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Developing junior sports competency using playing form activity: Outcomes of a randomized controlled trial

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Background: Competent sports performance, particularly during team sports, is not only dependent on the execution of technical (motor) skills, but also perceptual-cognitive skills concerned with obtaining and using information present within the game environment. In order to promote the development of technical and perceptual-cognitive skills for the demands of competitive sport, research recommends that athletes spend greater amounts of time in activity that replicates the technical, tactical and physical aspects of match-play (playing form activity).

Objective: The aim of this research was to evaluate the efficacy of 9-week pilot intervention based on increasing athlete exposure to playing form activity for improving game-play decision making, support play, skill execution and in-session activity (steps/minute) in junior netball players.

Methods: A group-randomized controlled trial in one junior netball club in the Hunter Region, NSW, Australia. Ninety female athletes (mean age = 9.04 years, SD 1.53) were randomized by team (n = 11) into the intervention (n = 41) or 9-week wait-list control (n = 49) condition. The Professional Learning for Understanding Games Education into Sport (PLUNGE into Sport) intervention was developed to facilitate game performance outcomes in junior netball players through exposure to researcher developed playing form curriculum. Curriculum was delivered via a coach education process designed to help coaches develop athlete technical and perceptual-cognitive skills. PLUNGE into Sport was undertaken in the first half of nine training sessions (9 x 30min), with the coach responsible for planning and implementing activities in the remaining session time (30min). Athletes’ decision making, support and skill outcomes during a small sided invasion game, and session involvement (pedometer step/min) was measured at baseline and 9-week follow-up. Proportion and time spent in playing form activity was evaluated through session observation at baseline and 3-week, 6-week and 9-week follow-up.

Results: The intervention group spent an additional 47.82% (95% CI = 25.05 – 70.59) of sessions in playing form activity, for a mean increase of 16.20 (95% CI = 3.90 – 29.21) playing form minutes during sessions. Linear mixed models revealed significant group-by-time intervention effects (p<0.05) for decision making (d=0.4) and support (d=0.5) during game play, and in-session activity (d=1.2).

Conclusion: An intervention exposing athletes to greater levels of playing form activity, delivered via a coach education program, was efficacious in improving athlete decision making and support skills in game play and increasing athlete involvement during sessions.

Keywords: junior sport, Coaching, coach-development, athlete development.

*Presenting author*
Figure 1: Game play outcomes per group across the intervention period (Mean, 95% CI)
Why learning can be optimized by the combination of TGFU and CLA? A longitudinal action research approach in a youth volleyball team

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The constraint-led approach (CLA) and teaching games for understanding (TGfU) are popular in designing learning environments in sports science (Renshaw et al., 2016). An integrated perspective of both approaches could enrich methodologies in sport pedagogy.

The CLA is predicated on a Nonlinear Pedagogy (NLP), that recognises the emergent, self-organised nature of learning. Here, the learning process can be guided by manipulation of key representative constraints, which faithfully simulate (aspects of) performance contexts for regulating actions (Pinder, Davids, Araújo, & Renshaw, 2011). In contrast, the TGfU, operationalised as a pedagogical approach, seeks to develop tactically aware team games players, able to make functional decisions during performance (Bunker & Thorpe, 1986). By involvement in learning contexts that are based on play situations, and supported by effective questioning and a consequent reflective practice, players can improve their tactical skills (Pearson & Webb, 2008; Thorpe, 2015). Despite some key differences, both approaches are similar in the ideas of the coach as a facilitator to guide athletes’ discovery, the importance of context in learning (known as representative learning designs in CLA), the need for an individualised focus on task constraints according to each athlete’s abilities, and on the autonomy that athletes should have in their own learning (Renshaw et al., 2016). Both are “athlete-centred approaches”, in which the athlete is placed in the centre of learning design.

Existing empirical knowledge in TGfU and CLA have arisen mainly from independent cross-sectional studies (Davids, Araújo, Seifert, & Orth, 2015; Hastie & Mesquita, 2016) that need to be supplemented with longitudinal designs, which allow the analysis of the direction, patterns and magnitude of change over time (Ruspini, 1999), predicated on the use of these pedagogical frameworks. Furthermore, in future research, an action-research, interventional qualitative methodology, could also be useful in studying how a coach can investigate and modify his/her own practice using critical self-reflection process (McNiff & Whitehead, 2009). The cyclical nature of action-research, featuring a retrospective analysis and prospective actions, allows the implementation of feedback at each stage during a longitudinal intervention (McKernan, 1996) and an understanding of the whole pedagogical process (i.e., studying coach-athlete dynamics during learning) as well.

Here present a framework for a research programme that seeks to analyse team tactical development by integrating CLA and TGfU, using a longitudinal perspective and an action-research design in youth volleyball. We describe how team tactical behaviours can be investigated through assessment of the development of team synergies in a longitudinal approach. The pedagogical impact of the practice programme will be measured through use of reflexive thinking and analysis of psychological dimensions. Practical development is expected of tactical awareness in players, endowed with enhanced critical and reflexive thinking. The implementation of this framework over time will inform understanding of how to create and effective learning designs in sport.

Keywords: teaching games for understanding, learning design, athlete tactical development, constraint-led approach.

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Enhancing Golf Putting Performance by Neurofeedback Training

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Neurofeedback training (NFT) is a technique to improve the brain’s functioning through self-regulation of the electroencephalogram (EEG). Among the EEG signatures regarding psychomotor efficiency, sensorimotor rhythm (SMR) activity has been related to the adaptive psychomotor efficiency during skilled action execution. This study investigated the effect of SMR neurofeedback training (SMR NFT) on golf putting performance. We hypothesized that pre-elite golfers would exhibit enhanced putting performance after SMR NFT. The increased SMR power after training would be a result of improved psychomotor efficiency which may reduce the irrelevant motor information processing in the sensorimotor cortex. Sixteen pre-elite golfers were recruited and randomly assigned into either an SMR or a control group. Participants were asked to perform 40 putting trials while EEG was recorded, both before and after intervention (8 sessions). Our results showed that the neurofeedback group performed more accurately when putting and exhibited greater SMR power than the control group after 8 intervention sessions. With our control analysis, we found that the higher SMR power mainly presented at the sensorimotor area and exhibited less fluctuation in other frequency bands in the neurofeedback group after training. Furthermore, the neurofeedback group exhibited a day-to-day learning curve in which they improve the ability to control the SMR power from the first session of training to the last session. This study concludes that SMR NFT is effective for increasing SMR power during action preparation and for enhancing golf putting performance. Moreover, greater SMR activity might be an EEG signature of improved psychomotor efficiency which can induce superior putting performance.

Keywords: Efficiency, Sensorimotor, EEG, Automaticity.

*Presenting author
Figure 1: A experimenter was carried out the neue-feedback training with a pre-elite golfer.
Effects of a bilateral football practice on the performance development of fourth grader in physical education

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Introduction

Several studies reveal that bilateral practice can be superior to unilateral practice, even for lower extremities (Focke et al., 2016). The aim of the present study was to investigate the effectiveness of a bilateral compared to unilateral practice schedule in football in physical education.

Method

The study has been designed as a pre-post-retention test design with a total of 119 participating pupils of 4th grade. N=89 (age: 10-11; boys=45; girls=44) participants remained for the analysis, due to exclusion criteria (missed measurements; missed lessons). A task for determining the dominant leg was performed. The pupils were divided quasi-randomized into four groups: a control group (N=17) and two intervention groups (bilateral group: N=40; unilateral group: N=32). All three groups were tested with three different motor skill tests at three measuring points (T1, T2, T3). The motor skill tests are part of the official test battery of the German Soccer Association (DFB) including ball control, heading and goal shot. After the pretest (T1) and a four-week practice in physical education, the posttest (T2) was conducted. The two intervention groups completed a specific and standardized intervention between T1-T2, conducted by a football-experienced sport scientist. The intervention units differed in the respective teaching method (bilateral or unilateral), while the content of the lessons were identical for each intervention group. The bilateral group trained alternating with both legs, the unilateral group exclusively with the dominant leg. The intervention was two times a week for 40 minutes in their regular physical education for 4 weeks. This is a typical time slot in German physical education to introduce a sport. The control group, however, did not complete a specific lesson, but received their regular physical education (gymnastics) taught by the proper teacher. The results of ball control are presented below.

