

1-3.JULY.2016

**Physical Education and Sports
Science Skill Acquisition
Symposium**

incorporating the

**9th Australasian Skill Acquisition
and Research Group Meeting
(ASARG)**

P r o g r a m m e



Dr Govindasamy Balasekaran

Associate Professor

Head, Physical Education & Sports Science (PESS)

National Institute of Education

Nanyang Technological University, Singapore

The Physical Education and Sports Science (PESS) is honoured to host the first Physical Education and Sports Science Skill Acquisition Symposium in Singapore. I would like to extend my warmest welcome to all participants, exercise and sport scientists and physical educators. This symposium also incorporates the 9th Australasian Skill Acquisition and Research Group Meeting (ASARG) and will take place at the National Institute of Education from 1 to 3 July 2016. ASARG has been held since 2008 in various locations with its most recent one in Perth last year.

This symposium hosts participants from seven countries with our keynote speaker, Professor John van der Kamp from VU University, Amsterdam. There will also be eight invited speakers who are leading experts in the field and would be sharing their experiences, data and research advances over the course of this symposium. Along with oral presentation sessions planned throughout this weekend, there will also be two interactive workshops and a tour to the Singapore Sports Hub and Sports Institute to showcase the sporting facilities and research in Singapore. In addition, this will be a good opportunity to interact and explore new possibilities and learning aspirations with the top researchers. This will also provide learning experience for the postgraduate students in sharing their research and gather feedback from the well-known experts. I hope that you would be engaged in inspiring exchanges over the next two days and for new connections and fresh ideas to be generated, setting the stage for future research collaborations in this field.

Finally, I wish to thank the organising committee and PESS staff who have worked hard to make this symposium a success! We hope you will have a fruitful and memorable time at the symposium and in Singapore.

Thank you and we look forward to seeing you.

1st July 2016

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Time	Programme
0900 – 0930	Registration- Lecture Theatre 11
0930 – 0945	Opening Address and Welcome A/P Govindasamy Balasekaran, Head of Physical Education and Sports Science
0945 – 1030	Keynote Dr John van der Kamp
1030 – 1100	Morning tea
1100 – 1200	Oral Session 1- Dr Chris Button Presenters: 1. Jonathan Leo Ng 2. Wan Rizal Bin Wan Zakariah 3. Willem Paul Wagtho
1200 – 1330	Lunch break
1330 – 1500	Oral Session 2- Dr James Croft Presenters: 1. Andrew Walsh 2. Jamie Hetherington 3. Haresh T Suppiah 4. Neha Malhotra
1500 – 1515	Break
1515 – 1615	Workshop 1- Dr Adrian Kee
1615 – 1715	Games
1800	Depart for welcome dinner- NIE Block 1

2nd July 2016

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Time	Programme
0900 – 1030	Oral Session 3- Dr Richard Masters Presenters: 1. Mak Chi To 2. Tim Buszard 3. Cynthia Choi 4. Georgia Askew
1030 – 1100	Morning tea
1100 – 1230	Oral Session 4- Dr Masato Kawabata Presenters: 1. Debbie Chan 2. Woo Mei Teng 3. Liis Uiga 4. Shayne Vial
1230 – 1345	Lunch break
1345 – 1500	Oral Session 5- Dr Chow Jia Yi Presenters: 1. Ng Yew Cheo 2. Kuniyasu Imanaka 3. Jonathan Connor 4. Jolene Lim
1500 – 1530	Depart for Sports Hub
1530 – 1830	Sports Hub Tour Workshop 2- Ms Miriam Lee & Dr Clara Tan Oral Presentation and Tour- Dr Marcus Lee (Singapore Sports Institute)

3rd July 2016

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Time	Programme
0900 – 1030	Oral Session 6- Dr Gert-Jan Pepping Presenters: 1. Tom R Eaton 2. Peggy Boey 3. Michael Maloney 4. Steven van Andel
1030 – 1045	Morning tea
1045 – 1215	Oral Session 7- Dr Robert Rein Presenters: 1. Fan Meng Jiao 2. Jonathan Shepard 3. Angelina Tan Li San 4. Cheryl Tay
1215 – 1230	Closing

Keynote Address



John van der Kamp
Vrije Universiteit Amsterdam

Is there a proper place for explicit instructions?

In recent years we have seen a surge of studies in implicit motor learning. Accordingly, implicit motor learning gradually finds its way in applied settings such as sport, rehabilitation and physical education. Still, practitioners often ask whether there is a proper place for explicit verbal instructions.

In this presentation I will present some of my recent studies examining various motor learning interventions (e.g., providing explicit and analogy instructions, granting self-regulated, video-feedback) that speak to the (in-)appropriateness of explicit instructions. The findings will be discussed within Dreyfus' stage model of skill learning. Based on this, I will argue that there is a proper place for explicit instructions, especially in the beginner stages of learning, because explicit instructions help simplify the movement problem.

