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## Abstract Book

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合辦單位：國立中興大學研究發展處、國立中興大學管理學院、

國立臺中教育大學體育學系、國立臺灣體育運動大學競技運動學系、體育學系

協辦單位：國立中興大學體育室、國立臺灣體育運動大學運動科學研究中心

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# 使用三維人體姿態估計深度學習網路於 桌球正手擊球動作之評估

陳凱愉<sup>1</sup>、許銘華<sup>2</sup>、吳俊霖<sup>1\*</sup>

<sup>1</sup> 國立中興大學資訊工程學系

<sup>2</sup> 國立中興大學運動與健康管理研究所

## 摘要

**目的：**桌球球員在技術訓練上，需要日復一日、年復一年刻苦訓練才能達到完美技術展現。本研究目的是根據相機所錄下的影像來判斷人體的動作姿態，進而讓桌球員的擊球動作能藉由科學化分析達到更好學習成效。**方法：**本研究使用了兩個工業相機做為攝影設備，提出兩個深度學習 Transformer 的模型，第一個模型透過二維人體姿態估計的數據，學習出人體關節與關節之間的關聯性，第二個模型則透過連續 81 畫面的二維人體姿態估計以及從第一個模型學習而來的關節之間的關聯性，增強學習了前後動作之關聯。再透過空間與時間的訊息，以減少遇到身體被遮蔽以及深度難以辨識而導致的問題，進而估計出中間畫面中的三維人體姿態。最後透過五個桌球正手擊球動作特徵-「膝蓋微彎」、「左腳略前」、「重心轉移」、「輔助手微彎」以及「拍高肘低」，建立一個桌球正手擊球動作評量系統。**結果與結論：**經實驗發現，使用二維人體姿態估計很容易受到拍攝角度或是人體姿態不同而對評量結果產生極大影響，而本研究所提出的三維人體姿態估計方法能有效降低一些被遮擋住時預估的誤差，最終在平均關節誤差的評估中達到 30.1 像素的結果，研究結果證實此評分機制是可行的，這對於桌球員在日後想從事自主訓練提供了很好一個良好的學習管道。

**關鍵詞：** 動作分析、桌球、深度學習、人體姿態估計、變換

# The Evaluation System of Table Tennis Forehand Batting Action Using 3D Human Pose Estimation Approach

Kai-Yu Chen<sup>1</sup>、Ming-Hua Hsu, Jiunn-Lin Wu<sup>1\*</sup>

<sup>1</sup>Department of Computer Science and Engineering, National Chung Hsing University, Taiwan.

<sup>2</sup>Graduate Institute of Sports and Health Management, National Chung Hsing University, Taiwan

**Introduction:** Recently, there are a lot of research problems in the automatic analysis of ball sports, such as table tennis and other open sports full of continuous changes, often make the table tennis players face unpredictable and instantaneous changes. To achieve perfect technical performance, the posture of the human body is determined based on the images recorded by the camera, enabling more scientific data on table tennis sports for the training and analysis of the players. **Results & Conclusions:** In this study, two industrial cameras are used as the camera equipment, and two deep learning Transformer models are proposed. The first model learns the correlation between the joints of the human body by using 2D human posture estimation data. The second model enhances the correlation between the front and back movements by estimating the 2D human pose in 81 consecutive frames and the correlation between joints learned from the first model. The 3D human pose in the middle frame is estimated by using spatial and temporal information to reduce the problems caused by the obscured body and the difficulty in identifying depth. Through five basic movements: Knees Slightly Bent, Left Foot Slightly Forward, Center of Gravity Transition, Non-Racket Hand Slightly Bent, Elbow Low with Racket High, a system of measuring table tennis is established. Experimental results show that the proposed method can reduce some of the predicted errors in the tridimensional human posture estimation when it was obscured, and achieved a result of 30.1 pixels in the evaluation of the average joint error.

**Key words: Motion Analysis, Table Tennis, Deep Learning, Human Pose Estimation, Transformer**



# 擾動在桌球發球的運用:奧洽洛夫對戰林 昀儒之個案研究

羅任余 許銘華\*

國立中興大學運動與健康管理研究所

## 摘要

**背景:**桌球比賽是一種動態過程，為求勝利選手們會採取破壞穩定狀態，讓對手產生不適應即形成擾動現象。本研究想藉由一位頂尖桌球選手的發球策略作為擾動主題，主要是想了解發球擾動後所產生的結果及其擾動可否解讀桌球選手戰術之用。**方法:**以榮獲 2 屆奧運男單銅牌的德國桌球選手奧洽洛夫為研究對象，以奧洽在 2019-2021 年期間對戰林昀儒選手的 4 場國際比賽影片為研究範圍；以自行研發的「發球擾動模式觀察表」作為研究工具，主要觀察變項有:不同發球種類之使用率和得分率、不同發球輪採用擾動的成功效果及其被平息(smooth out)現象，所獲數據以描述統計進行分析。**結果:**1.奧洽共採用 4 種發球進行擾動，其使用率高低排序為:正手傳統式(76 次/33.33%)、反手小動作(71 次/31.14%)、正手下蹲式(45 次/19.74%)、反手潛艇式(36 次/15.79%)；依得分率高低排序為:反手小動作(71.15%)、正手下蹲式(51.11%)、正手傳統式(46.67%)、反手潛艇式(41.82%)。2.奧洽在不同發球輪變化上採用了 65 次發球擾動，共成功 19 次、失敗 19 次、平息 27 次。**結論:**本研究證實了發球擾動的現象，以及奧洽善於採用發球擾動策略，尤其他近年來新採用的反手小動作發球更是獲得很好擾動得分效果，值得關注與效仿；後續我們可以針對選手在接發球輪進行擾動觀察來破解選手的接發球策略。

