOR: AN ECOLOGICAL MODEL

Julia K. Dutove<sup>1</sup>, Nicole M. LaVoi<sup>1</sup>

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Youth sport has the potential to provide numerous psychological, physical, and social benefits, however with high dropout rates (participation decreases by about 20% between 10-15 years old according to Active Healthy Kids Canada, 2014) not all children have the opportunity to receive these benefits. The overall climate of youth sport can contribute to dropout (Hedstrom & Gould, 2004) and adult involvement in youth sport is part of shaping that climate. One adult group that influences children's sport experience and the overall climate of youth sport is parents, who provide various types of support but can also negatively influence the climate through their behavior on the sidelines. Using Bronfenbrenner's Ecological Systems Theory (1977), the purpose of this poster is to outline what is known about sport parent sideline behavior and build a model that identifies gaps in current research and frames future studies about sport parent sideline behavior. A database search yielded 21 studies

that were used to build the model. From this model, it is clear that the perspective of the parent is not often considered and therefore future research about parental preferences for sideline behavior, including whether these preferences are influenced by personal or situational factors, is proposed. Specifically, gender and previous sport experience are personal factors that need to be examined and the situational factors of type of sport, the stakes, and type of occurrence on the playing field are factors that need to be considered simultaneously in a large scale study.

#### 54. A REVIEW OF TRENDS IN YOUTH SPORT PSYCHOLOGY RESEARCH

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The purpose of this study was to review trends in youth sport psychology research. Four major sport psychology journals (The Sport Psychologist, the Journal of Sport and Exercise Psychology, the Journal of Applied Sport Psychology and Psychology of Sport and Exercise) were reviewed to identify studies of youth sport. Articles were included based on the age of the sport participants (age range= 5-18 years) and their involvement in organized youth sport. The title, abstract, and contents of each article were analyzed to derive the main themes, which were then organized by journal and decade of publication. A total of 3079 articles containing original data were published in the journals over a span of 35 years with 470 articles meeting the inclusion criteria. Articles on motivation (n=91), social influences (n=84), anxiety/stress (n=47) and self-perceptions (n=43) appeared most frequently across all four journals. We assumed the number of articles published on a particular topic reflected interest in that topic within the discipline of sport psychology. Hence, a decrease in the number of articles about motivation and an increase in the number of social influence articles published in the last decade would indicate that motivation is a topic that has been exhausted by youth sport researchers while research on social influences is an emerging trend. The findings generate a discussion on why such trends occur and what impact they have on future research.

#### 55. CONFIDENCE AMID MISPERCEPTIONS: PROBLEM FOR CONCUSSION PREVENTION?

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Proper understanding of concussion injury is important in athletes' development of accurate risk perceptions and concussion prevention. The confidence associated with athletes' self-declared understanding may amplify misconception problems. Investigating how athlete self-declared understanding of concussion injury relates to grounded concussion experience and education can give insight into athlete's concrete and abstract understanding of concussion. We used a cross-sectional survey of 175 varsity athletes (60% male, mean age = 20) to explore athletes' grounded experience of concussion (direct / indirect experience, formal / informal education), their self-declared understanding of concussion, injury perceptions (severity, and control), and their objective understanding of concussion symptoms (accuracy). Analyses revealed significant relationships between athletes' concussion specific education, concussion history, and their injury understanding. Those who had received a concussion, had concussion specific education, or disclosed a greater number education sources, reported greater perceived understanding of concussion injury. Analyses revealed relationships between athletes' concussion understanding and their perception of the controllability of the injury through treatment and the cyclical nature of concussion. Those who reported a greater understanding of the injury perceived that concussion injury cannot be controlled with treatment and that concussion injury could be cyclical in nature. Higher perceived understanding did not relate to personal control of injury, accuracy of symptom recognition, viewing concussions as having long-term

problems, or perceiving concussions to have more consequences. Athletes' perceived understanding of concussion can be at odds with the features of injury, which may lead to faulty prevention beliefs. Assessing injury beliefs is important for prevention programs.

56. NO LONGER JOCKS VERSUS NERDS: VIEWS ON RURAL AND SUBURBAN POSITIVE YOUTH DEVELOPMENT (PYD) AND SCHOOL CLIMATE

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School climate plays a critical role in nurturing PYD and safe, positive schools (Lindstrom-Johnson et al., 2011). The purpose of this study was to gauge high school decision-makers' awareness, beliefs, and program ideas regarding school climate, bullying, and PYD. Participants included athletic directors, school counsellors, and safe-schools officials from three West Virginia counties representing five high schools. Nine staff participated in the hour-long semi-structured interviews, producing nearly 200 transcribed pages. Participants were typically white (n = 8) and male (n = 7), and their students were estimated to be mostly white (typically over 90%). Two pilot interviews were conducted and member check procedures were utilized after the analysis (Patton, 2014). Interviews were transcribed verbatim by one of the coders, and proof read against the audio recording by the second coder. Open codes were identified independently before reaching consensus, then arranged thematically by the two coders and primary investigator (Miles, Huberman, & Saldaña, 2014). Results described Students, Programs, and Bullying in their schools. Participants believed that it was very difficult to label students as belong to a single clique because students are involved in many groups and have friends in other groups—there are rarely/few 'Jocks' who only participate in sport. That said, students who participate in sport are highly influential (along with 'High-Academics'). Participants described formal programs and informal factors (e.g., peer mentoring, positive environment, etc.). Frequency of bullying, attitudes towards it, and who is involved were also described. The discussion will address how the results affect the implementation of PYD programs in Northern-West Virginia schools. Acknowledgements: Funding for this study was provided by the Association for Applied Sport Psychology (AASP) and from the College of Physical Activity and Sport Sciences at WVU.

57. FEELING LIKE A GROUP OR FEELING UNITED: EFFECTS ON INTENTION TO RETURN IN YOUTH SOCCER

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It has been established recently that groupness and cohesion have independent and additive effects on athlete's intention to return to a hypothetical sport team (Spink et al., in press). Given that the study was conducted using vignettes and global measures of cohesion, the current study examined the effects of both task and social cohesion and groupness on intention to return of players from intact soccer teams. Young athletes (N=127) from 10 soccer teams completed measures of groupness (Spink et al., 2010), cohesion (Eys et al., 2009), and intention to return to the team in the following season (Spink, 1995) near the end of the season. Perceptions of groupness, and both task cohesion and social cohesion, were coded as higher or lower using a median-split. Four groupings were created: high cohesion/high groupness [HH], high cohesion/low groupness [HL], high groupness/low cohesion [LH], and low cohesion/low groupness [LL] perceptions for task and social cohesion, separately. ANOVA results differed for each cohesion measure. A significant condition main effect,  $p < .001$ , partial  $\eta^2 = .24$  was found for task cohesion. Post-hoc results revealed independent effects for both task cohesion and groupness (HL > LL, LH > LL,  $ps < .03$ ,  $.51 \leq \text{Cohen's } d \leq 1.25$ ). While there was a significant condition main effect with social cohesion,  $p < .01$ , partial  $\eta^2 = .12$ , post-hoc results

revealed only one independent effect for groupness (LH > LL,  $p < .01$ , Cohen's  $d = .75$ ). Similarities and differences with Spink and colleagues (in press) are considered.

#### 58. TRANSCRANIAL DIRECT CURRENT STIMULATION APPLIED TO PRIMARY MOTOR CORTEX DOES NOT ENHANCE THE LEARNING BENEFITS OF SELF-CONTROLLED KR SCHEDULES

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A distinct learning advantage has been shown when participants control their knowledge-of-results (KR) scheduling during practice compared to when the same KR schedule is imposed on the learner without choice (i.e., yoked). Although this learning advantage is well-documented, the brain regions contributing to these advantages remain unknown. Using transcranial direct current stimulation (tDCS), which can increase (anodal) or decrease (cathodal) cortical excitability and thus modulate subsequent behaviour, we investigated whether increased primary motor cortex excitability mediates the learning advantages of self-controlled KR schedules. Participants practiced a waveform matching task in one of four groups using a factorial combination of choice (Self-Controlled versus Yoked) and tDCS (Anodal versus Sham). Testing occurred on two consecutive days with spatial and temporal accuracy measured on both days. Learning was assessed using 24-hour retention tests with and without KR, as well as a no-KR transfer test. All groups improved their performance across practice blocks; however, no significant group differences were found on either retention test ( $p$ 's > .05). Greater temporal accuracy was found for the self-controlled groups compared to the yoked-KR groups on the transfer test ( $p = .001$ ,  $\eta^2p = .26$ ); thus, practicing with a self-controlled KR schedule, independent of tDCS, resulted in an enhanced ability to generalize one's learning to novel temporal demands.