Chris Button

University of Otago

Assessment of fundamental aquatic movement skills

Chris Button¹, Ludovic Seifert², Tim McGuire¹, Anne-Marie Jackson¹, and Jim Cotter¹

¹School of Physical Education, Sport and Exercise Sciences, University of Otago, Dunedin, New Zealand

²CETAPS, University of Rouen, Rouen, France

Swim teaching typically places emphasis upon the reproduction of classical swimming strokes within the sheltered confines of a swimming pool. However, traditional measures of swimming ability are arguably inadequate when evaluating the skills needed to prevent drowning¹. It is also possible that learning to swim in a pool creates a misplaced confidence that does not transfer well to less predictable, open water environments (e.g., lakes, oceans, rivers, etc). Several movement assessment batteries exist to assess fundamental movement skills in children, yet not one of them includes aquatic locomotion. Figure 1 is a proposed model upon which fundamental aquatic skill assessment may be based². Globally we suggest that a nonlinear pedagogy in swimming should include 'survival' skills rather than limiting teaching to 'swimming' skills, which can arise when educators focus only on competitive approach of swimming.



Jonathan Leo Ng

The Kinect Movement Skill Assessment: An Ecological Dynamics Approach

Jonathan Leo Ng¹, Chris Button¹, and Motohide Miyahara¹

1 School of Physical Education, Sport and Exercise Sciences, University of Otago, Dunedin, New Zealand

Movement Skill Assessments (MSA) are used to assess movement competency. To date, an absence of a “gold” standard exists due to MSA’s differing objectives, content and constructs (Cools et al., 2009; Giblin et al., 2014). Many MSAs lack sensitivity in detecting children with a greater movement competence due to the focus on detection of motor impairment. In recent years, the potential of utilising Active Video Games (AVGs) in assessing movement has been highlighted. AVG systems such as the Microsoft Kinect have shown good validity and have demonstrated positive associations of increasing movement competency. Currently, no existing MSA has capitalised on the utilisation of AVGs to assess general movement skill competency. Adopting theoretical posits from the Ecological Dynamics perspective and utilising Kinect 2, this research involves the development of a new MSA (refer to Table 1) that assesses general movement competency of children. Results of the research will address the current limitations of existing MSAs.

Wan Rizal

Investigating Hysteresis in Less Skilled Participants over a Period of Practice: A Dynamical Systems Perspective

Wan Zakariah¹, Chow Jia Yi¹, and Rein²

1 NIE-NTU (Singapore)

2 GSUC (Cologne, Germany)

From a dynamical systems perspective, self-organization is a key tenet in understanding human movement and is best examined via features at the phase transition point namely hysteresis. The aim of this study is to examine hysteresis through the investigation of movement patterns over a practice period of 4 weeks in less skilled participants (n=5). In a table tennis task, participants were required to return balls delivered in a scaling manner by a feeding machine to 9 locations back to a target. Hysteresis region were wider at pre (4 locations) than post (3) and retention (3) tests. In the practice sessions hysteresis region spanned 6 locations. Results show that hysteresis that may be an indicator of skill proficiency and may be used as a tool to dichotomise skill levels.

Willem Paul Wagtho

'Social Affordances – Do others Afford Cooperation?

Edith Cowan University

The reason why humans spontaneously start cooperating in joint action is proposed to rely on affordances. As shown in studies in which the size of wooden planks that had to be moved were varied, participants showed action-mode switches from individual action to joint action at similar arm lengths (Richardson et al., 2007; Isenhower et al., 2010). In these studies, the emergence of a so called "social synergy" for joint action was investigated relative to someone's individual action capabilities. However, as in many real life situations, we also need to perceive if the other is capable of - and therefore affords - joint action. If a plank becomes too bulky or heavy and assistance is needed, we preferably not ask our grannies to give a hand. Thus, beyond our fit with the environment; what do others afford for cooperation?

James Croft

Edith Cowan University

Defining the task is critical to the interpretation of motor control strategies

James L Croft¹, Ryan T Schroeder², and John EA Bertram^{1,2,3}

¹Centre of Exercise and Sports Science Research, School of Medical and Health Sciences, Edith Cowan University, Perth, Australia

²Biomedical Engineering, University of Calgary, Calgary, Canada

³Cumming School of Medicine, University of Calgary, Calgary, Canada

Newell's widely used model of constraints suggests that organismic, environmental, and task constraints interact to shape emergent patterns of coordination. Task constraints are 'implied constraints' including the goal of the task. But, sometimes the goal of the task is difficult to explicitly define independent of the mechanisms that are used to generate it. This is problematic for interpreting the consequences of different strategies for movement; observed behaviour confuses the motor control solution with the problem being solved. Defining the task of locomotion fundamentally—in terms of the interaction between an individual's mass and the substrate—may seem non-intuitive, but it allows for a critical evaluation of the function and control mechanisms involved with accomplishing the task. This approach can provide substantial insight into the constraints and opportunities affecting the implementation of locomotion, allowing for an evaluation of why alternate movement strategies are typically neglected.



Andrew Walsh

The Creation of a Climbing Specific Task that Differentiates between Attunement and Calibration

Andrew Walsh¹, Chris Button², and James Croft^{1,2}

1 Centre for Exercise and Sport Science Research, Edith Cowan University

2 School of Physical Education, Sport and Exercise Sciences, Otago, New Zealand

Perception of affordances is a prospective act impacted by task experience, which allows experienced rock climbers to gain information about a route by mentally climbing it first, while novice climbers do not. The present study sought to examine if climbing experience impacts upon a person's ability to determine their maximum action boundary relating to reaching and grasping. Maximal boundary of reach and grasp was determined using a sliding assessment hold. A preliminary analysis of 31 participants (20 climbers and 11 non-climbers) revealed no differences in the ratio of perceived to actual grasp, 1.03 ± 0.03 for both groups. Factors such as climbing style, highest grade completed, hours training, experience and gender also had no influence on perception of action boundaries. Collectively, this study suggests that when participants are standing on the ground, climbing experience does not contribute to perception of overhead graspability.