**關鍵詞：**桌球、技戰術、成績分析、擾動

**通訊作者：**許銘華，mhhsu@mail2000.com.tw, +886-4-22840845 ext 888

# The Application of Perturbation in Table Tennis

## Serving: A Case Study of Ovtcharov Playing Against

Yun-Ju Lin

Jen-Yu Lo Ming-Hua Hsu\*

Graduate Institute of Sport and Health Management, National Chung Hsing University, Taiwan.

### Abstract

**Background:** The game of table tennis (TT) is a dynamic process. In order to win a match, a player will disrupt a stable situation to make his opponent uncomfortable, thus creating a perturbation phenomenon. The main purpose of this study was to identify the results of a top TT player's serving perturbation and whether the approach could be applied to explain the TT player's tactics. **Methods:** The German TT player Dimitrij Ovtcharov, who won two-time Olympic bronze medals in men's singles, was selected as the subject of the study, and the videos of his four international matches played against Yun-Ju Lin during 2019-2021 were taken as the scope of the study, and a self-designed "Serving Perturbation Pattern Observation Table" was adopted as a collection tool. The mainly observed variable: Usage rate and scoring rate of different serving types, and the effect of success and the phenomenon of smoothing out in different serving rounds using the perturbation, and the data obtained were analyzed with descriptive statistics. **Results:** 1. Ovtcharov used four types of serving as perturbation strategies, and the usage rate was in the following order: "Traditional Forehand Serving" (76 /33.33%), "Short Backhand Serving" (71 /31.14%), "Squatting Forehand Serving" (45/19.74%), "Submarine Style Backhand Serving" (36 /15.79%); the scoring rate was in the following order: "Small Backhand Serving"(71.15%), "Squatting Forehand Serving" (51.11%), "Traditional Forehand Serving" (46.67%), and "Submarine Style Backhand Serving" (41.82%). 2. Ovtcharov had 65 serve perturbations on different serving round changes, with a total of 19 successes, 19 failures and 27 smooth-out. **Conclusion:** This study proved the phenomenon of serving perturbation, and that Ovtcharov is skillful in using serving perturbation strategies, especially his new "Small Backhand Serving" in recent years, which has achieved a good perturbation effect and is worthy of attention and learning. In the follow-up study, maybe we can observe the player's perturbation in the receiving rounds to beat the player's receiving strategies. **Keywords:** table tennis, technique and tactics, performance analysis, perturbation  
**Correspondence:** Ming-Hua Hsu, mhhsu@mail2000.com.tw, +886-4-22840845 ext 888

# 關節跟蹤關節本體感覺與上下肢動作能力 間之相關性— 以台灣大專院校男子排球選 手為例

陳姿妤<sup>1</sup> 尹燕詠<sup>2</sup> 曾鈺婷<sup>1,3\*</sup>

<sup>1</sup>國立清華大學運動科學系 <sup>2</sup>國立清華大學教育與學習科技學系 <sup>3</sup>國立清華大學心  
智科學研究中心

**目的：**本體感覺能力使運動員得以得知身體活動的確切位置，進而做出最佳、最迅速的環境相對反應。而對於排球運動員來說，手腕與腳踝會直接影響防守、舉球、攻擊等動作。然而，手腕跟腳踝本體感覺與動作能力表現優劣之間的相關性則有待證實。**方法：**本研究招募 14 位臺灣大專院校之校男排選手(年齡：19.79 ± 1.12 歲)，並橫斷性測量所有運動員之上、下肢之位置覺、爆發力、穩定度。本體感覺量測上，使用腕關節本體感覺儀(Wrist bimanual manipulandum)與踝關節本體感覺儀(Ankle passive motion apparatus)測量腕與踝關節之位置覺(position sense acuity)，並利用心理物理感覺閾值測量法(psychophysical threshold testing)收錄參與者之最小可覺差異角度閾值(just noticeable difference, JND)。動作能力方面則測量上、下肢之穩定能力與爆發力。爆發力測驗分別為坐式藥球投擲 (Seated Medicine Ball Throw)與立定跳遠(standing long jump)；穩定能力(stability)測驗為上、下肢的 Y 字平衡 (Y Balance Test)。各動作能力皆取三次測驗中最佳者記錄 (cm)。所有實驗數據皆以皮爾森積差相關進行相關性統計分析。**結果：**(1)藥球投擲與腕關節位置覺呈顯著正相關 ( $r = .565, p = .035$ )；(2)下肢 Y 字平衡與踝關節位置覺呈顯著正相關 ( $r = .533, p = .050$ )；(3)上、下肢 Y 字平衡呈顯著正相關 ( $r = .604, p = .022$ ) (4)腕、踝關節位置覺無顯著正相關。**結論：**本研究中的排球選手上、下肢的穩定度有著顯著正相關性，但是上、下肢穩定度越高的選手，其本體感覺敏銳度則較差，此情況可能歸因於此批排球選手在其他動作技能上的個體差異。