Although a trend for greater temporal accuracy in transfer was noted for those receiving anodal-tDCS relative to sham-tDCS ( $p = .24$ ), this lack of a significant effect for tDCS suggests that primary motor cortex may not be strongly implicated in self-controlled KR learning benefits.

Acknowledgements: Supported by NSERC

#### 59. THE INFLUENCE OF PROPRIOCEPTION OF LIMB-TARGET PROCESSES

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When moving one's limb to a target, it has been hypothesized that separate online correction processes take place, including impulse regulation and limb-target processes (Elliott et al. 2010). It has also been suggested that vision for the use of limb-target processes is optimized when the limb reaches 1.0 m/s (Tremblay et al., 2013). However, proprioception is another potential source of information that could be useful for limb-target regulation. Participants completed two blocks of trials wherein agonist-antagonist tendon vibration was applied between trials at the elbow joint. This manipulation was employed to decrease the sensitivity of the muscle spindles of the elbow joint during the interspersed movements. During both blocks of trials, participants were provided with 20 ms windows of vision when their moving limb reached either 0.6, 1.0, or 1.4 m/s while reaching to a 30 cm target. On a third of the trials, a "jumped" target (i.e., 27 cm) replaced the 30 cm target during the window. In the absence of vibration, target jumps yielded significant shifts in endpoint distributions for the 0.6 and 1.0 m/s windows. In contrast, shifts in endpoint distributions were significant in all window conditions in the vibration block. However, the times after peak velocity were longer during the vibration block, as compared to the no vibration block. These results reveal that proprioception is important for the optimization of limb-target regulation processes.

Acknowledgements: NSERC, CFI, Ontario Research Fund

60. MANIPULATING TARGET SIZE TO INFLUENCE PERCEPTIONS OF SUCCESS WHEN LEARNING A DART-THROWING SKILL

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Positive feedback, leading to experiences of success during skill acquisition, has been shown to benefit motor skill learning. In this study, our aim was to manipulate learners' success perceptions through a minor adjustment to goal criterion (target size) in a dart-throwing task. Two groups of novice participants practiced throwing at a large (easy) or a small (difficult) target from the same distance. In reference to the origin/centre of the target, the practice targets were of equal objective difficulty and indeed participants in both groups were not different in their objective practice performance (i.e. radial error from the centre). Although the groups experienced markedly different success rates (making target 'hits'), with the large target group experiencing more hits and reporting more confidence (or self-efficacy) than the small target group, these practice effects were not carried into longer-term retention, which was assessed after a one-week delay. For success perceptions to moderate or benefit motor learning, we argue that unambiguous indicators of positive performance are necessary, especially for tasks where intrinsic feedback about objective error is salient.

Acknowledgements: Natural Sciences and Engineering Research Council and Canadian Institute for Health Research

61. TMS OVER M1 LATE IN LEARNING IMPAIRS RETENTION OF MOTOR MEMORY

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The primary motor cortex (M1) is important for the long-term retention of motor memory (Hadipour-Niktarash et al., 2007). However it is still unclear whether M1 contributes to memory storage as a result of the processing of movement errors early during learning (when motor commands are constantly changing; Tan et al., 2014), or when performance is stabilizing late in learning (Classen et al., 2008). To address this issue, we used a visuomotor adaptation paradigm in which participants performed 500 reaching movements toward 10 visual targets. During the first 250 trials, we introduced a gradual rotation of the visual representation of the hand (1° every 10 trials for a total rotation of 25°). The last 250 trials were performed with a constant 25° rotation. We interfered with M1 processing using single-pulse transcranial magnetic stimulation (TMS) delivered at movement end, either when motor behavior was gradually changing (trials 0-250; Early TMS group) or when performance was stabilizing (trials 250-500; Late TMS group). A control group received no TMS during adaptation. Retention was assessed 24h later by measuring the angular error at peak velocity. Participants in all groups showed identical performance during adaptation and none consciously perceived the induced visuomotor rotation. Participants of the Late TMS group demonstrated significantly lower retention compared to the Control group ( $p < 0.01$ ). This suggests that post-movement activity in M1 late in learning, when motor performance is stabilizing and motor commands tend to repeat, is crucial for the long-term retention of motor memory during visuomotor adaptation.

Acknowledgements: This project has been funded by a Natural Sciences and Engineering Research Council of Canada (NSERC) award, a Fond de Recherche du Québec - Santé (FRQ-S) subvention and a Senate Research Committee Grant from Bishop's University.

62. SHELL GAMES: LOCATION AND OBJECT-BASED INHIBITORY MECHANISMS IN INDIVIDUAL AND SOCIAL ACTION CONTEXTS

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Directing one's attention to a stimulus leads to the activation of inhibitory mechanisms for that stimulus. These inhibitory mechanisms must be overcome when that stimulus becomes a target once more resulting in longer reaction times to previously attended stimuli relative to other stimuli. This phenomenon of inhibition of return (IOR) is an efficient search mechanism that prevents individuals from reinvestigating a previously searched area/stimulus. Interestingly, the mechanisms of IOR seem to be shared across people (social IOR). The present experiment aimed to replicate and extend the study conducted by Tipper et al. (1994) to examine the IOR effects that emerge in individual and social tasks with static or dissociable stimuli. Based on previous findings, we expected a more pronounced IOR effect in the static condition for the same object and location than in dissociable conditions in which the potential target objects moved and switched locations after the initial response. We expected this finding because IOR is thought to be achieved through combined object and location inhibitory mechanisms. Furthermore, we predicted that the results obtained in the individual condition would be similar to the joint condition. The results showed an IOR effect when the same target occurred in the same location, but an IOR effect was not observed when the object moved in the dissociable condition. Importantly, this pattern of effects was observed in the individual and joint conditions. The findings can be explained in terms of object-based and location-based inhibitory mechanisms that compete with one another when objects switch locations.

63. EVALUATION OF THE PHYSICAL LITERACY OF CHILDREN BETWEEN 8 AND 12-YEARS OF AGE IN CALGARY, ALBERTA

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**Purpose:** The purpose of the study is to examine the physical literacy of children in multiple education sectors in Calgary through the use of the Canadian Assessment of Physical Literacy (CAPL). **Background:** The CAPL assessment tool is a reliable and validated measurement tool that assesses children in four subsets, which make up the construct of physical literacy. **Participants:** 491 students (female; n=234, male; n=243), aged 8-12-years old (M=10.3, SD=1.5) from both the public school sector, as well as a charter school sector, were assessed. **Independent Variable:** Age, gender and grade level are set as the independent variables. **Outcomes:** Children were scored in 5 separate areas yielding their overall physical literacy. These outcomes include; 1) physical competence, 2) daily behaviour, 3) cognitive domain, 4) affective domain, and 5) overall physical literacy as measured by an accumulation of the 4 subsets. **Results:** Children's scores were ranked in to one of 4 categories; beginning, progressing, achieving and excelling. 66% of the subjects fell within the Progressing score for physical competence, 57% fell within the Progressing score in the affective domain, 38% fell within the Progressing score of the cognitive domain, and 59% fell within the Progressing score of the daily behaviour domain. This yielded a total of 63% of children fell within the Progressing score for over Physical Literacy. **Conclusion:** It appears that the majority of children in Calgary fall below the achieving score in all but one of the domains as measured by the CAPL assessment tool. **Acknowledgements:** Joel Barnes

64. SAY HELLO TO MY LITTLE FRIEND: THE ANTHROPOMORPHIZATION OF STARFACE

Kimberley Jovanov<sup>1</sup>, Timothy N. Welsh<sup>1</sup>

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To understand the actions of other individuals, we must first understand their limbs and how they can be represented. The current study investigated how we perceive the limbs of non-human animals and, specifically, to deduce the aspects of a non-human image that facilitate human-animal representation matching (anthropomorphization). Previous studies revealed that anthropomorphization is influenced by the posture and class of the animal. These studies used a body-part compatibility task as a probe of self-other matching. Self-other matching is indicated by lower response times to targets that are presented on limbs of the image that are homologous to the actors' responding limb (e.g., RTs are lower for hand responses when targets are on the forelimb than the hindlimb of an animal). The current study employed the body-part compatibility task in which hand and foot responses were executed to targets on the limbs of a non-human image (line drawing of a starfish) in three blocks; without a face, with a face (by rearranging basic visual features) and again without a face. Results revealed that there were no compatibility effects when stimuli were presented on the "limbs" of a drawn starfish in the first block. When facial features were added to the starfish, however, significant compatibility effects emerged. Finally, when the face was removed from the image in the third block, the body-part compatibility effect did not significantly persist. Overall, this study provides preliminary evidence on the use of facial features on non-human images to act as a pre-requisite to anthropomorphization.