Results

At the beginning (T1) no significant differences exist for all groups. Both intervention groups improved their performance from T1-T2. Statistical analysis revealed a significant interaction between test time and learning group from T1-T2 (p<.01; eta² = .263).

Post Hoc showed a significant decline of the performance of the control group (T16=-4.30; p<.01) and a significant improvement of the bilateral group (T39=3.64; p<.01). No significant difference between the intervention groups were found from T1-T2. No significant interaction between test time and learning group for retention interval (T2-T3).

Discussion

The results show that apparently it makes no difference whether bilaterally or unilaterally is practiced during an introductory football unit under typical conditions for 10-11-year-olds in physical education. Future studies should be investigated in physical education analyzing different age groups as well as a longer intervention period to better understand the phenomena of bilateral transfer in football with children in physical education.

*Presenting author
Literature


Keywords: physical education, bilateral transfer, football.
Guidelines for designing and implementing effective modified perceptual training in sport: A meta-analysis

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Modified perceptual training (MPT) tools are becoming increasingly prevalent and popular within the sport technology market, meaning there is now a broad range of options for athletes seeking to develop their visual-perceptual (e.g. visual acuity, contrast sensitivity) and perceptual-cognitive (e.g. anticipation, decision-making) skills. While these perceptual skills normally develop alongside physical skills in traditional field-based training, MPT tasks use various techniques to modify, or 'change', this traditional training format to create non-traditional tasks that claim to specifically target these perceptual skills.

Two common MPT approaches are sports vision training, which use general optometry-based tasks [1, 2], and perceptual-cognitive training, which uses sport-specific film or image stimuli [3, 4]. Recently, the MPT market has expanded to now include a range of touch-board and lighting equipment tools (e.g. Dynavision D2, Batak Pro), computer-based applications and software programs (e.g. EyeGym, NeuroTracker), virtual reality and immersive training technology, as well as the use of non-traditional equipment or technology (e.g. occlusion goggles) in conjunction with field-based training [5, 6]. These MPT tools all vary based on: (i) the specific perceptual skill targeted, (ii) the type of training stimuli used, and (iii) how the athlete is required to respond to this stimuli. Some MPT tools have research evidence supporting their effectiveness, while others have limited or no support [7]. The wide variety of tools available and inconsistent evidence contributes to the current ambiguity regarding the effectiveness of MPT in sport which, in applied training settings, may limit the uptake of potentially valuable tools by coaches and athletes. For the practitioner and coach, the key questions here are: which MPT approach(es) provide the most effective transfer of improved perceptual skills to competitive performance, how should MPT be implemented to achieve these benefits, and what level of athletes will benefit most?

This presentation will address these practical questions by discussing the outcomes from a meta-analysis investigating MPT tools in sport. This meta-analysis will identify the designs and types of tasks that demonstrate a capacity to improve competitive performance in athletes. In conjunction to this, the meta-analysis will provide useful guidelines around the implementation and exposure requirements, such as training duration, frequency or practice trials, to obtain a performance benefit, and identify the sport categories and skill/performance level of athletes who may best benefit from engaging in MPT. These meta-analysis outcomes will be of significant value to the coaching community as they will guide the decision-making process of selecting and implementing MPT with athletes.


*Presenting author


Keywords: representative design, perceptual-cognitive training, sport training technology, sports vision training.
An examination of training design in an elite combat sports programme

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Introduction: An ecological dynamics approach suggests that one way to enhance practice is to ensure learning tasks adequately represent the competition task. In elite combat sports, athletes spend practice time striking a bag or sparring in conditions that do not simulate the demands of competition. Previous applied research suggests such tasks may limit skill transfer to competition (Pinder et al., 2011). This work details a mixed-methods research programme in an elite taekwondo environment that aimed to examine the representativeness of two common training tasks: (1) striking a bag, and (2) fighting under reduced affective demands. Data were collected from taekwondo athletes as they completed both training tasks and, to enable a point of comparison, competition fights.

Methods: Study one replicated a previous design by Hirstovski et al. (2009) that investigated the emergent striking techniques of boxers when attacking a bag at various interpersonal distances (IPD). We compared striking behaviour from the bag task to a competition fight to assess correspondence. Fight behaviour was assessed by tracking fighters’ movement coordinates to analyse coordination tendencies, notational analysis to examine kicking techniques and the IPD they occurred at, and quantifying the (un)predictability of movement coordinates and kicking technique selection using entropy. IPD data was scaled to a relative percentage of limb length. Data were analysed using descriptive and qualitative methods.

In study two, behavioural, affective and cognitive measures were collected as athletes fought in training and competition. Behaviour was assessed in accordance with the methods of study one. Affective and cognitive responses were assessed with mixed methods that included perceptual scales measuring anxiety, arousal and mental effort, and video-facilitated confrontational interviews. Differences were assessed with mixed models and dependent t-tests where appropriate.

Results: Study one revealed that striking a bag did not represent how athletes attacked in competition. When striking the bag, kicking actions occurred between the scaled IPD range of 0-168% of limb length. However, in competition players formed a dyadic system with two coordination tendencies: near IPD (76% limb length) and far IPD (181% limb length). Players transitioned between near and far IPD, with attacks initiated from far IPD and kick actions occurring at near IPD.

Study two revealed that in training, athletes were less anxious (d=0.49, p<0.05) and less aroused (d=1.76, p<0.05), which was associated with fight behaviour of lower fidelity compared to competition. In training, individuals attacked less (d=0.91, p<0.05), initiated attacks from further away (d=0.48, p<0.05), displayed more predictable movement behaviour (d=0.94, p<0.05) and fighter-fighter dyads were drawn to larger IPD (d=0.85, p<0.05). Qualitative data revealed the emergence of themes specific to the training environment, such as reductions in affect and challenge.

Conclusions: Findings from this research highlight the importance of sampling key affordances from competition when designing practice. Failing to adequately simulate a fight in training leads to changes in affect, cognition and behaviour and may limit transfer from practice to competition. Practitioners should aim to design representative practice tasks that afford rich competition-like experiences.

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so that athletes think, feel and act like they would in competition.

Keywords: Representative learning design.
Effectiveness of augmented feedback and observational learning in the learning of throwing in lacrosse in physical education

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Background

A central question in kinesiology is how motor skills are learned and how these skills should be taught. Important variables in the design of the learning process are learning through feedback as well as learning through observation (Schmidt & Lee, 2014). The aim of this study was to investigate the efficacy of different methods (augmented feedback, observational learning, and the combination of the two) in teaching lacrosse in physical education.

Methods

Ninety-seven 5th graders (age: 9-11; boys=44; girls=53) performed lacrosse two times a week for 40 minutes in their sport class for five weeks. This is a typical intervention duration in German physical education. Participants were divided into a control group (n=35) and three intervention groups: feedback group (n=22), observational group (n=20) and a combined group (n=20), which received the feedback of the feedback group combined with the model movements of the observational group. A pre-post-retention test design was used. The three intervention groups completed a specific and standardized intervention between T1 and T2, conducted by the same researcher. The intervention units differed in the respective teaching method (augmented feedback, observational learning, and their combination), while the content of the lessons were identical for each intervention group. The control group, however, did not complete a specific lesson, but received their regular physical education taught by the proper teacher. After T1 and a five-week practice program, T2 was conducted following the last practice session. Four weeks later the retention test (T3) followed. The test battery includes lacrosse specific throwing and catching of straight and variable balls in lacrosse. Below, only the results for throwing are presented.

Results

No significant differences for all groups at baseline test (T1). A significant interaction between test time and learning group were found for intervention interval (T1-T2: F3,93=12,3; p=.001; eta²=.285).

Post hoc showed a significant improvement for all intervention groups (feedback group: T21=3,2; p=.012; observational group: T19=-2,9; p=.016; combined group: T19=-6,1; p=.001) and a significant decline for the control group (T34=2,2; p=.039).