**關鍵詞：**排球、本體感覺、穩定度、爆發力

# **The relationship between proprioception and motor ability in the wrist and ankle joints : a study of male college volleyball players in taiwan**

**Tzu-Yu Chen<sup>1</sup>, Yan-Yong Yin<sup>2</sup>, Yu-Ting Tseng<sup>1,3\*</sup>**

<sup>1</sup>Department of Kinesiology, National Tsing Hua University <sup>2</sup>Department of Education and Learning Technology, National Tsing Hua University <sup>3</sup>Research Center for Education and Mind Sciences, National Tsing Hua University

**Introduction:** Proprioception enables athletes to perceive the exact position of their body's movements, allowing them to make rapid and appropriate body responses. For volleyball players, wrists and ankles are key points that directly impact performance on defending, setting, attacking and other movements. At present, the correlation between proprioception and ability in wrist joints and ankle joints haven't been confirmed.

**Method:** This cross-sectional study recruited 14 male volleyball players from Taiwanese college (mean age  $19.79 \pm 1.12$  years). We obtained upper and lower limbs' proprioception, explosive power, and stability in all athletes. With respect to proprioception, a wrist bimanual manipulandum and an ankle passive motion apparatus were used to test position sense acuity of wrist joints and ankle joints. The psychophysical threshold testing method was employed to measure the just noticeable difference (JND) of the position sense of the wrist and ankle. With regard to motor ability, both stability and explosive power of the upper and lower limb were measured. The Seated Medicine Ball Throw and Standing Long Jump were utilized for the explosive power of upper and lower limbs. The best score from the three attempts was recorded, respectively. The highest score was recorded as the participant's ability in explosive power. Stability was assessed through the Y Balance Test (YBT) in upper and lower limbs respectively. In the YBT, the non-dominant hand/feet has to reach maximally in three directions. The best score from the three attempts in each motor ability test was recorded. Pearson's correlation coefficient was performed to examine the correlations of proprioceptive and motor variables among all volleyball players.

**Result:** (1) There was a significant positive correlation between SMBT and upper limb position sense acuity measured by JND thresholds of the wrist ( $r = .565, p = .035$ ), (2) There was a significant positive correlation between upper limbs YBT and lower limb position sense acuity measured by JND threshold of the ankle ( $r = .533, p = .050$ ), (3) There was a significant positive correlation between upper limb YBT and lower limb

YBT ( $r = .604$ ,  $p = .0.22$ ), and (4) There was no significant correlation between position sense acuity of the wrist and the ankle in volleyball players.

**Conclusion:** Our data revealed that stability of upper limb was significantly correlated with that of lower limb, suggesting that volleyball players with higher levels of stability in their upper limbs tended to also have higher levels of stability in their lower limbs. However, players with higher stability in both their upper and lower limbs exhibited lower levels of proprioceptive acuity. This observation may be attributed to individual differences in other domains of motor expertise among these volleyball players.

**Keywords :** Volleyball, Proprioception, Stability, Explosive Power

**Correspondence :** Yu-Ting Tseng , [yutingtseng@mx.nthu.edu.tw](mailto:yutingtseng@mx.nthu.edu.tw),

+886-35715131 ext. 71527

# 應用賽局理論分析桌球選手林昀儒擰接 之最佳策略

朱振寧<sup>1</sup> 許英麟<sup>1</sup> 吳昇光<sup>2</sup> 許銘華<sup>2,3</sup>

<sup>1</sup>臺灣 臺中市 402 國立中興大學統計學研究所

<sup>2</sup>臺灣 臺中市 404 國立臺灣體育運動大學球類運動學系

<sup>2,3</sup>臺灣 臺中市 402 國立中興大學運動與健康管理研究所

## 摘要

**目的：**擰球是台灣桌球選手林昀儒成名招式，本研究運用賽局理論分析林昀儒對戰德國選手奧洽洛夫時，林採用擰球接發之後雙方的策略選擇，以找出對手可能的回球方式，從而為選手和教練提供回饋與建議。**方法：**蒐集林昀儒和奧洽洛夫在 2019-2021 年期間對戰的 4 場重要國際比賽之真實數據，運用賽局理論的原理，通過定義、計算「直接得分率」、「獎勵分數」等項目，得出對戰雙方在林選手擰接後 2 拍的效用，再運用「競賽樹」和「逆向歸納法」來加以分析，並提出雙方選手在林擰接後 2 拍的最佳策略。**結果：**在 2 拍的回擊中：當林擰接後而奧洽以「快推」回擊的效用(1.53)最高，此時林的效用為 5.41；當林擰接後而奧洽以「反拉」回擊的效用(-0.77)最低，此時林的效用為 1.96。在 3 拍的回擊中：對奧洽而言，其總效用最高(7.48)的賽局是「林擰接->奧洽快推->林擋」，而此時林的總效用為 2.06；奧洽總效用最低(-0.50)的賽局是「林擰接->奧洽擋->林快帶」，此時林則為 1.83。雙方達到均衡的優勢策略為「擰->推擠->反拉」。**結論：**本研究證實運用賽局理論在桌球比賽技戰術決策之可行性，此方法也突破了過往僅分析「2 拍模式」之局限。