#### 65. THE IDENTIFICATION OF DIFFERENT ITERATIVE RATES ASSOCIATED WITH THE CONTROL OF VOLUNTARY UPPER-LIMB REACHES

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The current study sought to investigate online feedback utilization by evaluating acceleration profiles of voluntary reaches using analyses performed in the frequency domain. This approach afforded the evaluation of specific rates of discontinuities rather than their mere presence/ absence. Eighteen participants performed medial-to-lateral reaching movements in either Full-Vision, No-Vision or Memory-Guided conditions. Blocks of 100 reaches were completed in each condition to two targets (i.e., 50 trials to each of a 10 and a 30 cm target amplitude). Participants were instructed to move quickly, but to prioritize movement accuracy. Movements were measured using a tri-axis accelerometer at 250 Hz. In order to isolate relative contributions of corrective discontinuities, the acceleration profiles were detrended with a 5th order polynomial and converted to a proportional power spectra via a Fast Fourier Transform. Performance was evaluated across frequencies ranging from 2 to 30 Hz. A peak in the 6 to 10 Hz range was observed in all conditions but was of a greater magnitude in the Full-Vision Condition compared to the other two conditions (i.e., the No-Vision and Memory-Guided conditions). In addition, a secondary peak at 20 Hz was more prominent in the conditions without vision and could represent non-corrective mechanical oscillations of the finger. Thus, visual control was exemplified by iterations of approximately 100 to 167 ms (i.e., 6-10 Hz), whereas discontinuities not associated with visual feedback occurred at an iterative rate of approximately 50 ms (i.e., 20 Hz). Although the quantification of feedback utilization through the assessment of trajectory discontinuities in temporal domain has proven difficult, their evaluation in the frequency domain is a viable alternative.

Acknowledgements: Natural Sciences and Engineering Research Council of Canada; Canada Foundation for Innovation; Ontario Research Fund

#### 66. GO-ACTIVATION ENDURES FOLLOWING THE PRESENTATION OF A STOP-SIGNAL: EVIDENCE FROM STARTLE

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Logan & Cowen (1984) proposed that in a stop-signal task (SST) independent go- and stop-processes “race” such that if the go-process wins, an overt response is produced, while if the stop-process wins, the response is withheld. Based on this model, one could predict that if a process is provided with additional activation, it would be more likely to win the race. A startling acoustic stimulus (SAS) has been shown to provide added activation, resulting in early release of a response. In the present study a SAS was employed to manipulate response outcome by adding activation to either the go- (prior to the stop-signal) or stop-process (after the stop-signal). Participants produced an isometric wrist extension in response to a visual go-stimulus (green), however, if a subsequent stop-signal appeared (stimulus turned red) they were to inhibit the response. Participants completed 100-trials in a SST, including 25 stop-signal trials presented at a fixed delay corresponding to a probability of responding of 0.4 (determined from a baseline block). On stop-signal trials a SAS was presented either with the go-signal, with the stop-signal, stop-signal+100, stop-signal+150, or stop-signal+200ms. Results showed that presenting a SAS during stop-trials led to an increase in probability of responding regardless of whether the SAS was presented before or after the stop-signal. The increase in probability of responding suggests that activation related to the go-response increases rapidly following the go-signal and remains high after the presentation of the stop-signal (when the stop-process is inhibiting the response). This suggests the two processes interact rather than remain independent. Acknowledgements: Supported by the Natural Sciences and Engineering Council of Canada & the Ontario Graduate Scholarship Program

#### 67. PERCEPTUAL AVERAGING FOR AUDITORY PRO- AND ANTISACCADES

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The visual antisaccade task requires the top-down and two-component processing of inhibiting a stimulus-driven prosaccade (i.e., response suppression) and the mirror-symmetrical inversion of a target’s visual location (i.e., vector inversion). Notably, recent work by our group (Gillen and Heath 2014: *Vis Res*; Heath et al. 2015: *J Vis*) has shown that vector inversion is a perception-based process governed via a statistical summary representation (SSR). In particular, our work showed that antisaccade amplitudes were biased in the direction of the most frequently presented target in a stimulus-set. The present investigation was designed to examine whether a SSR influences auditory-based pro- and antisaccades. To that end, participants completed auditory (i.e., 50 ms burst, 70 dBA white noise) pro- and antisaccades to three target eccentricities (10.5°, 15.5° and 20.5°) in blocks wherein eccentricities were presented with equal frequency (i.e., control-weighting condition) and when the 10.5° (i.e., proximal-weighting condition) and 20.5° (i.e., distal-weighting condition) targets were presented five times as often as the other eccentricities. Results showed that pro- and antisaccade amplitudes were refractory to the different weighting conditions; however, the slope relating amplitude to target eccentricity was markedly shallower for the latter task (prosaccade:  $b=0.51$ ; antisaccade:  $b=0.17$ ). Thus, preliminary results provide no evidence that weighting conditions differentially influenced the specification of pro- and antisaccade amplitudes. That said, the shallower amplitude/target eccentricity slope associated with antisaccades provides some evidence that an auditory vector inversion process is governed via a SSR that is similar to its visually based counterpart.

Acknowledgements: Supported by NSERC

68. SUBTHRESHOLD TRANSCRANIAL MAGNETIC STIMULATION APPLIED DURING THE REACTION TIME INTERVAL DECREASES REACTION TIME UNDER CONTROL BUT NOT STARTLE CONDITIONS

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Presenting a startling acoustic stimulus (SAS) during a simple reaction time (RT) task significantly decreases RT; however, the neural mechanism behind this early response triggering is not fully understood. One hypothesis is that a SAS leads to an involuntary increase in initiation-related activation processes via a sub-cortically mediated pathway, triggering a cortically stored response without engaging the usual cortical processing. Subthreshold transcranial magnetic stimulation (TMS) applied over motor cortex has been shown to increase cortical excitability in the time period 6-30ms after the pulse (termed intracortical facilitation [ICF]). ICF protocols have also been shown to reduce simple RT. The purpose of this experiment was to examine whether subthreshold TMS applied to motor cortex early in the RT interval following a SAS would result in a further decrease in RT, providing evidence the cortex is involved in SAS-triggered responses. Participants completed a simple RT task where a SAS was occasionally presented concurrent with the go-signal. On selected trials TMS (or sham TMS) was applied in the first 30 ms following the go-signal during control and SAS trials. Results from control trials revealed that TMS led to a significant decrease in RT (~30 ms), with sham TMS showing a decrease of smaller magnitude (~15 ms). Furthermore, RT on SAS trials was significantly faster than on control trials; however, no additional decrease in RT was observed following real or sham TMS. These results suggest that either cortical involvement is limited/bypassed during SAS trials or that startle leads to a ceiling effect on RT facilitation.

Acknowledgements: Supported by NSERC and the Ontario Ministry of Research and Innovation

69. SENSORY MODALITIES INFLUENCE ON HAND PERCEPTION

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Previous research has found that the perception of one's hands is inaccurate. Furthermore, this inaccuracy has certain distinguishable patterns including an overestimation of hand width and an underestimation of finger length. The aim of the present study is to investigate the influence of vision to this distorted perception. Participants were required to place their hand underneath a glass tabletop and point to ten locations on their hand when their hand was visible (real condition) or hidden from view (perception condition). Participants had vision throughout the task (Group 1) or wore a blindfold during the perception portion of the task (Group 2). They completed the task by pointing with their own finger or with a wooden stylus, to investigate if proprioceptive feedback of the pointing hand influenced hand perception. The task was completed with both the right and left hands. Results replicated previous findings of an overestimation of hand width and underestimation of finger length, but participants were more accurate when vision was unavailable (Group 2). This finding suggests that vision interferes with hand representation. Proprioceptive feedback of the pointing hand played only a minor role with slightly more accurate representation when pointing with the finger. Finally, when compared to the left hand, right hand estimates were more distorted regardless of visual availability and pointer effector (finger or stylus).