Jamie Hetherington

Development of a Representative Assessment of Perceptual-Motor Skill in Football

Southern Cross University, Lismore, Australia

Previous research into skill assessment in football has been questioned due to an inability of assessments to effectively replicate important aspects of competitive performance environments. In most cases, simulated performance contexts have been constrained to static and isolated situations. This presentation will highlight a novel research methodology which has been developed using the Ecological Dynamics framework, incorporating 3D motion analysis (integrated 20 camera vicon motion capture system) to enable the systematic manipulation of non-representative and representative constraints on perceptual-motor skill in football. It has been suggested that to gain a more accurate and holistic understanding of skill, assessments should be designed to maintain the functional coupling of perception and action processes, replicating how individuals interact with the performance environment. Furthermore, assessments should enable the investigation of constraints on skill and performance by assessing both outcome and kinematic measures and evaluating how these measures change in relation to each other.

Haresh T Suppiah

Effects of a Short Daytime Replacement Nap on Shooting and Sprint Performance in Adolescent Student-Athletes

Haresh T Suppiah^{1,2}, Low Chee Yong², Gabriel Choong Chee Wei² and Michael Chia¹

1 Physical Education and Sports Science, National Institute of Education, Nanyang Technological University

2 National Youth Sports Institute, Singapore

The purpose of the research was to investigate the performance effect of a brief afternoon nap on high-level adolescent student-athletes. In the studies, participants were randomly assigned to a nap or non-nap condition. In study one, 12 male shooters (13.8 ± 1.0 yrs) performed a shooting assessment (20 competition shots) with heart rate variability monitored during the assessment. In study two, 19 male track & field athletes (14.8 ± 1.1 yrs) performed a 20m sprint performance assessment. Psychomotor vigilance, working memory, sleepiness and alertness were measured in both studies. The nap had no effect on any measure of shooting performance ($p > 0.05$) and autonomic function ($p > 0.05$) in shooters. However, fastest 20m sprint times increased significantly ($p < 0.05$) from 3.385 ± 0.128 sec to 3.411 ± 0.143 sec, with mean 2m times trending towards significance ($p < 0.1$) amongst the track & field athletes. The results of the research indicate varying effects of naps between sport-specific performance measures of shooting and sprinting.

Neha Malhotra

The Effect of Negatively Phrased Instructions while Driving under Attentionally Demanding Conditions: Ironic Processes versus Implicit Overcompensation

Malhotra, N¹, Charlton, S¹, Starkey, N¹, and Masters, R.S.W^{1,2}

1 The University of Waikato

2 The University of Hong Kong

The theory of ironic processes (Wegner, 1994) proposes that negative self-instructions to avoid errors in a particular direction can result in precisely such errors especially under high cognitive load. This study explored ironic processes in a driving context under varying attentional demands. Participants drove roads in a simulator with non-ironic instructions followed by ironic instructions, in a control and roadworks condition, either with or without a secondary task. Overall, participants overcompensated by maintaining their car position in the left half of the lane. In the roadworks condition participants tended to maintain their car position farther left of the centre line when driving under ironic instructions than when driving under non-ironic instructions. Performing a secondary tone-counting task seemed to reduce the overcompensation effect in the ironic instructions block but not in the non-ironic instructions block. The results could be explained by the implicit overcompensation hypothesis (de la Peña et al., 2008).

Richard Masters

University of Waikato

Subtly Modified Perception of Stair Steepness: Mind your Step!

Rich Masters^{1,2}, Catherine Capio², Jamie Poolton^{2,3}, Thomson Wong², and Liis Uiga²

¹Te Oranga School of Human Development and Movement Studies, University of Waikato, New Zealand

²Institute of Human Performance, The University of Hong Kong, Hong Kong

³School of Sport, Carnegie Faculty, Leeds Beckett University, United Kingdom

Re-engineering cities in order to promote physical activity while reducing movement-related accidents, is no easy challenge for urban planners. In a quasi-experimental field study, we examined whether subtly adjusting a stair banister, in order to increase or decrease the convergence angle with the stairs, modified perception of their steepness. One hundred and forty-three participants (15 to 58 years of age) visually estimated the slant of the stairs from the top when they were aware or unaware that the stair banister had been adjusted. Slant estimations were greater when participants were unaware that the banister had been modified ($p < 0.001$) and when convergence angle increased rather than decreased ($p = 0.032$). Our results raise the possibility that relatively unobtrusive, easily engineered, modifications of the built environment influence movement-related perception, with likely implications for physical activity promotion and fall prevention.



Mak Chi To

Training Motor Skills of Children with Down Syndrome: An Implicit Approach
Mak, C.T¹, Capio, C.M^{1,2}, and Wong, W.L¹

1 School of Public Health, The University of Hong Kong, Hong Kong SAR, China

2 College of Allied Medical Professions, University of the Philippines, Manila, Philippines

Children with Down syndrome (DS) encounter difficulties including cognitive deficits and delayed motor skill development. Motor skill training is needed, and should be less dependent on cognitive resources. This study examined the effectiveness of an implicit training approach on improving fundamental movement skills (FMS) of children with DS. Children with DS (14 boys, 8 girls; 3-14 years old) participated in a 10-week FMS training following an errorless learning protocol. FMS was evaluated by the Test of Gross Motor Development-2 before and after training. Balance ability was measured using centre of pressure (COP) parameters. Significant correlation was found between balance ability and FMS proficiency (p 's<0.001). Object control (OC) skills significantly improved after training (p 's<0.05); such changes were not affected by balance ability nor age. Locomotor skills also improved, albeit not significant. The findings suggest that errorless learning may be a suitable approach to improve OC skills of children with DS.