Also a significant interaction between test time and learning group were found for retention interval (T2-T3: F3,93=2,8; p=.047; eta²=.082).

Post Hoc showed no significant differences from T2-T3.

Conclusion

The present findings suggest that for 5th graders augmented feedback, observational learning and their combination improved lacrosse performance after a five-week practice.

*Presenting author
Future studies should address and isolate single aspects, such as one of the three applied teaching methods. Consequently, an increase in the sample size could be achieved. Furthermore, a study design with one group learning only the intervention without a specific teaching method would be an interesting and important aspect for teachers. In addition, studies in pure girls or boys’ schools should be conducted because of the existing gender differences in throwing.

Literature


Keywords: augmented feedback, lacrosse, observational learning, physical education.
Experiential knowledge of elite Rugby Union players on key performance constraints in place kicking

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There has been a growing tendency in sport science research to examine the relationship between empirical knowledge developed in scientific experiments and theoretical frameworks and the experiential knowledge of elite performers and practitioners (Jones, Bezodis, & Thompson, 2009; Greenwood, Davids, & Renshaw, 2014; Phillips, Davids, Renshaw, & Portus, 2014). In this study, we investigated the experiential knowledge of elite Rugby Union place kickers to access their understanding of how to satisfy interacting constraints of competitive performance and practice environments. Place kicks in Rugby Union offer opportunities to score points outside the spatiotemporal dynamics of open play, but are typically performed under varying task and contextual constraints within a performance environment. Success percentage of place kicks can fluctuate under specific task and contextual constraints, as shown in a recent analysis of the 2015 Rugby World Cup (Pocock, Bezodis, Davids, & North, under review). For example, success percentage can drop sharply at critical thresholds of distance and angle to the goalposts and can vary depending on time elapsed, score margin and previous kick success. Interestingly, place kicks in the 10 minutes before half time were 8% less successful than the tournament average, and place kickers who had missed their previous kick were 7% less successful than place kickers who had scored their previous kick. It has therefore been speculated that emotions induced during competition can interact with perceptions and action to influence the emergent behaviours of place kickers. To develop greater understanding of how fluctuations in performance data may emerge, we interviewed professional Rugby Union place kickers and sought to explore their experiences of satisfying key interacting constraints on performance. Specifically, we aimed to investigate the key constraints that place kickers perceive to influence their emotions and perceptions of task difficulty. A secondary aim of the interviews was to identify specific details of how place kicking situations are currently practised, and why they are structured in this way. We present here the experiential knowledge of place kickers which includes their perceptions of the key constraints in performance environments and how they currently prepare for place kicks. Our findings highlighted how performance constraints can influence emotions, cognitions and perceptions during place kicking performance and the data indicated how the key constraints identified in this study, combined with the findings of previous quantitative analyses, could be represented in training environments. Initial interviews revealed that place kicking is predominantly practised individually and in isolation from game-based scenarios in training, without any form of pressure or expectation. Examples of pressure that place kickers identified in interviews included expectations of team-mates, performing in front of large crowds and closely-matched scores. This presentation will conclude by discussing how an integration of empirical and experiential knowledge can enrich understanding of sport performance and provide recommendations for coaches when designing practice environments which simulate relevant performance constraints to enhance the adaptive skills of elite and developing athletes in sport.

Keywords: Constraints, Emotions, Interviews, Practice Environments.

*Presenting author
Hitting a baseball can be seen in sports as a very complex movement skill. Within skill development in sports the constraint-led approach has proven to be a successful coaching model. However in studies and practice most manipulations are made in task or environmental constraints. Altering levels of fatigue in a variable way could potentially be a useful strategy to improve skill development. The aim is to study the effects of variable local fatigue and potentiation levels within a constraint-led approach on skill development in elite youth baseball hitting. Fifteen male junior baseball players from the Dutch National Juniors team (age 17.28 ± 0.63; height 180.1 ± 4.75 m; body mass 80.4 ± 7.74 kg) were divided in two groups for six-week intervention training with three training sessions per week. Control group performed hitting training for first 45-minutes following a 45-minute strength and conditioning program. The mixed group performed 90-minute training sessions with an S&C exercise directly followed by a hitting exercise in a superset. Hitting parameters (heel contact time (HCT), ball velocity (BV) and ball trajectory (BT)) and countermovement jump (CMJ) were measured during pre, post and intervention-test. HCT improved from pre-test to posttest (0.168 ± 0.031 to 0.158 ± 0.026; p = 0.02) and from pre-test to retention-test (0.168 ± 0.031 to 0.151 ± 0.025; p = 0.038; ES = 0.87). A significant interaction effect was found between groups with F=(2,26) 13.619, p = 0.009, ES = 0.64. CMJ improved from pre-test to post-test (38.04 ± 5.48 to 40.62 ± 4.96; p = 0.021) and from pre-test to retention-test (38.04 ± 5.48 to 40.08 ± 6.28; p = 0.038; ES = 0.625) without a significant interaction effect between groups (p = 0.507). Results support hypothesis that fatigue can play a role in motor learning and retention of learned skills.

Keywords: bat speed, local fatigue, baseball hitting, constraints-led approach.

Figure 1: Example of baseball swing during test, measuring HCT (frame 1-2) and BV (frame 2-3

*Presenting author
**Figure 2:** Results of pre-, post-, and retention-test on HCT in seconds. Grey line displays blocked group and black line displays mixed group. * is statistically significant (p < 0.05).
Deception in Sport: a Systematic Review on Kinematic Deceptive Action in Sport

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Background: The use of kinematic deception and disguise are a vital component of individual tactics to evoke tactical advantages in fulfilling the game’s goal. This systematic review categorizes previous research into deceptive action in sport in context of opponent interaction in the fields of perceptual, cognitive and motor research, giving an overview on the current findings and existing research gaps.

Method: Five electronic databases (Scopus, Web of Science, PubMed, SURF, PsycINFO) were searched from inception until Mai 2017. The filter required the studies to be in English language and to include the terms deception and sport in either title, abstract or keywords listed. Secondary literature was used to identify further eligible studies.

Results: The database analysis produced 18 hits after eliminating all duplicates, non-eligible text types as well as content in terms of game internal individual kinematic deception in opponent interaction. Additional five studies were added in reference to secondary literature. The findings revealed subcategories using deceptive actions either as independent variable condition in perceptual and cognitive research or as subject to the kinematic research question in motor execution research.

Perceptual recognition findings on deceptive versus non-deceptive action revealed a link to the level of perceptive and motor expertise. Performance, confidence and reaction time are influenced negatively in deceptive conditions. Global and late information pick up strategies showed less susceptibility and can be trained. Kinematic differences were found in the center of mass in successful vs. non successful deceits while the extremities and distal joints rather contribute to the deceptive action. Additionally, deceptive abilities are linked to the level of expertise. However, in light of the divergent deceptive action no detailed evidence can be formulated up to this point.

Conclusion: Recent findings allow an initial understanding of deception and perception. However, up to date there is no substantiated evidence on the execution of deceptive action itself. Consequentially, the use of kinematic deceptive actions in perception research needs to be accompanied by substantial research into kinematic deception execution in order to yield a consistent body of research into deceptive action in opponent interaction in sports.

Keywords: motor expertise, perceptual expertise, deception.