**關鍵詞：**桌球、賽局理論、競賽樹、最佳策略、擰球

**通訊作者：**許銘華，mhhsu@mail2000.com.tw, +886-4-22840845 ext 888

# Application of the Game Theory to Analyze the Best Strategy of Yun-Ju Lin's Side Twist in Table Tennis Receive

Zhen-Ning Zhu<sup>1</sup>, Ying-Lin Hsu<sup>1</sup>, Sheng-Kuang Wu<sup>2</sup>, Ming-Hua Hsu<sup>2,3</sup>

<sup>1</sup>Institute of Statistics, National Chung Hsing University, Taiwan.

<sup>2</sup>Department of Sport Performance, National Taiwan University of Sport, Taiwan

<sup>3</sup>Graduate Institute of Sport and Health Management, National Chung Hsing University, Taiwan.

## Abstract

**Purpose :** The skill of side twist receive is the famous skill of Taiwanese table tennis (TT) player Yun-Ju Lin. This study applied the game theory to analyze the strategical choices of both sides after Lin twisting the ball to receive in matches between Lin and German player Dimitrij Ovtcharov to find out the opponent's possible way to return the ball to provide suggestions feedback to the athletes and coaches. **Methods :** We collected the actual data of 4 important international matches between Lin and Ovtcharov from 2019 to 2021, and applied the principle of the game theory to define and calculate "direct score rate", "reward values" and other items used to obtain the utilities of the next two shots after Lin's side twist receive. Then, we used the form of the "game tree" and "backward induction" to analyze the utilities in details, and offered the best strategy for the next two shots after Lin's side twist receive. **Results:** On the 2-shots return, when Lin used "side twist" return serve and Ovtcharov hit back with "fast push", the utility (1.53) was the highest, at this time Lin's utility was 5.41; when Lin used "side twist" return serve and Ovtcharov hit back with "counter drive", the utility (-0.77) was the lowest, and the utility of Lin was 1.96 at this time. On the 3-shots return, for Ovtcharov, the strategy with the highest total utility (7.48) was "Lin Side Twist-> Ovtcharov Fast Push-> Lin Block", and Lin's total utility at this time was 2.06; The game with the lowest total utility (-0.50) was "Lin Side Twist-> Ovtcharov Block-> Lin Counter Drive". At this time, Lin's total utility was 1.83. The best strategy for both sides to reach equilibrium was "Side Twist->Fast Push-> Counter Drive". **Conclusion:** This study proves the feasibility of applying the game theory to the technical and tactical decision making in TT games. This approach breaks through the limitation of only analyzing "2-shot patterns" in the previous study.

**Keywords:** table tennis, game theory, game tree, best strategy, side twist

**Correspondence:** Ming-Hua Hsu, mhhsu@mail2000.com.tw, +886-4-22840845 ext 888

# 阻力訓練對肌力與肌肥大之文獻探討

賴子維 蔡維航 楊佳政

國立臺中教育大學體育學系碩士班

**目的：**為了提升運動員的運動表現，進行阻力訓練是個有效的方式，而除了提升肌力以外，增加肌肉量也是重要的一環，多數研究認為傑出運動員通常具有較高的肌力與肌肉量，隨著近年來阻力訓練越來越流行，須要合適的訓練安排，在預防傷害的前提下進行能最大化地促進健康與運動表現，但訓練安排有各種排列組合，因此本研究進行阻力訓練對於肌力與肌肥大文獻之探討。**方法：**本研究透過 PubMed 與 Google Scholar 資料庫搜尋範圍自 2015 ~ 2022 年有關訓練組數、次數、重量、休息時間等訓練安排，對於肌力與肌肥大相關之期刊文獻，經歸納、整理、分析後、作為研究上比對論述之參考依據。**結果與討論：**發現對於肌力的增加，需要較高的負重強度、總訓練量、較長的組間休息時間且不一定需要達到力竭的次數，提高肌肉適應性、肌電活動、運動單位徵召與訓練品質，進而增加肌力表現；而肌肥大的提升，需要較高的訓練頻率並提升總訓練量，能夠在低強度時使用力竭訓練與中高強度訓練時達到肌肥大效果。其中也發現中高強度負重能夠同時促進肌力與肌肥大的提升。**結論：**訓練時漸進增加總訓練量與負重強度，以利肌力與肌肥大的提升，肌力提升需要較高強度與較長休息時間，而進行低強度力竭訓練也能促進肌肥大效果。

**關鍵詞：**阻力訓練、肌力、肌肥大

**通訊作者：**賴子維，waynelai0806@gmail.com, +886921-318-000



# Resistance Training on Muscle Strength and Hypertrophy: A Literature Review

Zi-Wei Lai, Wei-Hang Tsai, Chia-Cheng Yang

Graduate Institute of Physical Education, National Taichung University of Education, Taiwan.