Tim Buszard

Are Children with Low Working Memory Capacity Disadvantaged in Explicit Learning Environments when Acquiring a Motor Skill

Although it is generally accepted that certain practice conditions can place large demands on working memory when performing and learning a motor skill, the influence that working memory capacity (WMC) has on the acquisition of motor skills remains unsubstantiated. It was predicted that children with low WMC would not learn as effectively as children with high WMC in a motor skill practice context that placed an excessive burden working memory resources (i.e., through the provision of explicit instructions). In a study of basketball shooting, high WMC children displayed consistent improvements from pre- to post-test and through to the retention test, whereas performance for low WMC children declined from pre- to post-test and further deteriorated in the retention test. Discussion will focus on the role of WMC when learning motor skills in highly explicit environments and the implications for practitioners working with low WMC children.

Cynthia Choi

The Association between Working Memory and an Object Control Skill Performance in Children

Cynthia S.Y. Choi¹, Rich S.W. Masters^{1,2}, Thomson W.L. Wong¹, Catherine M. Capio^{1,3}

1 The University of Hong Kong, Hong Kong SAR, China

2 The University of Waikato, Hamilton, New Zealand

3 University of the Philippines, Manila, Philippines

It has been shown that motor skill learners who depend on working memory resources are susceptible to experience performance breakdown under cognitively demanding conditions. This study focused on children whose working memory capacity (WMC) are still developing, and investigated the role of WMC on performance of an object control skill. Primary school children aged 5-7 years performed overhand throwing with a concurrent cognitive secondary task (occupying working memory resources). Verbal and visuospatial WMC were measured by backward Digit Span task and backward Corsi Block Tapping task. Throwing performance was assessed in terms of movement form and throwing accuracy, using components of the Test of Gross Motor Development-2 and video-based measurement of absolute error from target, respectively. Correlation and linear regression analyses revealed that verbal WMC was a significant predictor of movement form, and movement form itself significantly predicted throwing accuracy. These results suggest that when cognitive resources are occupied, children with larger verbal WMC would display better motor performance.

Georgia Askew

The Influence of Playing Area and Athlete Freedom on Exploratory Behaviours in Small-Sided Games

Georgia Askew, Daniel Greenwood, & Gert-Jan Pepping

Australian Catholic University, School of Exercise Science, Brisbane
Australian Institute of Sport, Canberra

Team sports are complex and dynamic competitive environments where skilled perception-action coupling is a critical attribute in player expertise. The interactions of positions, movements and intentions must be accurately and efficiently perceived to inform the actions and decisions required to successfully engage in the game. The current project investigates the ability of training-practice design for players to learn and execute perception-action skills that promote or hinder exploratory head and body movements in an on-field and team setting in field hockey. The aim of the project is to investigate the influence of non-linear pedagogy training practices, specifically task manipulation and representative learning design, on exploratory head and body movements. It is hypothesised that exploratory movements in smaller pitch size and fixed player position conditions will result in decreased exploratory behaviour, whereas larger pitch size and free player position conditions will result in increased exploratory behaviours.

Masato Kawabata

Nanyang Technological University

The Movement Specific Reinvestment Scale: Examining its Factor Structure for Japanese and Singaporean Adults

Masato Kawabata^{1,2} and Kuniyasu Imanaka³

¹ Nanyang Technological University

² The University of Queensland

³ Tokyo Metropolitan University

The Movement Specific Reinvestment Scale (MSRS: Masters, Eves, & Maxwell, 2005) is a 10-item self-report instrument consisting of two factors to measure the personal tendency to consciously attend to and control movements. The factor structure of the MSRS has been examined for different language samples using the original English or translated versions (e.g., French, German, and Chinese). However, the originally hypothesized model did not fit to data satisfactorily in most of the previous studies. To identify reasons for the unsatisfactory model fit, the factor structure of the MSRS was critically examined for Singaporeans (n = 105) and Japanese (n = 234) with confirmatory factor analysis (CFA) and exploratory structural equation modeling (ESEM). The original CFA model provided adequate fit to the Japanese data, but did not fit to the Singaporeans' data well. In the presentation, the results of CFA and ESEM will be discussed to progress the MSRS measurement model.