70. EFFECTS OF IMPLEMENT AND DISTANCE ON THE PERFORMANCE OF A DISCRETE MOTOR SKILL

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Golf putting is an example of a discrete motor skill that needs to be developed to produce success in the game of golf. Golfers attempt to use various putter designs and practice in numerous different ways in order to generate a successful putting technique. The counterbalanced putter design has been developed in order to replace the long putter now banned by PGA rules and there is no conclusive knowledge of its effects on performance. The aim of this study is to identify kinematic variables that change when novices putt from various distances using a conventional and counterbalanced putter. 8 novices (minimal to no experience with golf) performed 75 trials at 3, 5, 7, 9, and 11 feet from a target per putter for a total of 150 trials. Means and standard deviations for backswing timing (BST), downswing timing (DST), backswing amplitude (BSA), downswing amplitude (DSA), and putter path (PP) were determined using Visualeyex Motion Analysis system and subsequent software as well as Matlab and other processing software. A 2 putter (conventional/counterbalanced) by 5 distance (3, 5, 7, 9, 11 ft) ANOVA with repeated measures at  $p < 0.05$  was completed with Tukey's HSD post-hoc test. Results show a significant change in mean BST and BST, PP variability, mean DSA and variability, with increasing distance but no significant changes between putter. Performance analysis based on radial error scores shows constant error is lower when a counterbalanced putter is utilized by novices in comparison to the conventional putter. These results support previous force control research and suggest counterbalanced putters, while changing the performance may not change variability.

Acknowledgements: Ran Zheng, Felix Ling

#### 71. THE IMPACT OF RELATIVE AGE AND COMMUNITY SIZE ON FEMALE ICE HOCKEY PARTICIPATION IN ONTARIO

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An athlete's developmental environment has the potential to impact continued participation in sport and ultimate level of achievement. Researchers have suggested that when an athlete is born relative to peers and the size of the community where their sport development occurs may be important. The purpose of this study was to examine the pattern of relative age and rate of participation in communities of varying size in Ontario. Female hockey registration information was provided by the OWHA for the 2010-2011 season ( $n = 27,881$ ). Given the age group cut-off in hockey of December 31st of a given year, the birthdates were coded in quartiles: Q1-January to March; Q2-April to June; Q3-July to September; Q4-October to December. Population distributions were obtained from Statistics Canada for 2011. A chi-square goodness-of-fit analysis was performed for each population category within an age division to identify relative age patterns. From the chi-square analyses, an over-representation of relatively older players was observed across all age divisions for small, medium, and large population centres ( $p < 0.05$ ). No relative age differences were observed for rural communities ( $< 1000$ ) in any age division. Small (1,000 to 29,999) and medium-sized (30,000 to 99,999) communities also appear to be associated with increased participation in female ice hockey. Population size may influence relative age patterns and rates of participation. Further investigation of these trends and discussion of the limitations with using census data is warranted.

Acknowledgements: Support for this project was received through a Social Sciences and Humanities Research Council Doctoral Fellowship (K. Smith). Thank you to the Ontario Women's Hockey Association (OWHA) for sharing their registration data.

#### 72. ADVANCE KNOWLEDGE OF UPCOMING STARTLE STIMULUS DOES NOT INHIBIT THE STARTLE REFLEX DURING A REACTION TIME TASK

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The startle reflex is a defensive physiological response to an unexpected and intense stimulus, resulting in a generalized flexion response that typically includes activation in the sternocleidomastoid (SCM) muscle. A startling acoustic stimulus (SAS) can also involuntarily trigger the release of a pre-planned movement with decreased latency, a phenomenon termed the StartReact effect (Carlsen et al., 2004). It is generally accepted that only an unexpected, intense stimulus leads to an overt startle reflex. However, because startle habituation is attenuated during reaction (RT) time tasks, it is unclear whether foreknowledge of an impending SAS would have any effect on the startle reflex or the RT speeding effect of startle. To test this, sixteen participants completed a simple RT task consisting of two sequential blocks. In one block, the SAS, which replaced the usual go-signal, was randomly presented in 20% of trials without the knowledge of the participants. In the other, participants were warned of the upcoming SAS. One group completed the random block first, while a second completed the warned block first. Results showed that advance knowledge of an upcoming SAS had no effect on the incidence of observing a startle reaction ( $p = .971$ ), but led to significant RT savings in both control and startle trials ( $p = .019$ ). These data suggest that when used in the context of a RT task, a SAS does not need to be unexpected in order to elicit a startle reaction and speeded RTs, and can benefit advance preparation.

Acknowledgements: Supported by NSERC and the Ontario Ministry of Research and Innovation

#### 73. GENERALIZATION PATTERNS FOR SENSORY AND REACH ADAPTATION FOLLOWING EXPOSURE TO VISUAL-PROPRIOCEPTIVE DISCREPANCIES

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The CNS evolved sensory and reach adaptation as types of plasticity to deal with body-growth changes and variability in the surrounding world. Reach adaptation generalize to untrained contexts and transfer between limbs. We examined the extent by which proprioceptive recalibration generalize to the untrained hand, across novel locations in the workspace. In experiment 1, subjects trained to reach with an aligned and translated cursor, we assessed the resulting changes in hand movements (without cursor) and felt hand position for both trained and untrained hand. Reach adaptation transferred between hands, proprioceptive recalibration did not transfer. In experiment 2, we measured reach adaptation and proprioceptive recalibration at novel locations following training with a rotated cursor. Reach and sensory adaptation generalized to novel locations at different distances, however, sensory changes generalized with smaller extent at far-locations. In experiment 3, we removed the motor component during training so that subjects exposed to a proprioceptive-visual discrepancy in which they see the cursor heading to the training target while the robot gradually rotates their unseen hand-path. Subjects reached to one target from a starting-position(S1) then we measured reach and sensory changes at novel locations from S1 and from a novel starting-position (S2). We found proprioceptive recalibration at the trained and novel locations from S1 and S2. Additionally, we found reach adaptation at the same locations but with smaller extent. Our findings suggest that reach and sensory adaptation may be independent, mere exposure to proprioceptive-visual discrepancy results in proprioceptive recalibration which drive partial reach adaptation that follow similar generalization pattern.

#### 74. UTILIZING VIDEO CAPTURE TO EVALUATE AND IMPROVE REFEREE PENALTY DECISION-MAKING IN ICE HOCKEY

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Examining decision making in ice hockey referees has received limited attention; yet ice hockey is a popular sport. While research is needed to examine the factors that influence referee decision making, few research tools exist. This research evaluated the utility of on-ice video capture for the examination of in game referee decision-making. Methods: Written informed consent was received from referees officiating during a Spring hockey season. Complete game footage of AAA hockey games was collected using a Go Pro camera mounted to the helmet of officials. Video clips were then created from the game footage related to on-ice infractions. The clips were assessed by a panel of expert officials to provide a consensus on the appropriate decision for each penalty scenario, as well as provide a level of difficulty for making the correct call. Results: A high inter-rater reliability of 90% was achieved for the decision outcome of the scenarios as per current officiating rules, as well as for level of call difficulty. There was unanimous support that the information obtained would be of value for evaluating the competency of ice hockey officials and for referee training and development. Discussion: Simple video capture devices (e.g., helmet mounted Go Pro cameras) provide important insight into the on-ice perspective of hockey officials, and can be used to examine the decision-making capabilities of officials. It is envisioned that this approach will help in the ongoing training and evaluation of ice hockey officials across a range of competencies.