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Coach behaviour, practice activities, context and the relationship between these are viewed as essential components in athlete development and learning and consequently in the shaping of athletic experiences for individuals. This descriptive study examined the processes of coaching and participation in Brazilian jiu-jitsu (BJJ) for both experienced (3) and novice (3) adult participant members of a martial arts club in Finland. The male coach was 36 years of age, with 8 years of training experience and 5 years of coaching experience. He had a brown belt and was therefore able to teach the BJJ to others. The athletes ranged in age from 14 to 35 years of age: 20 and under (n = 3), 21–30 (n = 27), and 31 and over (n = 6). Over period of six weeks five practice sessions were videotaped with a mean duration of 84.35 minutes. Practice sessions were organized to include a warm-up phase, followed by skill practice and culminating in a sparring phase. Systematic observation data were used to describe the practice structure and participant engagement. Additionally, a modified version of the Coach Analysis and Intervention System was used to evaluate coaching behaviour. Uniquely, heart rate data were collected to evaluate the participants’ physical activity levels. Our findings in this study describe a contextualised practice setting that is different from traditional coaching practice presented in the literature. Data indicated that the coach structured practice sessions into three phases, where one third was warm up, about 40% skill practice and one quarter was used for sparring. The coaching emphasis observed in this study highlighted competition and technique perfection. Athletes were supposed to actively practice about two thirds, while instruction accounted for one fourth and management time was 10% of the practice sessions. Overall, the coach interacted more frequently during warm-up phase than during skill practice. Particularly positive modelling, instruction and praise had a higher proportion compared to other observed behaviours. The novice athletes received higher levels of individual attention from the coach in comparison to experienced athletes. Participants practice activity level was high with most participants spending more than half of practice time at a moderate to vigorous physical activity level. The athletes showed a very high success rate and thereby providing evidence that skill practice tasks were at an appropriate level of difficulty. However, when novice athletes showed higher physical activity levels across all practice phases compared to all other athletes, it is interesting to note that they had less total and correct trials. The concurrent use of both coach and athlete behaviour data has shed some light about the context and processes that take place in martial arts coaching, which might be useful for coaches and in coach education.

Keywords: systematic observation, martial arts, coach behaviour, athlete activity.

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Keywords: systematic observation, martial arts, coach behaviour, athlete activity.
Using motion capture to assess jumping performance variability in young female soccer players

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ABSTRACT

INTRODUCTION

Over the past two decades automated motion capture has been used in laboratory environments to quantify kinematics of movement and athletic performance. Advancements in gaming technology have resulted in more portable analysis of movement. A new product using the Kinect camera was designed to analyse fundamental adolescent athletic movements (AMAT Performance, AMAT Performance). AMAT Performance uses a 7-test battery including a maximal broad jump for distance and a maximal broad jump for distance with control to look at force production and absorption capabilities.

When using tests to quantify the potential effects of training on an individual performance we not only need to know the noise of measurement of the system but also the typical noise of performance when the athlete has not been trained. Therefore the aim of this study was to assess the typical error of jumping performance trial-to-trial and week-to-week of the AMAT Performance system.

METHODS

Twelve youth female soccer players (age = 13.57 ± 1.26 years, time until PHV = 1.57 ± 1.17 years, height = 164.13 ± 7.15 cm, weight = 53.76 ± 7.97 kg) belonging to a regional soccer training centre gave consent and participated in the study. One-week prior a pilot study was conducted to familiarise the athletes with the procedures.

The testing was completed at the beginning of a training session in a gym environment using the AMAT Performance system. Each participant completed 3 broad jumps with maximal effort and 3 broad jumps with controlled landing. The participants also had 3 familiarisation warm up jumps of each jump prior to each testing session. The participants were given standardised coaching cues to produce optimal jumping performance.

Jumping performances were analysed using the analysis of trials for reliability method developed by Hopkins. Trial-to-trial and week-to-week typical error data were log transformed and reported as a coefficient of variation (CV%). Confidence intervals were set at 90%.

RESULTS

The mean (SD) values for the control jumps were 191.82 cm (± 18.36) compared to 193.10 cm (± 13.86) for the maximal jumps, respectively.

The trial-to-trial typical error % (90% CI) was 3.6 % (2.7-5.7) for control jumps and 2.5 % (1.8-4.2) for the maximal jumps. The mean typical error week-to-week was 3.6% (2.9-5.2) for control jumps and 2.6% (2-4) for maximal jumps. The typical error was less between 3 to 2 trial in comparison to 2

*Presenting author
to 1 trial for both control 3.5% (2.6-5.5), 3.7% (2.8-5.8) and maximal jumps 2% (1.4-3.4), 3% (2.1-5).

CONCLUSIONS

The typical error was higher in broad jumps with controlled landing compared to maximal broad jumps. The weekly mean variability in maximal broad jumps and broad jumps with controlled landing was 2.6-3.6%. The jumping performance typical error trial-to-trial decreased for all three weeks, which could indicate that besides the three trial warm up more than one trial is needed to reach maximal effort and overcome the learning effect in these tests.

AMAT Performance shows promising preliminary evidence that it can be used to collect consistent jumping performance data.

Keywords: Jumping performance variability, Kinect camera, Girls soccer, Motion capture.

![Figure 1: AMAT Performance system](image)
Does wearing textured and compression materials enhance somatosensory system regulation of action when controlling a football?

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The purpose of this study was to observe effects of wearing textured insoles and clinical compression socks on movement organisation during a dynamic interceptive action (ball reception performance in Association Football). Six skilled and six less-skilled football players (15.42 ± 0.97 years) received low and high ball passes from a feeder. This ball control task was performed across four randomly organised insoles and sock conditions: a) Smooth Socks with Smooth Insoles (SSSI); b) Smooth Socks with Textured Insoles (SSTI); c) Clinical Compression Socks with Smooth Insoles (CSSI); and d), Clinical Compression Socks with Textured Insoles (CSTI). Reflective markers were placed on key anatomical locations to facilitate three-dimensional (3D) movement recording and analysis. Results revealed significant interaction effects between Group*Insoles/Socks conditions on movement criterion scores (on both passes) and movement organisation (i.e. lower body centre of gravity values) when receiving a high pass in the skilled and less-skilled participants. Distinct patterns of movement organisation were observed between the skilled and less-skilled participants when receiving a low pass. It was concluded that wearing textured insoles and compression socks might constrain movement organisation of a dynamic interceptive action in participants when controlling a football, possibly by the exploitation of noise added to the somatosensory system.

Keywords: association football, clinical compression socks, ball reception task, textured insoles.

*Presenting author
Schöllhorn (1999) proposed that the differential learning approach – where movement forms during practice are deliberately varied for every trial – facilitates better learning outcomes compared to the traditional repetitive learning approach. With the differential learning approach, the learner is asked to deliberately modify some components of the action after every practice trial while keeping the core elements of the task intact. Usually these modifications are included to make the performance of the target task experientially more challenging and novel thereby eliciting learning effects. It is, however, not known whether learners are necessarily motivated to practice using such an approach given its departure from conventional repetitive practice approach. We speculated that increasing sense of autonomy-support among learners may lead to better retention outcomes when practicing through differential learning. In the present study, we examined whether the provision of autonomy-supportive message, a motivational strategy associated with the self-determination theory (Deci & Ryan, 1985), would interact with the differential learning approach in predicting desirable retention effects while learning a novel laboratory-based motor task. Accordingly, we expect that explaining the rationale and efficacy of the differential learning approach could benefit skills retention. A total of 148 participants took part in the study. They were randomly assigned to one of four conditions comprised of a combination of practice method and motivational induction. Formally, a 2 x 2 design was used to test for interaction effects arising from practice method (differential learning versus repetitive practice) and motivational induction (autonomy-support versus controlling). After being exposed to a short text with assigned motivational induction, participants practiced a novel reverse-mouse movement task over 80 trials according to the practice conditions assigned. They were tested over 10 trials immediately after the first session and retested again on the second day, with median trial completion timings used as the performance indicator. The difference in performance between the two tests was used as the measure of retention effects. The motivation by practice analysis of variance (ANOVA) revealed the expected motivation by practice interaction, F(1, 131) = 4.68, p = .03. Simple main effect analysis showed that among participants in the controlling conditions, those who performed differential learning showed greater retention effects (M = 124.13, SD = 1269.11) than those who were in the repetitive practice condition (M = -607.65, SD = 1279.64), F(68) = 5.78, p = .02. Among participants in the autonomy-support condition, retention effects did not differ significantly between those who undertook repetitive practice and those who underwent differential learning. In conclusion, while there was an interaction effect arising from the two factors examined, the results suggest that the combination of controlling message and differential learning yielded greatest retention effects. Differential learning seems to be more beneficial for inducing retention effects when no additional motivational inductions are provided. Explanation of the efficacy of differential learning could have heightened participants’ expectations about it, and interfered with the inherent workings of novelty elicitation associated with differential learning, thereby undermining its effectiveness.
Sport Sampling within Practice types

*ted kroeten
Joy of the People, USA

Whether young people should specialize in one competitive sport at an early age, or pursue a wider range of sports during adolescence is a topic of some debate (Baker, Cobley, & Fraser-Thomas, 2009) and is fundamental within sports policy and coaching practice. At the 2015 Kisakhalio Conference Jean Cote presented the idea of "Sampling within a sport” noting that Brazilian soccer players routinely played a sampling of different versions for their sport (futsal, foot volley, beach soccer, etc.).