Debbie Chan

Investigating Real-Time Neural Activity using Electroencephalography during Different Standing Positions

Debbie C.L. Chan¹, Thomson W.L.Wong¹, Frank F. Zhu¹, Chi Cheng Lam¹, Catherine M. Capio^{1,2}, and Rich S.W. Masters^{1,3}

1 The University of Hong Kong, Hong Kong SAR, China

2 University of the Philippines, Manila, Philippines

3 The University of Waikato, Hamilton, New Zealand

In electroencephalography (EEG) studies of motor tasks, power analyses have been extensively used to investigate cortical activation, but few studies have used coherence analysis to investigate regional co-activation. Those that have explored coherence, focus on sports, surgical and fine motor tasks. Evidence suggests that conscious effort plays an important role in postural balance, so the current study used EEG to assess neural co-activation between the verbal-analytical (T3) and motor planning (Fz) areas during balance in simple and difficult static positions. Forty-four older adults were asked to stand with feet apart or together on a force-plate to assess postural sway while EEG was used to collect cortical signals. Participants were divided on the basis of whether they had a high or a low tendency to consciously monitor and control their movements (i.e. reinvestment) and analysis revealed changes in co-activation during the different standing postures in those with low but not high propensity for reinvestment. The findings suggest that high reinvestors engage consciously in postural control during easy or difficult balance tasks, whereas low reinvestors engage consciously during difficult balance tasks only.

Woo Mei Teng

Effects of Wearable Garments on Postural Regulation in Community-dwelling Elderly Adults

Woo, M.T^{1,2}, Davids, K³, Liukkonen, J.¹, Chow, J.Y⁴, and Jaakkola, T.¹

1 Department of Sport Sciences, University of Jyväskylä, Finland

2 Centre for Sports Engineering Research, Sheffield Hallam University

3 Physical Education and Sports Science, National Institute of Education, NTU

The aim of this investigation was to analyze the effects of wearable garments on postural regulation in a sample of community-dwelling elderly individuals. Participants (N=63) performed a 30-s Romberg balance test protocol under four conditions (barefoot; wearing commercial socks; wearing clinical compression socks; wearing non-clinical compression socks), in a counterbalanced order, with four levels of performance difficulty tasks: (1) standing on a stable surface with open eyes (SO); (2) a stable surface with closed eyes (SC); (3) a foam surface with open eyes (FO); and (4) a foam surface with closed eyes (FC). Centre of pressure (CoP) measurements included postural sway area (C90 area), trace length (TL), sway velocity. The findings showed that thirty-five participants (55.6%) showed positive effects of wearing the socks (responded group). For the non-responded group, participants achieved lower TL and sway velocity in SO task under the barefoot condition. This study suggests that it is possible that wearable garments provide sensory cues, and interact with a biological cueing system to enhance performance in the postural regulation system.

Liis Uiga

Allocation of Attention by Older Fallers is Associated with a High Propensity for Conscious Control by Non-fallers

Uiga, L., Capio, C.M., Wong, T.W.L., Wilson, M.R., and Masters, R.S.W.

We have previously shown that older adult non-fallers with a high propensity for movement specific reinvestment (conscious control of movements) are more aware of their limbs and less aware of the external environment during walking than older adults with a low propensity for reinvestment (Uiga et al., 2015). In this study, 30 older adults with a history of falling performed 30 obstacle-navigation walking trials during which their allocation of attention was assessed by asking tone-related attention focus questions. We found that older fallers answered external focus questions no better than participants who were non-fallers, regardless of their reinvestment propensity ($p > .05$). However, they answered internal focus questions as accurately as high reinvestor non-fallers and better than low reinvestor non-fallers ($p < .05$). Our findings suggest that older adults who have fallen or who have a high propensity for reinvestment prior to falling use a movement related focus of attention when navigating challenging environments.

Shayne Vial

Examining Variability in the Badminton Short Serve

Shayne Vial, Dr Jodie Wilkie, Dr James L. Croft

Centre for Exercise and Sport Science Research, Edith Cowan University, Western Australia

Traditionally, precision-based sports have focused upon achieving an invariance in movement. Recent research suggests that movement variability is an inherent component of skilled performance, and variability around individual joints may allow consistent movement of the end point. In badminton, successful short serves are characterised by the shuttlecock passing low over the net and falling. Three-dimensional motion analysis of the backhand short serve was performed on eight elite badminton players. Preliminary analysis of the racquet position found higher variability at the start and end of the backswing, however after the end of the backswing through to contact shows increased consistency. This shows that athletes incorporate a functional level of variability in the racquet movement to achieve better consistency or less variation at contact.

Chow Jia Yi

Nanyang Technological University



Ng Yew Cheo

The Effects of Body Mass, Body Composition and Blood Pressure from an 8-week Aerobic Training Intervention in Singapore University Students

Ng Yew Cheo¹, Govindasamy Balasekaran¹, Dianna Thor¹, Visvasuresh Victor Govindaswamy², Danielle Ng¹, and Jolene Lim¹

1 Physical Education and Sports Science, Nanyang Technological University

2 Concordia University of Chicago, United States

Purpose: To investigate the effects of an 8-week aerobic training intervention without diet modification in Singapore University students. **Methods:** Four sedentary university students (age: 23.75 ± 0.5 yrs, height: 1.68 ± 0.1 m, weight: 65.3 ± 6.5 kg, body mass index: 23.3 ± 1.4 kg·m⁻²) completed an 8-week aerobic exercise intervention. Participants underwent a total of 24 exercise sessions, 3 sessions a week to meet the minimum energy expenditure of 1500 kilocalories (kcal) per week. **Results:** Significant differences were found in body fat % (BF%): Pre: 28.0 ± 5.0 , Post: 26.1 ± 5.6 ; Fat Mass (FM): Pre: 17.9 ± 1.8 , Post: 16.3 ± 2.1 ; and Systolic blood pressure (SBP): Pre: 135 ± 12.2 , Post: 127.3 ± 14.9 . **Conclusion:** Maintaining moderate-intensity aerobic exercise with 3 sessions a week for 8 weeks facilitates in burning 1500 kilocalories a week and helps in reduction of weight loss, specifically in reducing BF% and FM.