75. END-STATE COMFORT IN TWO OBJECT MANIPULATION TASKS: INVESTIGATING HOW THE MOVEMENT CONTEXT INFLUENCES PLANNING IN CHILDREN, YOUNG AND OLDER ADULTS

Sara M. Scharoun<sup>1</sup>, Pamela J. Bryden<sup>2</sup>, Eric A. Roy<sup>1</sup>

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Scharoun et al., (in preparation) demonstrated that movement context (pantomime, pantomime with image/glass as guide, actual use) influences end-state comfort (ESC) planning across the lifespan. In the present study, we advanced this work in two ways. First, we tested whether we would see more ESC with a more familiar object (glass) relative to a less familiar (hammer) one. Secondly, we examined how the movement context (pantomime, using a dowel as the tool and actual use) influenced ESC planning across these two tasks. Children (ages 5-11, n=56), young (Mage = 22.9; n = 21) and older adults (Mage = 69.1; n=21) picked up an overturned glass to pour water and a hammer to hit a nail, where the handle faced away from the participant. Preliminary results revealed more ESC in actual use compared to using a dowel and in pantomime, which did not differ. In addition, more ESC was displayed in the hammer task. Age-related differences revealed less ESC in 5- to 6-year-olds compared to older participants, and in 9- to 10-year-olds compared to young adults. This supports adult-like ESC planning beyond age 10 (Wunsch et al., 2013). As a group, older adults did not differ from young adults; however, more ESC was displayed in actual use compared to pantomime in the old (70+) compared to young (60-69) older adults. This adds to our knowledge of when and at what rate motor planning skills are developing and declining and how movement context (tool use versus pantomime) affects the expression of these skills.

Acknowledgements: The authors would like to acknowledge the Natural Sciences and Engineering Research Council (SMS, PJB, and EAR), the Ontario Ministry of Training, Colleges and Universities (SMS) and the Heart and Stroke Foundation of Ontario (EAR) for funding.

**Saturday, October 17, 1:30-3 pm**  
**Carron and Wilberg Lectures**

Dr. Nick Holt, University of Alberta  
Dr. Romeo Chua, University of British Columbia

**Saturday, October 17, 3:30-5 pm**

**Symposium: Acquisition and maintenance of sporting expertise; Saturday, October 17, 3:30-5**

UNDERSTANDING THE ACQUISITION AND MAINTENANCE OF SPORTING EXPERTISE:  
CURRENT PERSPECTIVES

Joe Baker<sup>1</sup>, Nick Wattie<sup>2</sup>

<sup>1</sup>York University

<sup>2</sup>University of Ontario Institute of Technology

The acquisition and maintenance of high levels of sporting skill continues to fascinate large numbers of the Canadian population. In recognition of Canada's role as host of the 2015 Pan-Am and Para-Pan-Am Games, this symposium focuses on the multidisciplinary processes involved with the acquisition and maintenance of sport skill in able-bodied and para-sport athletes. The first two presentations in this symposium explore psychological factors that appear to underpin elite athletes' ability to perform deliberate practice, a variable highly related to attainment. Young et al propose a scale for measuring athletes' ability to practice, while Tedesqui et al. examine the concept of 'Consideration of Future Consequences' as a possible buffer of individuals' capability to self-regulate thereby affecting practice behaviours. From the psychological, the symposium shifts to the influence of geographic factors on athlete development. LaForge-MacKenzie et al. consider how geographic factors might constrain the development of Canadian Olympians. In the fourth presentation, Lemez et al. focus on an area of high performance sport that has received very little research attention. More specifically, they examine the developmental histories of high performance athletes in wheelchair basketball. Finally, Schorer et al. considers the maintenance of skilled perceptual performance in elite volleyball players. Collectively, these five presentations highlight the range and complexity of issues currently being considered in sport expertise research.

MEASURING ATHLETES' SELF-EFFICACY FOR DELIBERATE PRACTICE: INITIAL  
DEVELOPMENT AND ANALYSES

Bradley Young<sup>1</sup>, Rafael Tedesqui<sup>1</sup>, Joe Baker<sup>2</sup>

<sup>1</sup>University of Ottawa

<sup>2</sup>York University

Research has substantiated the role of deliberate practice (DP) in the acquisition of expertise but none has considered psychological characteristics enabling athletes to navigate Ericsson et al.'s (1993) three constraints to DP (Baker & Young, 2014). This study examined the initial factorability and concurrent validity of items assessing self-efficacy to navigate resource (6 items), effort (3 items) and motivational (3 items) constraints. Sixty-six athletes (30 m, 36 f, ages 13-17), from six (regional to international) performance levels, also provided amounts of DP and pertinent concurrent measures. A 3-constraint factor model, CFI = .93, SRMR = .06, RMSEA = .08 (90% CI .03 - .12) showed superior fit to a 1-factor model,

CFI = .68, SRMR = .12, RMSEA = .17 (90% CI .14 - .20). Pearson correlations (partialling out age) between each scale and performance level, DP and physical preparation were non-significant,  $p > .17$ . However, resource efficacy correlated with future sport self ( $r = .25$ ,  $p = .04$ ) suggesting athletes who are more efficacious practicing without resources more strongly foresee themselves as reaching the upper echelon of sport in the long-term. Further, effort efficacy correlated with consideration of future consequences ( $r = .36$ ,  $p = .003$ ) suggesting athletes who are more efficacious practicing when they are fatigued/lack energy report a greater focus on the long-term consequences of their training. Partialling out performance level, older athletes reported higher motivation efficacy ( $r = .26$ ,  $p = .04$ ) meaning they have greater efficacy to practice even when unmotivated or not improving.

Acknowledgements: This research was funded by a grant from the Research Development Program and the Faculty of Health Sciences at University of Ottawa.

## INITIAL EXAMINATION OF THE VALIDITY OF 'CONSIDERATION OF FUTURE CONSEQUENCES' SCALES IN AN ADOLESCENT SPORT SAMPLE

Rafael Tedesqui<sup>1</sup>, Dora Bartulovic<sup>1</sup>, Joe Baker<sup>2</sup>, Bradley Young<sup>1</sup>

<sup>1</sup>University of Ottawa

<sup>2</sup>York University

Consideration of future consequences (CFC) represents the extent one considers the long-term implications of current actions (Strathman et al., 1994). Unexamined in sport, CFC may influence individuals' capability to self-regulate long-term deliberate practice (Barone et al. 1997). We compared the factor structure and concurrent validity of the original CFC-12 scale to our scale (CFC-A) which had added items (totaling 17) reflecting achievement striving among adolescents. Seventy-eight athletes (41 females, ages 13-18) completed both scales, and questions on performance level, deliberate practice amounts, and sport aspirations. We examined fit indices for three measurement models: unidimensional CFC-12, two-factor (Future, Immediate) CFC-12, two-factor (Future, Immediate) CFC-A. Unidimensional CFC-12 showed very poor fit (CFI=.72) and inferior item loadings. After eliminating two items, CFC-A showed superior fit (CFI=.92) to the two-factor CFC-12 (CFI=.88) and stronger item loadings on Future (7 items >.54) and Immediate (8 items >.57) factors. We advanced all scale scores to concurrent validity tests. Elite and non-elite groups did not differ on any scale and no scale correlated with deliberate practice,  $p > .30$ . Controlling for age, unidimensional CFC-12 ( $r = .28$ ) and CFC-12 Future ( $r = .24$ ) correlated with the number of years athletes were willing to continue to reach their peak,  $p < .05$ . CFC-12 Future correlated with future sport self ( $r = .41$ ,  $p = .001$ ), meaning adolescents who considered long-term consequences of their training also reported higher drive to reach the upper echelon of sport in the long-term. Although the factorability of the CFC-A appears preferable and has conceptual merits, our scales failed to perform better than the original CFC-12 on preliminary concurrent validity tests.

Acknowledgements: This research was funded by a grant from the Research Development Program and the Faculty of Health Sciences at University of Ottawa

## DEVELOPMENT OF EXPERTISE IN CANADIAN WHEELCHAIR BASKETBALL PLAYERS

Srdjan Lemez<sup>1</sup>, Nick Wattie<sup>2</sup>, Nima Dehghansai<sup>1</sup>, Joe Baker<sup>1</sup>

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Athlete development research over the past two decades has largely focused on the development of expertise in able-bodied athletes/sports despite considerable growth in parasport during the same period. Although similarities between performance contexts exist, the developmental trajectories may be

considerably different between able-bodied and disabled athletes (e.g., differences in starting age or onset of ‘deliberate practice’). This study examined 74 Canadian male (n = 48; M = 22.26 years) and female (n = 26; M = 24.20 years) wheelchair basketball players who were enrolled in The Wheelchair Basketball Canada National Academy. A modified version of the Developmental History of Athletes Questionnaire (DHAQ; Hopwood, 2003) was used to ascertain demographic and career information, developmental milestones, practice history, and participation in other organized sports. Descriptive analyses revealed varied training histories and sporting backgrounds in our sample. For example, males first participated in wheelchair basketball (in any format) at 13.58 years (SD = 4.22); 13.22 years (SD = 4.03) at the junior level, 15.06 years (SD = 4.64) at the senior level, and 12.36 years (SD = 3.71) for those who competed in both. In contrast, females began participation at an older age (M = 15.21 years), but at a higher variability (SD = 6.33). Further, 40 participants (54.1%) had prior involvement in other sports (M = 3.53; SD = 2.64), starting at an average age of 8.67 years for first ‘other sport’ participation (SD = 5.37). These results emphasize the unique developmental pathways of parasport athletes compared to their able-bodied counterparts.