**Introduction:** Resistance training is an effective way to enhance athlete's sports performance. In addition to increasing muscle strength, increasing muscle mass is also an important part. Many studies believe that outstanding athletes usually have higher muscle strength and muscle mass. As resistance training has become increasingly popular in recent years, appropriate training arrangements are necessary to maximize health and athletic performance while preventing injury. However, there are various arrangements for doing resistance training, so this study aims to investigate the literature of resistance training on muscle strength and hypertrophy. **Methods:** This study searched for journal articles on training sets, frequency, intensity, rest time, and other training arrangements related to muscle strength and hypertrophy in the PubMed and Google Scholar databases from 2015 to 2022. The findings were summarized, organized, and analyzed as a reference for comparative discussion in this study. **Results & Discussion:** It was found that increasing muscle strength requires higher load intensity, total training volume, longer inter-set rest time, and not necessarily training to failure. Improving muscle adaptation, EMG activity, motor unit recruitment, and training quality can enhance muscle strength performance. On the other hand, increasing muscle hypertrophy requires higher training frequency and total training volume. Muscle hypertrophy can be achieved through training to failure at low intensity and moderate to high-intensity training. It was also found that moderate to high-intensity resistance training can simultaneously increase muscle strength and hypertrophy. **Conclusion:** Gradually increasing total training volume and training intensity while training can enhance muscle strength and hypertrophy. To improve muscle strength, higher intensity and longer inter-set rest time are required, and low-intensity failure training can also increase muscle hypertrophy.

**Key words:** resistance training, muscle strength, muscle hypertrophy

**Correspondence:** Zi-Wei Lai, [waynelai0806@gmail.com](mailto:waynelai0806@gmail.com), +886921-318-000

# 大專優秀運動員身體組成跟運動表現 相關性之研究

余殷杰 何健章

輔仁大學體育學系碩士班

**研究目的：**探討大專優秀運動員身體組成與運動表現之相關性。**研究方法：**本研究針對 30 位大學甲組運動員，分別透過身體成分分析儀 (inbody 770)、等速肌力測量系統 Biodex 以及人體呼吸代謝 VO2Max 測量系統檢測其身體組成、最大肌力及最大攝氧量。運用皮爾森積差相關係數分析運動員身體組成與最大肌力及最大攝氧量之相關性。**結果與討論：**在本研究身體質量指數比與運動能力之淨相關係數分析發現：棒球受試者下肢最大肌力與身體質量指數之間存在淨相關係數，且雙腳的慢速膝伸和快速膝曲的相關係數達到統計學上的顯著性 ( $p < 0.05$ )。結論：本研究顯示有較好身體質量指數比的棒球選手相對有較高運動能力，特別是在下肢肌力方面。然而，身體質量指數與最大攝氧量之間並沒有顯著的相關性。**關鍵詞：**身體組成、最大肌力、最大攝氧量

# **The relationship between body composition and sport performance in university A grade athletes**

**Yan-kit YU Chien-Chang Ho**

Graduate Institute of Physical Education, Fu Jen Catholic University

**Purpose:** The purpose of this research is find out the correlation between body composition and athletic performance of elite university athletes. The research method in this study we invite 30 university athletes to test for their body composition, muscle strength and the cardiorespiratory fitness through the body composition analyzer call inbody 770, the isokinetic muscle strength measurement system call Biodex and the human respiratory metabolism measurement system to test the cardiorespiratory fitness (VO2Max). Pearson product-moment correlation coefficients (r) would be use to analyze the correlation between athlete's body composition and maximum muscle strength also maximum oxygen uptake (VO2Max).**Results and Discussion:** In the analysis of the net correlation coefficient between body mass index (BMI) and exercise capacity in this study, it was found that there is a net correlation coefficient between lower limb maximum strength and BMI in baseball subjects, and the correlation coefficient between slow knee extension and fast knee flexion of both feet reached statistical significance ( $p < 0.05$ ). This study shows that baseball players with better BMI ratios have higher exercise capacity, especially in lower limb muscle strength. However, there was no significant correlation between BMI and maximum oxygen uptake.