Kuniyasu Imanaka

Innate and Acquired Nature of Representational Momentum and Anticipatory Visual Perception

Imanaka, K¹, Banno, H¹, Ishihara, M¹, Shirai, N², and Nakamoto, H³

1 Tokyo Metropolitan University, Tokyo, Japan

2 Niigata University, Niigata, Japan

3 National Institute of Fitness and Sports in Kanoya, Kagoshima, Japan

Representational momentum (RM; Freyd & Finke, 1984) is defined as a visual illusion of forward-distorted memory of the final position of a moving object. RM may be an acquired/skilled visual function facilitating anticipatory perception of a moving object (e.g., in hitting/catching a fast ball). We have shown evidence (Nakamoto et al., 2015) that baseball experts have large RM magnitudes and this correlates to their accurate coincidence timing. RM may also be an innate visual function, so that even young children can adequately perceive a moving object in daily life. To examine likely innate nature of RM, we compared RM magnitudes in children, university students, and older adults, using an identical experimental procedure for all participants. Our results showed that RM was the largest in young children, then decreased in university students, and the smallest in older adults, indicating that RM may be innate and gradually decrease in general with maturity/aging.

Jonathan Connor

Evaluating a 12 Week Games-based Training Program to Improve Cricket Batting Skill

Connor, J.D^{1,2}, Renshaw, I⁴, Farrow, D^{2,3}, and Abernethy, B⁵

1 National Cricket Centre, Cricket Australia, Brisbane, Australia

2 College of Sport and Exercise Science, ISEAL, Victoria University, Melbourne, Australia

3 Australian Institute of Sport

4 Queensland University of Technology, Brisbane, Australia

5 University of Queensland, Brisbane, Australia

This study examined whether a games-based training design, underpinned by CLA, was more effective at developing cricket batting skill than a more traditional technically-focused coaching approach. 16 under 15 year old skilled cricket batters participated in a 12 week intervention study and were randomly allocated to a traditional or experimental training group. The experimental group participated in activities with manipulated rules, equipment and outcome goals, while the traditional group focused on optimizing technical batting skill processes. Both groups completed two 2 hour sessions per week, bookended by a pre and post intervention batting skills test. Skilled U15 players significantly improved facets of their batting using a games-based training approach, while a more traditional training approach did not. Training, using a systematic approach to manipulating constraints, is suggested to benefit the overall development of a batter.

Jolene Lim

Effects of Acute Foam Rolling on Quadriceps Performance and Short-Term Recovery from Fatigue

Jolene Lim¹, Govindasamy Balasekaran¹, Dianna Thor¹, Visvasuresh Victor Govindaswamy², Wayne Foo¹, and Ng Yew Cheo¹

1 Physical Education and Sports Science, Nanyang Technological University

2 Concordia University of Chicago, United States

Purpose: To investigate the effects of foam rolling on performance and short-term recovery of the quadriceps muscles. **Methods:** 10 recreationally active males (height: 173.3 ± 0.70 cm, mass: 70.81 ± 1.33 kg, age: 23.9 ± 0.28 yrs) volunteered in a 3-week study. Participants completed foam rolling and control conditions before and after an isokinetic warm up, concentric (CON) and eccentric (ECT) maximal voluntary contraction (MVC) pre-test (pre) and a fatigue protocol. MVC post-test (post) was performed at the end of the session, with a 5-minute static stretch. Perceived muscle soreness, rate of perceived exertion (RPE), and ratings of fatigue were recorded. **Results:** No significant differences were found between conditions and time for CON ($p=0.857$; $p=0.356$) and ECT ($p=0.067$; $p=0.370$); between conditions for soreness, fatigue, and RPE during pre ($p=0.247$; $p=0.716$; $p=0.726$), after fatigue protocol ($p=0.428$; $p=0.081$; $p=0.591$), and post ($p=0.678$; $p=0.662$; $p=0.591$). **Conclusion:** Acute foam rolling does not have an effect on quadriceps performance or short-term recovery from fatigue.

Gert-Jan Pepping

Australian Catholic University

The Influence of Opponent Positioning on Tennis Serve Decisions

An important feature in tennis is to hold serve. Servers need to select a type of serve and location to gain tactical initiative over the upcoming rally. Little is known about the influences of the lateral receiver position behind the baseline in this process of decision-making. Eight right-handed and one left-handed intermediate tennis players hit first services towards an instructed receiver who positioned himself at five different locations at each side of the court (2 inside, neutral, 2 outside). Participants had to point out where they intended to serve on a notification paper of the service box after vision was occluded. Serve location in the service box was captured by a full HD-camera with 50 fps and also calculated as serve location at the baseline. Repeated measures ANOVA's revealed that the receiving position mattered; the more inside receiving positions resulted in wider services compared to the neutral position, however, the analogous effect for the wide receiving positions was not found. This study discusses the findings in the context of affordance based decision-making in a complex perception and action environment, serve strategies, as well the potential implications for the return.