We are proposing that as important to sampling a variety of sports is the sampling of a variety of practice types along the Free Play / Deliberate Practice continuum.

If a child was to sample sports today she would go from "Structured” versions of soccer, baseball, volleyball, basketball, hockey and tennis.

It is our proposition that it is more organic and natural to sample sports along the Free play/Deliberate practice continuum with "Free Play” more important early and "Deliberate Practice” becoming more important later.

What we did

Using Cote’s Idea of Sampling within a sport, we set up a play environment that encourages soccer sampling. This included, sand soccer, futsal, soccer games inside inflatables, soccer tennis, soccer golf, etc. Different balls and different surfaces.

We set aside 1500 hours of free play time with almost 3,000 kids participating.

What we found

Similar to the ideas of Differential Learning (Schöllhorn). We found that Free Play elements included little repetition, little to zero feedback and no correction. Kids did it only because it was fun.

Similar to Self Determination Theory (Deci and Ryan) Fun was associated with

1) Being able to make their own choices
2) Playing games with friends
3) Building competencies

Kids played for much longer at at much lower pace/tempo. Play did not resemble a competitive game in intensity.

Kids played more ”cooperative” type games including non elimination games that allowed for risk taking without elimination. This includes World Cup, Keepy uppy, and soccer tennis.

Technical observations of small to large group games.

Proactive. Kids tended to try as best as they could to dribble straight at the goal. The goal of dribbling for these kids seemed NOT to be to move the ball, but to move the opponent out of the way so they could go straight to goal.

*Presenting author
Early independency. More dribbling less small group play and passing present early. Passing does not seem to be an organic solution early in development.

Efficiency. Kids looked for the easiest solution. In Brasil there is a saying that good technique is defined by doing something as fast as possible with the least amount of effort. The kids focused on least amount of effort.

Conclusion

Sampling different practice types is important to the development of the high performer. By allowing kids to sample different learning systems Kids developed a ’’learning literacy,’’ an ability to learn through all games and not just those that are coach centered (structured practice and Deliberate Practice).

Keywords: free play, sampling, soccer.

Figure 1: Play at Joy of the People
How do coaches identify talent? An examination of international coach perspectives in combat sports

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Despite its complimentary application to understanding complex tasks in various sporting environments, empirical research in talent identification (TID) has underutilized the knowledge of experienced coaches. The purpose of the current research was to gain an understanding of the methods that coaches use when identifying future talent in combat sport athletes.

Coaches are an integral part of the TID process, particularly in sports where performance and progression cannot be measured by centimetres, grams or seconds. The Olympic combat sports of boxing and taekwondo are open-skill, individual and opponent-based in nature; and their dynamic nature highlights the complexities of identifying talent for the future. With a lack of objectively measurable outcomes in combat sports, coaches are required to make subjective decisions regarding future talent and potential for success. Interestingly, empirical TID research often relies on coach evaluations to validate the success of objective TID methods. Despite the use of coach knowledge in both applied and empirical contexts, how coaches forecast talent is not well understood. By investigating the knowledge and beliefs of elite combat sport coaches, the current research aims to gain insight into the complexities of identifying talent in these sports.

In order to better understand coaches’ knowledge of TID, 14 elite international coaches (>10 years coaching experience, current national coach) from boxing (n=7) and taekwondo (n=7) from 11 countries were interviewed using interpretive description. This methodology aims to generate knowledge within applied research settings, allowing for the contextual interpretation of experiences by participants. A three-section interview – understanding and importance of TID; current TID processes within their sport/country; and the athlete attributes necessary for long-term success – was designed to explore coach knowledge of the TID process. Interviews were audio recorded and transcribed verbatim. Transcripts were analysed thematically following the guidelines from Braun and Clarke (2006).

Preliminary results align with the concepts of ecological psychology, especially relating to the coaches’ understanding that an athlete’s context is just as important as the athlete themselves. In addition, coaches demonstrated an innate understanding of an athlete’s interacting constraints (Newell, 1986); and indicated that while the individual, their environment and the task they are performing are all integral to an athlete’s ultimate success. As the whole athlete is more than simply a sum of the three categories of constraints, single task evaluation methods of TID may prove simplistic, and a more flexible approach could be adopted.

This investigation into the knowledge and methods used by elite coaches to forecast talent may guide future TID processes, highlighting the benefits of incorporating multiple knowledge sources to develop a better understanding and more effective practical applications.

Braun, V. and V. Clarke, Using thematic analysis in psychology. Qualitative Research in Psychology,

Keywords: coach knowledge, constraints, combat sports, talent identification.
Forms of life, Affordances, and Athlete Performance

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Sporting expertise is multidimensional and develops when an athlete interacts with a range of task and environmental constraints. Ecological dynamics is a suitable theoretical framework to understand these complex and dynamic interactions due to the importance placed on the person-environment mutuality. A key principle of ecological dynamics, when faced with the challenge of developing skilled performers, is the influence of task and environmental constraints on an athlete’s ability to become attuned to the affordances (opportunities for action) in a performance landscape. Athletes who are unreflectively responsive to a rich and diverse range of affordances will be better equipped to act skillfully in competition.

Ecological psychologist James Gibson introduced the concept of affordances as "the affordances of the environment are what it offers the animal" (e.g. a ball offers kicking, or a slow player offers a quick player running past, or a hard pitch offers sidestepping on). Recently several scholars have further developed Gibson’s concept of affordances, here we aim to combine these interpretations to propose that the variety of socio-cultural practices that exist in what Wittgenstein termed forms of life (e.g. behaviours and customs of our communities), can influence an athlete’s affordance responsiveness.

Although recent conceptual interpretations make valuable contributions to the literature on affordances, little is known in the sport domain about how identifying a form of life can help sport pedagogists to gain an understanding of how socio-cultural practices influence affordance responsiveness and sporting expertise. Understanding more about this important area can help sport pedagogists to manipulate socio-cultural constraints to enhance the quality of skill and expertise acquisition in specific sports. Therefore the purpose of this presentation is to (1) provide a brief historical insight into why forms of life and the associated behaviours and customs may exist in sport performance and coaching. (2) Using examples from the sport of rugby league we discuss how recent interpretations of affordances can provide insights into how forms of life can affect an athlete’s skilled performance.

Keywords: Forms of Life, Socio-cultural constraints, Affordances, Skill Acquisition.
There is a need for more research examining the efficacy of constraints based interventions in sport training and practice. However, future research on the effectiveness of constraints-led pedagogies needs to include more robust practice environments that better represent the underpinning theories of ecological dynamics. Emphasising the need for guiding frameworks to bridge the gap between the theoretical understanding and its practical application. These frameworks should act as guidance tools for practitioners and researchers to ensure they are designing environments consistent with the underpinning principles of ED. As CLA is based on an ecological dynamics theoretical rationale, the methodologies of the reviewed studies need to be assessed as embedded within that specific framework. This presentation will bring to life a guiding framework. The environment design framework (EDF) is designed to act as the bridge that enables the provision of effective learning environments. Facilitating the generation of practice environments that produce a positive, permanent change in human movement. A development that is most importantly transferable to the performance environment. The philosophical ideas of forms of life, fields of affordances (Rietveld and Kiverstein, 2014) and optimal grip (Bruineberg and Rietveld, 2014) underpin an affordance driven approach. These will provide the theoretical lens through which the international field hockey case studies will be analysed and presented.