**Keywords: Body composition, maximum strength, maximum oxygen uptake**

# 臺灣運動科學國際競爭力與發展策略 之探析

李炳昭、楊皓文、王奕云

國立臺中教育大學 體育學系

**目的：**本計畫旨在探究臺灣運動科學國際競爭力與發展策略，嘗試結合學術論點與實務層面，盤點本地運動科學研究與分析國際運動科技應用趨勢。**方法：**本計畫採用內容分析(文件分析法)、半結構式訪談、德懷術等方法，以國科會教育與體育學門近三年運動科學/科技研究成果、世界大學體育相關系所評鑑指標，以及各國運動科技應用與產業連結現況為調查對象，探討國科會補助對於整體體育與運動科學之實質影響。**結果：**1. 研究參與者認為具體提升臺灣體育與運動科學發展的主要策略有：研擬適切之相關補助計畫徵件辦法、落實研究人才培育、補助充足的研究設備、鼓勵運動相關產學合作、建立具有效與客觀之評估指標等。2. 透過整體權重排序可知，研究參與者對國際競爭力與人才培育感到較為重要，尤其是建立學術刊物與提高跨國合作之機會，以及優秀人才之育才、用才與留才。**結論與建議：**國科會提供的相關研究補助，對於臺灣運動與運動科學的發展有相當大的貢獻。透過本研究所建立的提升臺灣體育與運動科學發展的評估指標顯示，未來相關單位應致力於創辦國際期刊和專責機構、加強國際交流合作、建立研究人員的發展與激勵制度、媒合學術研究與產業合作，以提升體育與運動科學的國際學術影響力。

**關鍵詞：**國際競爭力、產學合作計畫、德懷術

**通訊作者：**王奕云，[bpe111101@gm.ntcu.edu.tw](mailto:bpe111101@gm.ntcu.edu.tw)，0982351023

# **An Analysis of Taiwan's International Competitiveness and Development Strategies in Sports Sciences**

**Ping-Chao Lee, Hao-Wen Yang, Yi-Yun Wang**

Department of Physical Education, National Taichung University of Education

## **Abstract**

This research project seeks to understand the international competitiveness and development strategies of sports science in Taiwan. It attempts to combine academic arguments with practical aspects by reviewing the research of sports science in Taiwan and analyzing the application trend of sport sciences in the world. This study was presented by survey research method. It selected science/technology research results of the sport discipline in the National Science and Technology Council in the past three years, the indicators identified by the sports-related department of the university in the world, and the current situation of sports technology application and industry connection in various countries as the survey objects. The content analysis (document analysis), expert consultation, and other research approaches will be utilized to complete the thematic analysis report through a one-year study. The participants in the study identified several key strategies for enhancing the development of sports and exercise science in Taiwan. These included developing appropriate subsidy programs and solicitation methods, implementing research talent cultivation, ensuring adequate equipment subsidies and purchases, promoting industry-academic cooperation in sports, and establishing effective and objective evaluation indicators. Through the overall weight ranking, it was found that the participants in the study placed greater importance on the international competitiveness dimension and talent cultivation dimension, particularly in terms of how to establish academic journals, increase opportunities for cross-national cooperation, and cultivate excellent talent willing to stay in the academic field for long-term growth. Conclusion and recommendations: The research subsidies provided by the National Science and Technology Council have contributed significantly to the development of sports and exercise science in Taiwan. The international academic ranking improvement indicators developed in this study demonstrate that efforts should be made to enhance international competitiveness and cultivate talent. There are many specific measures that can be taken to enhance the international academic influence of sports science, including establishing international

journals and professional organizations, strengthening international exchanges and cooperation, promoting the development of researchers and incentive systems, and linking academic research with industry cooperation.

**Keywords:** international competitiveness, university - industry cooperative, Delphi

**Correspondence:** Yi-Yun Wang, [bpe111101@gm.ntcu.edu.tw](mailto:bpe111101@gm.ntcu.edu.tw), 0982351023

# 臺灣運動防護專業研究的過去、現在與未來建議—範域文獻回顧

周珈頡<sup>1</sup> 余中綺<sup>1</sup> 黃昱倫<sup>1</sup>

<sup>1</sup> 國立臺灣師範大學體育與運動科學系

**目的：**臺灣運動防護專業於 1980 年代萌芽，其重要性雖已逐漸獲得重視，但至今仍缺乏針對此專業與其當前重要議題進行系統性文獻探討。為推進專業發展，本篇範域文獻回顧的研究目的為 (1) 描繪邁向建制化 (2002 年前)、過渡期 (2003-2012 年)、研究成長期 (2013-2022 年) 三個時期的研究取向；(2) 指認過去、現在與未來於教考用三構面可能遭遇之挑戰；(3) 對照國際研究趨勢，作為臺灣未來研究與專業發展的建議。**方法：**遵照 2020 PRISMA 指南，共 14 篇期刊與 13 篇學位論文，及 1 篇國科會計畫符合篩選標準。**結果與結論：**(1) 研究取向從邁向建制化時期的制度化訴求，在過渡期轉為探討法規設立後因法律位階不足伴隨的限制，並出現職業傷害的新興研究主題。研究數量、主題與深度在研究成長期來到高峰，主題擴展至運動防護員與其他角色的關係、防護室配置和社會支持等。(2) 教考用失衡為過去、現在與未來專業發展挑戰的主軸。為達教考用整合，首先需執行角色界定研究以建立職能標準，作為教學端與考核的依準。建議參照美國運動防護專業組織運作模式將教考用三權分立。並爭取國考化與制定《運動防護師法》，透過提高法律位階保障業務執行的合法性。(3) 建議未來研究探討運動防護專業教育的提升、專業的生機，與潛在經濟效益。