#### UNDERSTANDING THE ORIGINS OF CANADIAN OLYMPIC PERFORMANCE: GEOGRAPHIC CONSTRAINTS ON THE ACQUISITION OF SPORT EXPERTISE

Kaitlyn LaForge-MacKenzie<sup>1</sup>, Jörg Schorer<sup>2</sup>, Nick Wattie<sup>3</sup>, Joe Baker<sup>1</sup>

<sup>1</sup>York University

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Over the last ten years, there has been significant research devoted to how size of one’s birthplace affects likelihood of becoming an elite athlete based on the assumption that access to early resources can impede opportunities for skill development. Despite this attention, our understanding of how geographical factors constrain or facilitate skill development is far from complete. For instance, all prior work in this area has used National level analyses, which may not capture the nuances of development across a nation. In this study, we examined geographical variables among Canadian Olympians to understand their relationship with Olympic athlete development. For this analysis, birth province and size of birthplace were collected for 1144 Canadian summer Olympic athletes and compared to data from age-matched cohorts from the Canadian census. Results indicated significant differences between provinces/territories and birthplace sizes for athletes compared to the general population. More specifically, a) British Columbia had an over-representation of summer Olympic athletes compared to other provinces/territories and b) athletes coming from smaller regions (<10,000) were significantly under-represented compared to the general population while those coming from larger areas (> 30,000) were significantly over-represented. These findings continue to highlight the significance of geographical factors in understanding sport skill acquisition and athlete development. Furthermore, when considered relative to previous work, our results highlight potential limitations of National-level analyses for understanding these effects and suggest several areas for future work (e.g., the influence of provincial talent pathways and location of national training centres). Acknowledgements: This research was funded by a grant from the Social Sciences and Humanities Research Council of Canada

#### MAINTENANCE OF PERCEPTUAL COGNITIVE EXPERTISE IN FEMALE VOLLEYBALL PLAYERS

Lennart Fischer<sup>1</sup>, Joe Baker<sup>2</sup>, Judith Tirp<sup>3</sup>, Rebecca Rienhoff<sup>1</sup>, Bernd Strauss<sup>1</sup>, Jörg Schorer<sup>3</sup>

<sup>1</sup>University of Muenster

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Understanding how to maintain skill with age is becoming increasingly important and while there is strong evidence that ‘hardware’ elements of the perceptual and cognitive system (sensory and cortical factors) decline with age (Andersen, 2012; Brach & Schott, 2003), other components of the visual system and the brain’s ability to process (i.e., software elements) visual stimuli change with age (Berke, 2009). Different studies have shown that many elements of experts’ superior perceptual and motor performance can be maintained with age (Baker & Schorer, 2009). A recent study by Fischer et al. (2015) focused on the maintenance of perceptual and motor performances in older aged basketball experts, noting maintenance of motor but not perceptual performance (fixation duration) and suggesting older aged experts are able to compensate for losses in perceptual skills. The current study examined aspects of skilled perceptual performance among older female expert (n = 6), advanced (n = 7) and novice (n = 10) volleyball players. As expected, there were skill-related differences among the groups although analyses of differences in perceptual performances between the groups were mixed. Our results highlight several interesting areas for future work including the possibility that age-related changes in the performance environment might drive maintenance or decline of skill. This research contributes to a surprisingly limited evidence base regarding the influence of age on perceptual skill.

**Free papers: Exercise Messaging; Saturday, October 17, 3:30 – 5 pm**

**THE EFFECT OF HEALTH MESSAGING ON SEDENTARY BEHAVIOUR RISK PERCEPTIONS:  
DOES IMMEDIACY OF RISK MATTER?**

Madelaine Gierc<sup>1</sup>, Larry Brawley<sup>1</sup>

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

The past decade has seen increasing research on sedentary behaviour (SB) reduction, such as environmental interventions, wearable technology, and policy. However, there is little evidence to suggest that these resource-intensive interventions produce clinically-significant changes in behaviour. One potential explanation for this limitation is a poor understanding of sedentary psychology (Biddle, 2011), including individuals’ perceptions of SB as a health risk. For instance, whereas empirical work tends to emphasise SB’s relationship with chronic disease (e.g., Tremblay et al, 2010), early research suggests individuals associate SB with musculoskeletal pain, poor fitness, and negative emotions (Gierc & Brawley, 2014; Gilson et al, 2011). The purpose of this study was to examine two questions. First, can a simple health education message about SB risk affect individuals’ perceptions of SB? Second, does the type of risk information presented matter? Participants (N=175) completed an online questionnaire. After obtaining baseline beliefs and knowledge of SB, they were randomised to receive one of three messages: control, proximal risk, or distal risk. Messages were followed by scaled items on perceptions of SB (e.g., “I think SB is a health risk to me”). Analysis indicated no between-group differences in message readability or quality,  $p > 0.05$ . Significant differences were observed between participants who received risk information (proximal/distal) versus those randomised to the control,  $\Lambda = 0.874$ ,  $F(8, 154) = 2.764$ ,  $p < 0.01$ . No differences were found between participants receiving proximal versus distal information,  $p > 0.05$ . Collectively, results suggest that the receipt of any information regarding the health risks of SB may be an effective way to increase risk perceptions about prolonged sitting.

**MOVE MORE OR SIT LESS? COMPARING PHYSICAL ACTIVITY AND SEDENTARY  
BEHAVIOUR MESSAGES AMONG SEDENTARY ADULTS**

Shane N. Sweet<sup>1</sup>, Marcus A. Waskiw-Ford<sup>1</sup>, Lindsay Duncan<sup>1</sup>  
<sup>1</sup>Department of Kinesiology and Physical Education, McGill University

Sedentary behaviour and physical inactivity are major health concerns, but research comparing messages that promote either a reduction in sedentary behaviour or an increase in physical activity is limited, especially those that also examine changes in their related cognitions. The purpose of this study was to test the impact of a sedentary behaviour reduction message versus a physical activity promotion message on behaviour-specific cognitions (e.g., self-efficacy and intentions). Participants (N = 64) were randomly shown either a sedentary behaviour (n = 31) or physical activity message (n = 33), and then reported their intentions and task self-efficacy for each behaviour. Effect size calculations (Cohen's d and partial eta square) were conducted to examine changes in sedentary behaviour and physical activity intentions from pre- to post-message exposure and post-message differences on sedentary behaviour and physical activity task self-efficacy. Regarding intentions, participants who read either message increased their physical activity and sedentary behaviour intentions (Cohen's d = .54 and .66, respectively); however, this change occurred irrespective of the message they read (partial eta square = .01 and .03, respectively). No post-message differences were found between message groups on physical activity task self-efficacy (Cohen's d = .13) and sedentary behaviour task self-efficacy (Cohen's d = .08). We observed that both sedentary behaviour and physical activity messages can influence intentions related to sedentary behaviour and physical activity. Thus, cognitions related to sedentary behaviour and physical activity do not appear to change only in response to a behaviour-specific message. More research is needed to examine the most effective strategies to independently target behaviour-specific cognitions.