Keywords: Ecological Dynamics, Affordances, Constraints-Led Approach.
Effects of an 8-week Constraints-based Coaching Intervention on Emergent Behaviour in Mini Tennis

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Introduction: The benefits of manipulating task constraints (e.g. court dimensions and ball compression) in tennis for the purpose of enhancing young participants’ skill development have been well-documented (Buszard et al., 2016). Despite this, modified versions of the sport, such as the Lawn Tennis Association’s Mini Tennis Red, may not afford participants sufficient opportunities to perform and develop the backhand groundstroke (Fitzpatrick et al., 2016). The aim of this study was to afford backhand development during Mini Tennis Red coaching by introducing an intervention designed to develop backhand groundstrokes. Method: Two groups; Control (n = 8, age = 7.2 ± 0.6 years, tennis playing experience = 1.9 ± 0.6 years) and Experimental (n = 8, age 7.4 ± 0.4 years, tennis playing experience = 2.1 ± 0.6 years) underwent an 8-week coaching intervention, during which constraints-based adaptations (manipulating internal court dimensions, the location of participants’ recovery boxes and practice match-play rules) were applied to the experimental group’s learning environment. Pre- and post-test match-play characteristics (e.g. forehand and backhand percentages, winner and error percentages) and Tennis-Specific Skills Test results (e.g. forehand and backhand technical proficiency, rally performance with a coach) were analysed. Results: Following the intervention, both groups improved their ability to maintain a rally during match-play (Control: pre 4.5 ± 1.6, post 5.2 ± 1.9; Experimental: 5.3 ± 1.9, post 5.9 ± 1.2, p < 0.001). However, the experimental group performed a greater percentage of backhands out of total shots (46.7 ± 3.3%) and a greater percentage of backhand winners out of total backhands (5.5 ± 3.0%) than the Control group during post-test match-play (backhands = 22.4 ± 6.5%, p < 0.001; backhand winners = 1.0 ± 3.6%, p < 0.01). The Experimental group also demonstrated superior improvements in backhand technical proficiency (Experimental group 4.0 points improvement; Control group 0.8 points improvement, p < 0.001). Finally, the Experimental group improved their ability to maintain a rally with a coach (Control group improved by 2.9 strokes compared to 7.6 stokes improvement for the Experimental group, p < 0.05). Conclusion: The manipulations implemented here elicited more representative emergent behaviour than standard Mini Tennis Red constraints. Coaches may wish to utilise these adaptations during their coaching sessions, to augment players’ technical and tactical development, and negate the disparity between the number of forehands and backhands typically performed during training and match-play.

References


Keywords: Representative learning design, Mini Tennis, Task Constraints, Emergent behaviour.

*Presenting author
Many different parameters have been considered for performance analysis in competitive swimming (including anthropometric measures, spatio-temporal variable analysis, coordination analysis, physiological measures). Most of the time, however, these analyses have been conducted separately, but when athletes are considered as complex adaptive systems, it is important to understand how these parameters interact with skill level to constrain performance. The objective of this study was to provide an analysis of variable patterns that help to identify separate skill levels in competitive swimming. Forty-two swimmers of various levels were instructed to complete the maximum distance in 2 minutes swimming in the front crawl stroke. Anthropometric measures were taken prior to the study. Video analysis of spatio-temporal (swim speed, stroke rate, stroke length, trajectory of the hand, streamlining of the body, duration of the breathing) and coordination (index of coordination, swim phase durations) parameters were recorded throughout the trial. Heart rate was also measured. A principal component analysis (PCA), followed by a cluster analysis, were performed on the data at the beginning (30 s after departure) and at the end (30s before the end) of the trial. Results show that: (1) the first axis (which explains 25.1% of the variance) is mainly related to performance and the second (which explains 13.3% of the variance) is related to coordination parameters. Those axes did not vary greatly when the analysis was performed at the end of the trial; (2) Three groups, with significantly differing swim speeds (group 1: 1.16 m.s-1, group 2: 1.27 m.s-1; group 3: 1.47 m.s-1), were identified. Inter-group analysis revealed that body streamlining improved gradually from group 1 to group 3, together with distance of hand path trajectory, whereas duration of breathing gradually decreased. None of the coordination parameters were related to swim speed as indicators of efficiency at the beginning of the trial. However, at the end, group 1 exhibited significant increase body verticality, longer breathing times while at the same time group 3 (more expert) had lower index of coordination. These findings suggest that: (1) if skill enhancement were to be performed systemically, streamlining and increasing the distance of hand path trajectory while shortening breathing are objectives that can be pursued all along the learning process (2) In low level groups, management of the effort should also focus on the position of the body and on the duration of the breath, (3) advice concerning coordination mode should be given with caution: low level swimmers should in general try to increase the superposition of their motor actions, but intermediate level should be more encouraged to ”take more water”. But in any case, coordination parameters should not be analyzed independently from indicators of efficiency (stroke length and stroke index).

Keywords: ecological dynamics, constraints, swimming, expertise.
Tuning to the wave: Active movement extent discrimination at the ankle in elite and sub-elite surfers

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Introduction

In the sport of surfing, maintaining control and an upright posture on the board is a key requirement. Scoring criteria also reward flow, or the ability to sequence manoeuvres across the wave without interruption. The visual channel is necessarily important in balance and in selecting manoeuvres, however the feet are in contact with the surfboard, and are hence able to provide direct perceptual information about the environment. We hypothesised that the ability to use this information, to produce fine adjustments in response to the wave is an underlying feature of high performance surfing. The active movement extent discrimination apparatus (AMEDA) has been previously shown to provide a representative and ecologically valid test of weight bearing movement discrimination sensitivity at the ankle joint in a range of sports. We compared AMEDA scores from ankle inversion, for surfers front and back foot. We were interested in whether the sensitivity of the front and back foot differed, given previous research has shown asymmetry to be a feature of the system.

Methods

A cross-sectional mixed cohort of 34 (18 males and 16 females; 24.7 9.3 years, 170.2 8.3cm, 65.5 11.6 kg) recreational and competitive surfers volunteered to participate in the pilot study. Front and rear feet, depending on preferred surfing stance of ‘natural’ (left foot forward, n = 32) or ‘goofy’ (right foot forward, n = 2) were both tested. The AMEDA apparatus consists of platform that can be rotated about a central axis to five positions, that are randomly presented to the participant and represent five stimuli (10.5, 11.6, 12.5, 13.6 and 14.5 degrees of ankle inversion). After a 15-trial familiarization, participants undertook 50 trials where they were required to make a judgement about the position/extent of the movement, after returning to the starting position. Non-parametric signal analysis produced mean pair-wise area under the curve (AUC) scores, that range from 0.5-1. A paired samples t-test was used to compare the front and back foot across all participants.

Results

Front foot (FF) and back foot (BF) AUC scores are presented; there were no significant differences (t33 = 0.881, p = 0.385). However, the front and back foot were significantly correlated (r = 0.448, p < 0.01).

AUC

Front foot

0.67 0.06

*Presenting author
Discussion

There were no significant differences between the front and back foot. However, the implication of this finding is of interest, given that for a range of sports previous AMEDA results have reported asymmetry between the ankles. Generally, the ‘stance dominant limb’ presents greater sensitivity, proposed to be a function of its support role. The data here suggest that surfers have adapted their perceptual systems to minimise the asymmetry. Given both feet are constrained to act together through the board during practice, this suggests an adaptation in response to functional activity. The pilot data will be extended to include more high-ranking competitive surfers to ascertain whether this adaptation is correlated with surfing performance.

Keywords: sport-specific training, psychometrics, ankle proprioception, perceptual information.