**關鍵詞：**研究取向、教考用、角色界定研究、職能標準

# The past, present, and future recommendation of athletic training profession research in Taiwan- a scoping review

Chia-Chieh Chou<sup>1</sup>, Chung-Chii Yu<sup>1</sup>, Yu-Lun Huang<sup>1</sup>

<sup>1</sup>Department of Physical Education and Sport Sciences, National Taiwan Normal University

**Purpose:** Athletic training profession emerged in the 1980s in Taiwan. Although its importance has gradually been recognized, there is still a lack of systematic literature review on this profession and its current critical issues in Taiwan. To promote professional development, the aims of this scoping review are to: (1) depict the research trends during three periods—towards institutionalization (-2002), transitional period (2003-2012), and research developing period (2013-2022); (2) identify challenges that the profession encounters in the past, present, and future to education, certification, and employment; and (3) provide recommendation for future research and professional development in Taiwan against international research trends. **Methods:** According to the 2020 PRISMA guidelines, a total of 14 journal articles, 13 theses, and 1 research project funded by National Science and Technology Council met the eligibility criteria. **Results & Conclusions:** (1) The research trends shifted from calling for institutionalization during the towards institutionalization period to exploring the limitations resulted from the inadequate legal status during the transitional period after related regulation have been established, following by emerging topics including occupational injuries. The number, topics, and depth of research is peaking during the research developing period, with the focus expanding to the relationship among athletic trainers and other professionals, athletic training facilities, and social support etc. (2) The imbalance among education, certification and employment has been the primary challenge for the past, present, and future professional development. To bridging the gap between integrate these elements, the first priority is to conduct a role delineation study/practice analysis to establish Standards of Professional Practice as the foundation of education and certification. It is recommended to refer to the US Strategic Alliance of the athletic training profession that separate powers among education, certification, and employment. Meanwhile, efforts should be made to strive for national certification and the establishment of the "Athletic Trainers Law" to ensure the legitimacy of clinical practice through the enhancement of legal status. (3) Future research is recommended to explore the enhancement of athletic training education, vitality of the profession, and potential economics.



**Key words: research trends, education-certification-employment, role delineation study /practice analysis, Standards of Professional Practice**  
**Correspondence: Professor Yu-Lun Huang, huanyulu@ntnu.edu.tw, +886-7749-3219**

# 潛水旅遊的永續發展之因素-以綠島為例

盧敬元<sup>1</sup> 王崇豐<sup>2</sup>

<sup>1,2</sup> 國立高雄科技大學海洋休閒管理系

**目的：**全球沿海環境極易因人為壓力與氣候變遷的影響下而退化，因為它們除了擁有豐富的海洋生物多樣性外，還居住著世界近一半的人口。綠島作為台灣為數不多的離島之一，潛水旅遊已在當地發展成為一個蓬勃發展的行業，每年吸引著大量的遊客前往進行潛水旅遊。在經歷疫情洗禮後，給綠島當地的潛水旅遊業和飯店業造成了毀滅性的衝擊。疫情帶來的封鎖，不僅讓潛水愛好者無法旅行，也帶來精神壓力和情緒壓力等問題。因此，在面臨疫情後的綠島擁有巨大的永續發展的需求，以促進經濟和環境保護的增長。**方法：**本研究透過專家利用德菲法建立 19 項適合的評估準則，再使用層級分析法建構各評估因素間之關係，獲得評估因素之權重。本研究將構面分為「海域環境」、「政府管理」、「企業商家」、「遊客行為」等 4 個構面，計算各成對比較矩陣的特徵值與特徵向量，檢定矩陣的一致性。**結果與結論：**結果顯示，整體權重前六名依序為「控制管理登島人數(0.2605)」、「劃分活動區域(0.1283)」、「生物多樣性減少(0.1145)」、「提供生態旅遊模式(0.0786)」、「增設綠能建設(0.0647)」、「海洋廢棄物增加(0.0620)」。**結論：**專家認為最重要的構面是政府管理構面，控制管理登島人數是專家最為顧慮的指標。綠島地區如果能加強管理登島人數及有效的劃分活動區域，將能永續發展綠島海域的潛水旅遊活動。

**關鍵字：**潛水旅遊、永續發展、層級分析法

# Factors of Sustainable Development of Diving Tourism - Green Island as an Example

**Chin-Yuan Lu<sup>1</sup>, Chong-Fong Wong<sup>2</sup>**

<sup>1,2</sup>National Kaohsiung University of Science and Technology Department of Marine Leisure Management