#### HELPING PARENTS HELP CHILDREN: MESSAGE FRAMING EFFECTS ON PARENT'S COGNITIONS AND BEHAVIOURS RELATED TO CHILDREN'S PHYSICAL ACTIVITY

Rachael C Stone<sup>1</sup>, Jocelyn Jarvis<sup>2</sup>, Amy Latimer-Cheung<sup>3</sup>, Pratik Nair<sup>1</sup>, Rebecca Bassett-Gunter<sup>1</sup>

<sup>1</sup>Kinesiology and Health Science, York University

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Parents are often the gatekeepers to youth physical activity (PA) involvement. Specifically, parental social support-related thoughts and behaviours act as prominent factors for facilitating regular participation (e.g., providing transportation, verbal encouragement); yet, a paucity of research has measured whether persuasive messages can influence parental social support behaviours over time. This study examines the effects of framed messages (gain, loss, or mixed) on parental social support cognitions and behaviours, and changes in youth PA reported over four weeks (Ninitial=224 parents of children aged 5-11, Nweek1=164, Nweek4=126). Repeated measures ANOVAs revealed significant increases in planning PA (p=0.001), subjective norms (p=0.01), perceived behavioural control (p=0.0001), and intentions for social support (p=0.002) from pre- to immediately post-exposure regardless of message frame. However, these positive trends did not carry-over to one-week follow-up. Nevertheless, actual PA social support provided by parents to their children was significantly higher at four-weeks compared to week one (p=0.001), with children's weekly PA participation significantly increasing during this time as well (p=0.03). While no significant overall frame by time interactions were found, parents exposed to loss-framed messages inconsistently reported significantly higher social support cognitions and behaviours compared to gain- and mixed-framed. These findings suggest message presence may have more influence than frame when aiming to enhance parent social support cognitions and behaviours. Furthermore, with these effects diminishing beyond immediate exposure, future interventions should encourage parents to create action plans for their children shortly after exposure to PA messages.

## A TEST OF SOCIOEMOTIONAL SELECTIVITY THEORY IN THE CONTEXT OF HEALTH INFORMATION

Martina Marien<sup>1</sup>, Patrick Vellner<sup>1</sup>, Lindsay R. Duncan<sup>1</sup>

<sup>1</sup>Department of Kinesiology & Physical Education, McGill University

The socioemotional selectivity theory (SST) states that individuals who perceive time as expansive are more likely to choose less emotionally-meaningful goals; whereas, those who view time as more finite tend to select more emotional goals. Additionally, individuals with a limited time perspective (e.g., older adults) tend to preferentially recall emotional information. The purpose of this study was to identify differences between younger and older adults' recall of emotional and factual health information. Consistent with the SST, and given that older adults tend to perceive time as more limited than younger adults, we hypothesized that older adults would recall a higher proportion of emotional information than younger adults. Our sample ( $n = 59$ ) consisted of 28 younger adults (age = 18-26 years) and 32 older adults (age = 64-95 years). Participants were asked to read an article about a man with a fictional health condition whose experiences were described using factual and emotional information. The fictional disease was used to ensure that participants would not be influenced by any previous knowledge of, or experience with, the disease. The participants then completed a series of distraction tasks (e.g., crossword puzzle) for 30 minutes, and an oral recall of all of the information they could remember from the article. Consistent with our prediction, older adults recalled a significantly higher proportion of emotional information compared to their younger counterparts ( $t(51) = -1.98, p = 0.05$ ). This suggests that health messages may be more meaningful when information is tailored to a specific age group, and could be an effective way of educating individuals on healthy lifestyle behaviours.

## THE EFFECTS OF GAIN- VERSUS LOSS-FRAMED MESSAGES FOLLOWING HEALTH RISK INFORMATION ON PHYSICAL ACTIVITY IN INDIVIDUALS WITH MULTIPLE SCLEROSIS

Alexander Lithopoulos<sup>1</sup>, Rebecca L. Bassett-Gunter<sup>2</sup>, Kathleen A. Martin Ginis<sup>3</sup>, Jocelyn W. Jarvis<sup>1</sup>, Amy E. Latimer-Cheung<sup>1</sup>

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<sup>3</sup>Department of Kinesiology, McMaster University

Some secondary complications of multiple sclerosis (MS) can be countered by physical activity (PA) participation. To encourage PA participation, practitioners may deliver risk information about secondary complications of MS preceded by messages encouraging PA participation. This study examined the effects of risk information (or no risk information) followed by gain- or loss-framed messages on perceived risk of secondary complications, fear arousal, and PA intentions, behaviour, and self-efficacy in people with MS. Two-hundred sixty-two participants ( $M$  age = 41.62,  $SD = 9.47$ ) completed measures on Day 1, Days 2-5, and Days 6, 14, and 28. Participants read corresponding risk information and/or framed PA messages on Days 2-5 (one health topic per day), covering health topics relevant to people with MS (i.e., chronic diseases, falls, fatigue, and mental health). Repeated measures ANCOVAs showed risk information participants had higher scores than no risk information participants for PA and perceived risk ( $ps < .04$ ). ANCOVAs revealed that participants who read information about chronic diseases had higher scores for intentions than participants who did not read risk information ( $p = .04$ ). Participants who received risk information/gain-framed messages had higher fear arousal regarding chronic diseases, falls, and mental health compared to no risk information/gain-framed participants ( $ps < .02$ ) and higher fear arousal regarding fatigue compared to no risk information/gain-framed ( $p < .001$ ) and risk

information/loss-framed ( $p = .002$ ) participants. In summary, the results suggest the provision of risk information—and in some instances gain-framed messages—effectively changes PA and potential antecedents in people with MS.

## THE INFLUENCE OF HEALTH MAGAZINE MESSAGING ON INTENTIONS TO EXERCISE

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The public is inundated with media messaging, much of which readers of health and fitness magazines perceive to be credible. The impact of commercial media messaging on physical activity behaviors is not widely understood. This research made use of a naturalistic approach to examining fitness magazine messages on exercise cognitions and behaviours. The relationship between perceived credibility of popular fitness magazine articles and attitudes, perceived behavioural control (PBC), intention, and exercise behaviour was examined. A pretest posttest approach was used. University undergraduate volunteer participants ( $N=151$ ) were randomized to one of two groups. Group A read a popular fitness magazine article and Group B read a science magazine article, both presented in situ. Participants in both groups completed a baseline questionnaire, received an article to read, completed posttest measures immediately, and then again one week later at follow-up. An ANOVA showed Group A reported a significantly higher perception of article credibility than Group B ( $F(1, 148) = 7.14, p = .00$ ). An RM MANOVA examining the effects of the intervention over time on study variables showed there was no effect for group (condition), but there was a significant effect for time ( $F(4, 144) = 3.46, p = .01, \eta^2 = .08$ ) and a group by time interaction ( $F(4, 144) = 2.42, p = .05, \eta^2 = .06$ ). The key variable was PBC, with Group B reporting higher control beliefs. The findings of this research may indicate that a one-time exposure to commercial fitness magazines may be insufficient at influencing exercise cognitions and behaviours. Acknowledgements: Athabasca University, Mount Royal University

### **Free papers: Children and Youth Exercise Psychology; Saturday, October 17, 3:30 – 5 pm**

## AN EXPLORATION OF THE BODY PRIDE EXPERIENCES OF YOUNG ABORIGINAL MEN AND WOMEN IN CANADA

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The purpose of this qualitative description was to explore how Aboriginal youth in an urban center experience body pride. Body pride may be a predictor of health for Aboriginal youth and has been described as being connected to culture. Eight participants (four men, four women) that self-identified as Aboriginal and were between the ages of 20-25 years, participated in one-on-one interviews to describe their meanings and experiences of body pride. A qualitative content analysis highlighted five themes representing body pride: (a) the body as a changing “vessel,” (b) body pride as a practice, (c) traditional activities that foster body pride, (d) challenging westernized body stereotypes and the marginalization of native peoples, and (e) body pride and male views of masculinity. This research contributes to the literature by highlighting Aboriginal youth’s meanings of body pride and describing how to foster body pride while affirming Aboriginal cultures and identities.

Acknowledgements: The project described in this paper was funded by the Social Sciences and Humanities Research Council (SSHRC, grant number 430-2012-0239) of Canada and a Research Award

by the Office of the Vice President (Research) Special Fund, University of Alberta. The authors would like to thank the participants who shared their knowledge and contributed their time and effort to this project.