Figure 1: Distribution of AUC scores for front and back foot. Red lines indicate means, grey lines indicate 95% confidence intervals.
The Use of Reflection-Card in Elite Youth Individual and Team Sports: Objective and Subjective Effects on Performance and Perceptions of Usage-Related Factors

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Self-reflection has been shown to enhance professional development in clinical, counseling and educational settings. In recent years, self-reflection has also been suggested as a potential tool to enhance performance in the elite sport. The primary purpose of the present study was to quantitatively test the effectiveness of the reflection-cards (r-cards: Hughes, Lee, & Chesterfield, 2009) in one individual and one team sport, namely archery and basketball, in Singapore. Secondly, we qualitatively identified the facilitating and hindering factors in the usage of the r-cards. Objectively, the comparison of the pre- and post-intervention performance scores of 8 Singaporean elite archers (4 females, 4 males, aged 20 – 24) showed that only 2 archers improved their performance after the intervention, whereas 6 archers performed poorer than before. Along the same lines, the use of r-cards did not result in significant effects on the difference in free-throw percentage, and on the targeted defensive rebound percentage, across the five matches played by 12 female basketball players (aged 15-16). However, content analyzed qualitative data based on semi-structured interviews of the archers, and the head coach, team manager, and female basketball players provided a contrasting but insightful perspective. Subjectively, the three most often mentioned facilitating factors for the r-card usage in archery were: 1) serves as a reminder, 2) description of shooting feeling, and 3) enhances motivation. In basketball, the top three facilitating factors were 1) performance improvement, 2) focused preparations, and 3) goal setting. In contrast, athletes in both sports critically commented the questions of the r-cards (their number, irrelevance, or repetitive nature). In addition, time consumption for archers, and realistic goal setting, effort recognition, and feedback to the head coach for basketball players were mentioned most often as hindering factors for the effective use of r-card. Implications for future use of r-cards in the field of sport coaching were critically discussed.

Keywords: performance development, reflection, elite sport, athlete development.
A perceptual approach to the transfer of skill: Quiet Eye as an insight into perception-action coupling in elite football goalkeepers

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Amidst the continued theorising and objective epistemological approach to perceptual research (Michaels and Beek, 1995), there remains little clarity regarding what information athletes use to direct decision making in performance settings and how skill is transferred from training to performance.

The role of perception-action coupling within decision-making in team sports has been discussed at great length (Vaeyens et al, 2007; Pinder et al, 2011). With scholars reaching some consensus that skilled performers are not blessed with superior visual ability, rather, their ability to locate and interpret key specifying information is what determines expertise in a particular skill (Vickers, 2006). The methodological accord has often been to recreate core, single action motor-control tasks in the hope of elucidating data to suggest a change in behaviour in any given number of constraint manipulations (Vickers, 1996; Williams, Singer and Frehlich, 2002; Vine and Wilson, 2011). However, research remains in isolation of the complexities of the real world (Vaeyens, 2007; Williams and Grant, 1999).

The Quiet Eye (QE) has become increasingly popular (Vickers, 2016), it details the final fixation towards a specific location or object within 3° of visual angle or less for a minimum of 100m/s (Vickers, 2016). It is reasonable to suggest that QE describes the variable in which to examine the relationship between perception and action (Vickers, 1996; Panchuk and Vickers, 2006).

A SensoMotoric Instrument – Eye Tracking Glasses (SMI-ETG) binocular system will be employed within an elite level goalkeeping context. QE data will be collected in three different practice environments and compared to QE measures taken in a representative performance simulation. The practice environment design will be informed by principles of ecological dynamics as presented in the Environment Design Framework (Newcombe et al, in press).

The data will be coded to establish the relationship between increased variability and the location, onset and off set of the Quiet Eye. Effect size measures will be conducted to see the variance between the 3 training trials and the representative simulation to determine the level of fidelity, between training and performance.

This key data set will allow coaches to design practices and training environments in accordance with key perceptual cues used by Goalkeepers to inform their decisions and actions.

Keywords: Action-Fidelity, Quiet Eye, Goalkeeping, Perception-Action.
The effect of implicit motor learning on improving and retaining the skill under pressure within expert trainees.

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Modern studies and models of teaching techniques emphasize practice in which informative instruction is of minor importance and performance will be improved by tasks and environment. Implicit motor learning is a modern teaching method which relies on the unconscious and more productive areas in brain in practicing and learning motor skills. Implicitly learned skills are found to be more permanent than skills learned explicitly even when performed under pressure. The purpose of this study is to explore the effect of implicit and explicit practice on the learning and retention under pressure in trainees whose skills are already on the automatic stage.

In this intervention study 17.4 ± 0.9 years old ice hockey players (n=32) wrist shot accuracy was tried to improve both in implicit and explicit ways. The control group (23.1 ± 3.3; n=17) performed only the tests. The pretest for study groups were 30 wrist shots to hit the target (size 30 x 45 cm) in the ice hockey goal. The performers were divided into two equal learning groups, after which there was a practice period which included three workouts including 270 shots all together. The shots were delivered from three different distances. The implicit group always began the workout at the shortest distance and moving to more advanced distances according to errorless learning. For the explicit group workout was performed vice versa. The study groups reserved no feedback during workouts. After the practice period those in the study groups performed 30 shots as in the pretest but now under pressure. After 8 or 14 days, the learning process was evaluated in a retention test in the same way as in the pretest. At the end of the practice period and the test under pressure, the study groups answered questionnaires which primarily asked for the attentional focus and the frustration level. They gave evidence of the implicit and explicit levels of practicing.

The major result of this study is that the performance level of the implicit group in the pressure test was significantly better than those of the explicit group and the control group (p < 0.04; p < 0.01). This underlines the theory, that skills learned implicitly would be retained under pressure better than those learned explicitly. Another significant result is that the attentional focus was more external in the implicit group than in the explicit group. The result was statistically significant (p < 0.01) in practice period. The implicit group improved test results between the pretest and the retention test, but the improvement was not significant. There were no relevant changes in the results of the explicit group.

The results of the study indicate that the implicit practice will develop skills better than does the explicit practice and that the skills obtained will be better retained under pressure. The small number of the subjects and the difference practice backgrounds undermine the validity of the study and therefore the results cannot be generalized in larger populations.

Keywords: motor learning, the automatic stage of the learning of the skill, ice hockey, implicit learning.

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The effects and differences between the coach and the teachers of EPS in the use of Demonstration Style (Global-Partial) During Motor Learning of Complexes and Simple Skills

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Aims: This study want to illustrate the different between coach and teachers of physical education on demonstration style using during motor learning of complexes and simple skills

Sample: the sample of our study is comprised from coach and teacher of physical education, its comprised for 100 teacher and 75 coach from chlef and aindefla province, (The Province is located about 200 Km from Algiers capital)

Pilot study (instrument): both of the coach and teacher complete an questionnaire that comprised from 36 question within 12 item for each collective sports (handball, volleyball, basketball) ,where we evaluated and ask him about six motor skills in each sports within the identification of the degree of the hardness and easily of each skills (from -to very hard- hard -easy – very easy) than choosing the ideal demonstration style(global/partial) use for the best and fastest ways.

Result: the results showed that the ideal and preferably style or method used by both teachers and coach to learning the volleyball and basketball skills is the partial style/ways, where this results is different when we want to learning handball skills where the major teachers and coach preferably the global style, in addition to this the results reveal that there no different in the classification of the degrees in hardness or easily between coach and teachers

Keywords: motor learning, Motor Skills, Demonstration Style (Global-Partial).

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A preliminary 'Representative' analysis of elite goalkeeping performance

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Introduction

Recently, there has been a call to include both traditional, discrete categories of behaviour and the interactions between opponents from which these emerge. Collectively, these data represent the tactic, which can be analysed at multiple levels. Individual tactics include one on one dyadic interactions between opponents. Yet there has been little consideration of the interaction between attacker and the goal keeper (GK); the final line of defence and key determinant in scoring outcome. The GK plays a specialist role that necessitates a different training environment to the rest of the team, yet data to guide its design are lacking. The act of coming off the line (i.e. decreasing the distance to attacker) has been found to be a critical psychological variable for the GK; associated with a shift in emotional valance. Given the lack of focus on individual tactics of the GK, we set out to determine if there is any range or distance between the goal keeper and striker for which there is a greater likelihood of scoring. By detailing tangible aspects of the environment in which the GK operates, it was expected that the findings would support the establishment of representative practice situations to target goal-keeper tactics.