Tom R Eaton

Fatigue and Decision Making in Australian Football

Tom R Eaton¹, Derek Panchuk^{1,2}, and Nigel K Stepto¹

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Decision making and fatigue are aspects of sporting performance that have predominantly been researched separately. It is unclear how fatigue and decision making interact and influence athlete performance in team-sports such as Australian Football. This presentation will detail the results from two studies that formed the basis of a recently completed PhD thesis. The first study examined the validity and reliability of two novel decision making tests for Australian Football, one with and one without a skill component. The second study examined how match-simulated fatigue influenced the skill and gaze behaviour of Australian football players. Results from these studies will be discussed in the context of skill acquisition research, and how this is related to fatigue experienced by team-sport athletes in matches. Suggestions for future research directions will also be provided.

Peggy Boey

Comparison of Handgrip Strength with Relative Body Weight of Adolescents in Singapore

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Introduction: Handgrip strength is closely associated with general health status and mortality rate in both the adults and geriatrics population. However, there is little data for adolescents. Purpose: To compare handgrip strength (relative to body weight) with body fat percentage (BF%) of adolescents in Singapore schools. Method: 1555 adolescents, 715 girls and 840 boys, were recruited island wide. The test conducted was measured using a bio-impedance analysis for the BF% and a handgrip dynamometer for the handgrip strength. Participants performed the handgrip strength test twice on each arm, in alternate turns. Results: There were significant differences between relative (left, right and combined) handgrip strength and % body fat ($p < 0.05$). Negative correlations were observed for the whole cohort (left: $r = -0.61$, right: $r = -0.61$, combined: $r = -0.63$). Conclusion: Higher handgrip strength was observed in adolescents with lower body fat percentage.

Michael Maloney

A Qualitative Comparison: Does Fighting in Training Adequately Simulate the Cognitive-emotional Constraints of Competition in Elite Taekwondo Players?

The importance of designing training tasks that simulate the cognitive-emotional constraints of competition has recently been highlighted (Headrick et al., 2014). Fighting is a key training task of combat sports, however it is unknown whether the constraints of this task adequately simulate the cognitive-emotional demands of competition. This study aimed to use the qualitative course-of-action methodology to determine how the cognitive-emotional responses of taekwondo athletes differ between competition and training. Results revealed the emergence of themes unique to either competition or training fights. Competition themes: Ego goal orientation, aggression, mental effort, physiological arousal and anxiety. Training themes: Mastery focus, low stimulation and opponent familiarity. Findings highlight the contextualised nature of cognitive-emotional responses, which emerged from the interaction between actor and environment. Our interpretation suggests that simply fighting in training does not produce cognitive-emotional responses representative of competition, perhaps because players are familiar with their team mates and have different goals.

Steven van Andel

Measuring Exploration and Perceptual-Motor Calibration with Implications for Successful Motor Control in Older Adults

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Success in perceptual-motor control is dependent on the ability to perceive the environment in terms of one's own action capabilities. In order to gain insight in this scaling, an actor needs to explore the scaling. Exploration has been shown to exist in multiple forms, for instance as a search for visual information, but also in the form of postural movement. Increases in postural sway can be explained as an active search for information of the postural system. But, in gerontology research, increases in sway have often been interpreted as a decline in balance. A study will be presented that aimed to investigate how exploration influences assessments of balance. Participants were required to stand stationary on a force platform for trials of thirty seconds in different conditions. We show that with these conditions we are able to influence a person's amount of sway, without either improving or decreasing balance capabilities.

Robert Rein

German Sport University, Cologne

Gestalt Instructions and Bimanual Coordination Interference Effects and Brain Activation during a Bimanual Coordination Task

Robert Rein & Daniel Memmert

Asymmetric bimanual coordination underlies many everyday behaviors and successful performance often requires the suppression of bimanual interference effects. Thus, the tendency of asymmetric limb movements to become more similar for example during synchronously tapping one's head whilst rubbing the stomach must be overcome. Traditionally, interference effects have been interpreted according to a "Neuronal Crosstalk" model where signals from ipsilateral pathways interfere with contralateral signals. However, increasingly evidence is coming forward suggesting that interference effects can be modified purely through instructions which challenges static neuroanatomical views. Here, we provide further support in this regard by showing that bimanual interference effects are reduced when instructions enable the generation of a coherent movement gestalt. We further show how these effects lead to changes in brain activation in pre-frontal and primary motor areas. The findings are further discussed with respect to models of motor learning addressing instructions during skill acquisition.



Fan Meng Jiao

Motor Adaptation after Error-based Training of Goal-directed Reaching Movements

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This study examined goal-directed reaching with or without visual feedback in conditions that involved single sensory (proprioception) or multisensory integration (vision and proprioception). Participants trained in conditions that limited or promoted errors (errorless or errorful, respectively). We made two working hypotheses: 1) Sensorimotor behavior is altered by visual perception inadequacy and 2) Errorless training compensates for visual deficiency. Sixty-one students (mean age = 25.10 ± 2.73 ; 41 females & 20 males) with normal or corrected-to-normal vision were allocated to an online visual feedback condition or a no visual feedback condition. Within each condition, participants received errorful, errorless, or normal training. Movement data was captured and gaze behavior was recorded with EyeLink II (SR Research, Canada). Results suggest that simulated vision deficiency may influence sensorimotor behaviors and that errorless training potentially influences movement and gaze during reaching differently from errorful training.