## VALIDATION OF THE CHILDREN'S ACTIVE PLAY IMAGERY QUESTIONNAIRE (CAPIQ)

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The present study examined the convergent and discriminant validity as well as the factorial structure of the Children's Active Play Imagery Questionnaire (CAPIQ; Cooke et al., 2014), which assesses three types of imagery (capability, social, fun) used during active play. Participants included 194 male and female students (9-14 years of age) from five elementary schools. They completed the CAPIQ, the Physical Activity Enjoyment Scale for Children (Moore et al., 2009), two subscales from the Sport Friendship Quality Scale (Weiss & Smith, 1999), the Sport Imagery Questionnaire for Children (Hall et al., 2009), and the Competitive State Anxiety Inventory-2 for Children (Stadulis et al., 2002). Spearman correlation coefficients revealed that all three subscales from the CAPIQ were positively correlated with enjoyment in physical activity, elements of friendship quality, all five functions of sport imagery, and confidence – thus providing support for convergent validity. Additionally, fun imagery and social imagery were negatively associated with cognitive anxiety – thus supporting discriminant validity. Results from the Confirmatory Factor Analysis provided support for the factor structure of the CAPIQ. The findings reported in this study provide evidence that the CAPIQ is a psychometrically sound instrument for assessing children's imagery use in their active play.

## UNIQUE AND COMBINED EFFECTS OF COMPETENCE, AUTONOMY AND RELATEDNESS ON QUALITY OF LIFE AND PHYSICAL ACTIVITY AMONG ADOLESCENTS

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Psychological needs satisfaction (PNS) fosters adaptive psychological and behavioural outcomes. However, research to date has been limited by either disentangling specific PNS factors (competence, autonomy, relatedness) or by regrouping them into a global PNS factor. Using bi-factor analysis, a form of factor analysis, enables specific and global PNS factors to be examined simultaneously to understand how they uniquely relate to key outcomes. We examined if (1) PNS in physical activity (PA) contexts could be operationalized to represent specific needs of competence, autonomy, and relatedness as well as a global PNS factor, and (2) global PNS was associated with quality of life (QOL) and PA beyond the specific PNS factors. Data from 564 adolescents (Mean=13.62, SD=.63) who completed questionnaires in the Fall of 2014 for the MATCH study were analyzed. A bi-factor model specifying one global and three specific PNS factors provided a good fit to the data [ $\chi^2(75)=289.83$ , CFI=.95, TLI=.93, RMSEA=.07 (90%CI=0.06,0.08)]. Results of the model including QOL (R<sup>2</sup>=.12) and PA (R<sup>2</sup>=.31) as outcomes of PNS also provided a good fit to the data [ $\chi^2(97)=343.52$ , CFI=.95, TLI=.93, RMSEA=.07 (90%CI=0.06,0.07)]. Global PNS was independently associated with QOL ( $\beta$ =.31), whereas competence ( $\beta$ =.28), relatedness ( $\beta$ =.12) and global PNS ( $\beta$ =.47) were independently associated with PA ( $p$ 's<.05). By simultaneously

estimating their relationships, this study demonstrates that specific and global PNS have unique and empirically distinguishable relationships with QOL and PA. Researchers can use bi-factor analysis to overcome methodological limitations encountered when studying the unique and combined associations between PNS and relevant outcomes.

Acknowledgements: The MATCH study is supported by the New Brunswick Health Research Foundation (#20130729) and by the Social Sciences and Humanities Research Council and Sport Canada through the joint Sport Participation Research Initiative (#862-2010-0001).

## CROSS-SECTIONAL AND LONGITUDINAL ASSOCIATIONS BETWEEN PARENTAL SUPPORT AND CHILDREN'S PHYSICAL ACTIVITY IN THE EARLY YEARS

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**Purpose:** Examine the cross-sectional and longitudinal associations between parental support and children's physical activity outside of child care, and whether children's age or sex moderated the associations. **Method:** Results are based on 93 children aged 19-60 months at baseline from eight child care centers across Alberta, Canada. Parental support (i.e., transportation, co-activity, watching, encouragement, and informing) and children's physical activity outside of child care were measured with a parental questionnaire at baseline (October/November, 2013) and follow-up (May/June, 2014). Linear mixed-models that accounted for children being nested in child care centers and that adjusted for children's sex, children's age, parental education, parental immigration status, temperature, and precipitation were conducted. **Results:** Every additional unit increase in parental support was significantly associated with 48.5 minutes/week (95% Confidence Interval (CI): 29.3, 67.6) and 52.2 (95% CI: 32.0, 72.3) minutes/week higher parental reported children's physical activity outside of child care at baseline and follow-up, respectively. Children's age was found to be a moderator at baseline only, with associations slightly stronger in toddlers ( $\beta = 60.4$ ; 95% CI: 32.2, 88.6) compared to preschoolers ( $\beta = 45.9$ ; 95% CI: 18.5, 73.4). A 1-unit increase in parental support from baseline to follow-up was significantly associated with a 24.8 (95% CI: 2.8, 46.8) minutes/week increase in parental reported children's physical activity outside of child care. **Conclusion:** Parental support was positively associated with children's physical activity across all analyses. Parental support may be an important correlate to target in future interventions aiming to promote physical activity in the early years.

**Acknowledgements:** This research was funded by the Alberta Centre for Child, Family, and Community Research (ACCFRC).

## THE EFFECTS OF INTEGRATED CLASSROOM BASED PHYSICAL ACTIVITY ON ON-TASK BEHAVIOR FOR ABORIGINAL CHILDREN IN GRADES FOUR AND FIVE

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There is a wide academic achievement gap between Aboriginal and non-Aboriginal youth. The rate of high school non-completion for Aboriginal Peoples is approximately 61% (Statistics Canada, 2006). The need to close this gap is great given the growth of the Aboriginal population in Canada. Research over the past decade has shown that physical activity improves the learning ability and academic performance of children (Tompsonski et al., 2011; CDC, 2010). **Purpose:** This study examined the effects of classroom based physical activity lessons that incorporated curricular content on the on-task behavior of grade four and five participants at an on-reserve elementary school. **Methods:** Time on task was assessed for thirteen participants (N=13) through direct observation before and after the intervention

and before and after an inactive classroom lesson. A two way [time (beginning of lesson vs end of lesson) x period (active lesson vs non active lesson)] repeated measures ANOVA was conducted. Results: The intervention was effective in improving the on task behavior of the participants. On task behavior scores decreased from beginning of lesson to end of lesson lesson in the non active lesson period, while on task behavior scores increased from beginning of lesson to end of lesson lesson in the active lesson period. The two way repeated measures ANOVA revealed a significant time x period interaction [ $F(1, 12) = 36.067$ ,  $p < .001$ ]. Conclusion: This research illustrates that incorporating physically active lessons that reinforce curricular content into the classroom may be an effective way to improve the on-task behaviors of Aboriginal children.

## SOCIAL AND INDIVIDUAL REFERENCE NORM AND PHYSICAL SELF-CONCEPT

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When analyzing the correlations between motor abilities and physical self-concept of children, most studies concentrate on direct interrelations between performance and self-evaluation. Only a few studies deal with the reference norm orientation in terms of internal and external frame of reference, although there is evidence that in sport external frame of reference might moderate the interrelationship (Tietjens & Niewerth, 2005). Aim of the study is to analyze the correlation pattern of motor performance, physical self-concept, global self-evaluation and reference norm orientation. This study of 128 (female 44.5%; Mage = 11,57; SD=.622) fifth and six graders examines the differences in physical self-concept (PSC-C, Dreiskämper et al., 2015), preferred reference norm orientation (RNO, internal/external), and motor performance (DMT 6-18, Bös et al., 2008) in respect to age, gender, and sports club membership, as well as the relationship between these constructs. Comparisons between gender and age are made and structural equation modeling is performed to analyze pathways between the factors. With regard to PSK, significant gender differences ( $F(8, 103)=3.32$ ,  $p < .001$   $\eta^2=.205$ ) are confirmed in MANOVAs in favor of boys on strength and endurance as well as significant differences concerning club membership ( $F(8, 104)=3.32$ ,  $p=.006$   $\eta^2=.181$ ) in almost all scales (except strength, coordination and global self worth). SEM shows that IRNO ( $\beta = .40$ ) and ERNO ( $\beta = .30$ ) moderate the interrelation between motor abilities and PSC. Physical self-concept and global self-evaluation correlate significantly with each other ( $r = .64$ ). The results indicate that children in this age group use both internal and external frames of reference to evaluate their performance independently from type and extent of their sport activity.