Methods

All matches of the first 10 rounds of the 2016/17 Australian Hyundai A-League (n=50) were analysed using SportsCode Elite. Two coding windows captured shot location and characteristics, including spatial coordinates of the striker and goal keeper. This produced 1,000 shots at goal, of which 14 were penalties (excluded from this given their predetermined shot characteristics).

Results

Of the 986 shots on goal, 389 were on target and of those there were 122 goals and 267 saves. The percentage of shots on target that were converted into goals are presented for each 1m increment in distance from the GK in figure 1; for distances between 2 and 7m, the conversion rate of shots on target into goals appeared to present an advantage to the striker. This was confirmed when grouped together, this range was significantly different to all others $X^2 (5, N = 986) = 50, a < 0.01$ (figure 2).

Discussion

As might be expected, the distance between striker and GK is related to whether a goal is scored or saved; the closer the shot is made, the less time the GK has to react and make a save. There was an advantage in the favour of the striker for distances of 7m and below, yet fewer goals were scored when distance was 1m or less, suggesting the advantage might be regained by the GK closing the range. Between 2 and 7m appears to be the riskiest from the point of view of the goalkeepers; potentially reflecting a ‘corridor of uncertainty’ as to whether they should close down the shot by coming off the line or remain in a set position. Practice drills targeting a high number of shots within this range may therefore be fruitful to target decision making capability under pressure.

Keywords: Representative, Training, Goalkeeper, Environment.

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**Figure 1:** Percentage of shots on target that were converted into goals are presented for each 1m increment in distance from the goalkeeper.

**Figure 2:** Zonal completion percentage in grouped ranges representing distances (m) from the goalkeeper. The asterisk indicates the significant result of a Chi-square test between all grouped ranges ($N = 986$), $a < 0.01$.
DIFFERENTIAL AND TRADITIONAL-LEARNING TRAININGS ON CHILDREN’S FOOTBALL

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Introduction

There are several different methods of learning motor skill, like traditional and differential-learning training. In motor learning literature, variability of practice is believed to be an effective method producing successful learning, retention and transfer of learned motor skills (Lee, T & Simon, D. 2004; Shoenfelt, E et al. 2002).

Classical(traditional) motor learning approach proposes that learners improve a skill just by repeating it. One method to include variability in teaching is differential learning pertaining maximum variability between single repetitions (Schöllhorn et. al. 2010).

The purpose of this study is to examine the effects of differential and traditional training on technical development of 10 years old children who have been continuing football education.

Methods

Thirty two (32) children from football team (U 11) of Istanbul Umranıye Sports Club whose were tested as voluntarily in this study. In this study, agility/dribbling, feet-juggling, passing to target tests were applied on football field with synthetic of the Club in 2017.

Both groups that performed exercises as differential and traditional learning training two times a week for six weeks in addition to their football training.

Mann Whitney U test for paired comparison of the groups and Wilcoxon test for the comparison of pre- and post-tests of the groups were used.

Results & Discussion

There were statistically significant difference passing (Z=-2.970; p<0.01), feet-juggling (Z= -3.054; p<0.01), and dribbling (Z= -2.158; p<0.05) performances between the pre-and post-test in differential-learning group.

A significant differences was found passing (Z= -2.352; p<0.05), feet-juggling (Z= -2.333; p<0.05) performances between the pre-and post-test in traditional-learning group.

There were not statistically significant difference between performance of tests in differential and traditional groups (p>0.05)

Conclusion

In conclusion, although differential and traditional trainings improves football technical development of children differential learning can be considered that showed a statistically more significant improvement. The present study may also contribute to the literature on the specific skills related performance profile of child football players.

References

*Presenting author


Keywords: differential learning, football test, children’s football, teaching method.
Fundamental Movements Skills and achievement goal orientations in 10-year-old Finnish children

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Fundamental Movement Skills (FMS) are considered as an important prerequisite for more complex motor skills. Proficiency in FMS is associated with maintaining higher levels of physical activity and sports participation in children (Lubans et al. 2010). Achievement Goal Theory (AGT) outlines two primary goal orientations which help to understand children’s behaviour better: task (or mastery) and ego (or performance). Task-oriented athletes are motivated by developing competence or gaining a mastery of a task, whereas ego-oriented athletes are motivated by normative competence (Nicholls, 1989). The purpose of this study was to examine the relationship between FMS and achievement goal orientations in Finnish 10-year-old children involved in sports club activities.

Participants of this study were 321 girls and 356 boys. The Körperkoordinations Test für Kinder (KTK) and throwing and catching test were used as the instrument for assessing participants’ FMS. Achievement goal orientations were assessed using the Perception of Success Questionnaire (POSQ).

There were not any significant gender differences in KTK results. In throwing and catching test boys outperformed girls (p<0.05). In addition, boys had higher ego orientation than girls (p<0.05). Results show that children who scored higher in KTK and throwing and catching test achieved significantly higher score in ego (p<0.05) and task (p<0.05) orientations.

These results are in line with previous studies. Relationship between children’s FMS and goal orientations could be due to advanced perceived competence which contributes to widened levels of motivation. Future research should investigate the role of perceived competence as a mediator for FMS and goal orientations.

REFERENCES


*Presenting author
Field location and player roles as constraints on emergent 1-vs-1 interpersonal patterns of play in football

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This study examined effects of player roles on interpersonal patterns of coordination that sustain decision-making in 1-vs-1 sub-phases of football in different field locations near the goal (left-, middle- and right zone). Participants were fifteen U-16 yrs players from a local competitive amateur team. To measure interpersonal patterns of coordination in the 1-vs-1 dyads we recorded: (i) the relative distance value between each attacker and defender to the centre of the goal, and (ii), the relative angle between the centre of the goal, each defender and attacker. Results revealed how variations in field locations near the goal (left-, middle- and right-zones) constrained the relative distance and relative angle values that emerged between them and the goal. It reveals that relative position of the goal is a key informational variable that sustained participants’ behaviours for dribbling and shooting. Higher values of relative distance and angle were observed in the middle zone, compared to other zones. Players’ roles also constitute a constraint on the interpersonal coordination for dribbling and shooting. Additionally, it seems that players’ foot preference constrains the dynamics of interpersonal patterns of coordination between participants, especially in left and right zones. The findings suggest that to increase participants’ opportunities for action, coaches should account with field positions, players’ roles and preference foot.

Keywords: game constraints, patterns of play, performance analysis, interpersonal coordination.

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Abstract
Caffeine, Accuracy and Quiet eye in Badminton Serve

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The badminton serve is an important shot for winning a rally in a match. It combines good technique with the ability to accurately integrate visual information from the shuttle, racket, opponent, and intended landing point. Considering the need for optimal concentration and high level of precision for a successful serve, there is a possibility that psychoactive stimulants such as caffeine might enhance performance. Caffeine was removed from the World Anti-Doping Agency’s banned list of substances in 2004 and has since grown in popularity as an ergogenic aid for athletes (Burke, Desbrow, & Spriet, 2013). Caffeine can easily move across cellular membranes including the blood-brain barrier; hence it has the potential to affect all systems in the body including the central nervous system. However, despite the purported ergogenic and stimulatory effects of caffeine, there is little evidence regarding caffeine ingestion on perceptual processes (QE) and skill-related performance such as the badminton serve. Moreover, unlike anticipatory tasks such as the return of a shot, the serve is not temporally constrained. This thus presents a unique opportunity to explore the role of quiet eye (QE) – the final fixation during the preparatory phase of this goal-directed movement (Vickers, 1996). It has been suggested that the QE is a key factor for successful performance across a wide variety of sporting tasks (see Lebeau et al., 2016 for a review). In this study, eight elite badminton male players performed short and long serve accuracy tests following caffeine (6 mg/kg) or placebo (maltodextrin) ingestion 60 minutes pre-exercise. The study followed a double blinded, randomized counterbalanced design, with each session separated by at least a week. It was hypothesized that both short and long serve accuracy would increase with caffeine and caffeine ingestion would affect QE duration.

References