Jonathan Shepard

A Dynamical Systems Based Operational Framework for Aiding Augmented Technology Implementation in Skill Acquisition Interventions

The learning processes that drive skill acquisition are individualistic and are based upon practice and feedback. To facilitate this acquisition process technology is increasingly used to augment feedback and instruction however the role and implementation of technology isn't clearly defined from a dynamical systems perspective. This presentation presents a novel operational framework to assist with shaping skill acquisition interventions from this context. It also highlights the potential role of technology to not only provide augmented feedback but objectively assess the effectiveness of skill acquisition interventions. The efficacy of the framework was assessed utilising a lower limb rehabilitation study was conducted using a single inertial sensor with concurrent visual feedback.

Angelina Tan

Developmental Pathways of High-performing Youth Athletes and Coaches in Malaysian Sport Schools

Studies on the development of expert performance in sport are extensive although findings are still being debated. Both early specialization and diversification have been identified as prospective pathways of elite athletes. Substantial funds have been invested for programmes and institutions to develop potential young athletes. These athletes undergo specialized coaching in their respective sport and receive formal education at the institutions. Currently there are four sport schools in Malaysia, with the first one started in 1996. Although many athletes have graduated from these schools and represented the country, no empirical studies have been attempted on what sporting activities they underwent and how were they trained whilst there. This study aims to examine the practice histories of the athletes who have been selected for the 2017 SEA GAMES and are currently studying in those institutions. This study also attempts to examine the developmental pathways of the athletes' coaches. Semi structured interviews using adapted questionnaires from previous studies will be used to elicit information from the athletes and coaches of selected sports.

Cheryl Tay

Consistency in Stroke Synchronisation Patterns of an Experienced Sprint Kayaking Crew (K2) over a Four-week Period

In Olympic sprint kayaking, the two-seater K2 is one of the crew-boat classes competed over distances of 200-, 500-, and 1000-m. The purpose of this study was to compare the stroke synchronisation patterns of a K2 sprint kayak crew over a four-week pre-competition period. The crew was an experienced duo of female paddlers from a national team. Once a week, for four weeks, high-speed (120 Hz) sagittal-view video were recorded of their 200-m time trial. Through video analysis, stroke synchronisation was measured at four key positions of the stroke cycle (catch, immersion, extraction and release). Across the four sessions, the crew displayed a particular pattern whereby the back paddler was in sync or slower to reach the catch position (91% of all strokes analysed), but faster to reach the release position (81% of all strokes analysed). It is likely that an experienced sprint kayak crew has a signature stroke synchronisation pattern.



Adrian Kee

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The Use of Scratch and Makey-Makey for Creating Novel Motor Tasks

The creation of novel motor tasks is often needed when teaching and researching motor control and learning. In the past, the creation of such tasks requires much expertise and financial costs. With the advent of open source technology, it is becoming easier to prototype such tasks. In this workshop, the possible use of Scratch (<http://scratch.mit.edu>) alongside with Makey Makey (<http://www.makeymakey.com/>) for the purpose of creating novel movement task will be introduced.

Scratch is a simple drag-and-drop programming package that can be easily used to create the task, while Makey Makey is a plug-and-play board that can act as sensors to detect movements. The combination of both, alongside with creativity on the task designers' part can lead to interesting new motor tasks. The features afforded by the aforementioned, as well as have a brief discussion on possible tasks that can be created, will be presented to the audience.

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Nonlinear Pedagogy and the ‘Big Blue Blocks’: A Framework and Tool Set Integrated for Motor Skills Development

Nonlinear Pedagogy (NP) provides a pedagogical framework for practitioners to account for nonlinearity in learning and individual differences in learners (Chow et al., 2013). Essentially, NP involves the manipulation of constraints which form boundaries for interacting components to self-organise, facilitating the emergence of goal-directed behaviours (Davids et al., 2005). Key principles of NP involve the manipulation of constraints, external focus of attention, variability in practice, representativeness of design and task simplification (Chow, 2015).

In this workshop, the “big blue blocks” will be introduced as a tool that can be manipulated to create task constraints to develop certain motor skills. The “big blue blocks” is a set of giant light-weight building blocks which can be used by learners to explore and design their own playgrounds, creating opportunities for a variety of movement solutions to develop. Practical examples utilising the NP approach to facilitate acquisition of motor skills will be discussed during the workshop.

Marcus Lee

Singapore Sports Institute

Pre-movement and Post-movement Visual Search Behaviours Vary Depending on Expertise and Anxiety Levels in Ten-pin Bowling

Longer pre-movement quiet eye (QE) has been reported to characterise elite athletes and successful performances. Recent evidence suggests that post-movement-initiation QE could also differentiate performances and is affected by anxiety. We investigated the pre-movement and post-movement-initiation VSBs of 11 elite versus 10 sub-elite ten-pin bowlers, performing under high-anxiety and low-anxiety conditions. Pre-movement and independent of expertise, bowlers increased their fixation quantity and directed them to more varied locations when performing under high-anxiety. Elite bowlers recorded longer QE durations post-movement-initiation rather than pre-movement albeit a later onset during the longish five-step approach prior to ball release compared with the sub-elite bowlers. Our results suggest that post-movement-initiation instead of pre-movement QE could be more pertinent in differentiating expertise during sporting tasks with a long movement phase and far-aiming target. The relevance of pre-movement or post-movement initiation QE in characterising expertise and performance could therefore be sport-dependent and has implications on skill acquisition.



THANK



YOU