**Introduction:** The world's coastal environments are highly vulnerable to degradation from anthropogenic pressure and the impacts of climate change, as they host nearly half of the world's population, in addition to rich marine biodiversity. Green Island is one of the few outlying islands in Taiwan. Diving tourism has developed into a thriving industry in the local area, attracting a large number of tourists for diving tourism every year. After experiencing the baptism of the epidemic, it caused a devastating impact on the local diving tourism and hotel industry in Green Island. The blockade brought about by the epidemic not only prevents diving enthusiasts from traveling, but also brings mental and emotional stress and other problems. Therefore, after facing the epidemic, Green Island has a huge demand for sustainable development to promote economic growth and environmental protection. **Methods:** This study established 19 suitable evaluation criteria by experts using Delphi method, and then used the analytic hierarchy process to construct the relationship between evaluation factors and obtain the weight of evaluation factors. In this study, the facets are divided into four facets: "Sea Environment", "Government Management", "Businessmen", and "Tourist Behavior", calculate the eigenvalues and eigenvectors of each pairwise comparison matrix, and verify the consistency of the matrix. **Results & Conclusions:** The results show that the top six rankings in the order of overall weight are "controlling and managing the number of people landing on the island (0.2605)", "dividing activity areas (0.1283)", "reducing biodiversity (0.1145)", "providing eco-tourism models (0.0786)", "Increased green energy construction (0.0647)", "Increased marine debris (0.0620)". **Conclusion:** Experts believe that the most important aspect is the aspect of government management, and the control and management of the number of people landing on the island is the indicator that experts are most concerned about. If the Green Island area can strengthen the management of the number of people landing on the island and effectively divide the activity areas, it will be able to sustainably develop the diving tourism activities in the Green Island waters.

**Key words:** Diving tourism, sustainable development, AHP

**Correspondence:** Chin-Yuan Lu, [F110191104@nkust.edu.tw](mailto:F110191104@nkust.edu.tw), +886909606645

# 當「嬌點」變成「焦點」-析論2023年世界棒球經典賽中華隊啦啦隊之應援效應

楊筑鈞、王建興

國立臺灣體育運動大學休閒運動學系碩士班

**目的：**2023年第五屆世界棒球經典賽(WBC)剛落幕，臺灣祭出最強啦啦隊「台灣精品經典女孩」為中華隊加油，從賽前至賽後話題持續不斷的啦啦隊無疑是媒體與球迷關注的焦點。本研究擬針對中華隊啦啦隊於2023世界棒球經典賽之相關報導與社論，析論中華隊啦啦隊之應援效應。**方法：**根據研究目的，研究者透過Google搜尋引擎搜尋「中華隊啦啦隊」、「台灣精品經典女孩」、「經典賽啦啦隊」等關鍵字，針對中華隊啦啦隊於2023年第五屆世界棒球經典賽中所報導之內容與社論，以內容分析法對於正反面觀點加以評析。**結果與結論：**本研究之分析結果如下：(一)正面觀點：啦啦隊是球場上的能量來源；帶動球迷替球員加油，提升主場優勢；在場上的熱力應援驚豔了國內外媒體；成員林襄成為媒體喜愛訪問的對象，創造話題性；成功讓世界看到「台式應援」的魅力。(二)反面觀點：棒球場上的主角應是場上選手，而非場邊的啦啦隊；當啦啦隊作為台灣特色的同時，可能會侵蝕棒球文化的本質。本次經典賽中華隊啦啦隊的表現，展現出臺灣棒球場上獨特的應援文化，不僅成功吸引國內外媒體的關注，也讓世界看見臺灣。然而，在經典賽結束後，如何延續中華隊啦啦隊所帶來的熱潮，在啦啦隊員們歸建後持續為所屬職棒球團提升人氣，進而拓展運動表演業，是相關主管單位與推廣團體未來積極努力的方向。

**關鍵詞：**台灣精品經典女孩、台式應援、運動表演業

# When "Charm" Becomes "Focus": Analyzing The Fanchant Effect Of The Chinese Taipei Cheerleading Team In The 2023 World Baseball Classic

Zhu-Jun Yang and Chien-Hsin Wang

Department of Recreational Sport, National Taiwan University of Sport

**Purpose:** The 5th World Baseball Classic (WBC) has just ended in 2023, and Taiwan's strongest cheerleading squad "Taiwan Excellence Classic Girls" has been cheering for the Team Chinese Taipei. The cheerleading squad has been a constant topic of discussion from pre-game to post-game, and has undoubtedly become the focus of media and fans. This study aimed to analyze the relevant reports and editorials on the Chinese Taipei's cheerleading squad in the 2023 WBC, and to examine the cheerleading squad's fanchant effect. **Method:** In accordance with the research purpose, the researcher used the Google search engine to search for keywords such as "Chinese Taipei's cheerleading squad," "Taiwan Excellence Classic Girls," and "WBC cheerleading squad," etc., and conducted a content analysis of the positive and negative viewpoints regarding the Chinese Taipei's cheerleading squad in the WBC. **Results and Conclusion:** The findings of this study were as follows: (1) Positive viewpoints: the cheerleading squad is a source of energy on the field; inspiring fans to cheer for the players and enhancing the home advantage; the squad's passionate support on the field has amazed both domestic and foreign media; Lin Xiang has become a popular interview subject for the media, creating topicality and successfully showcasing the charm of "Taiwanese-style cheering." (2) Negative viewpoints: the main focus on the baseball field should be on the players, not the cheerleading squad on the sidelines; while the cheerleading squad is a unique feature of Taiwan, it may also erode the essence of baseball culture. The performance of the Chinese Taipei's cheerleading squad in the WBC showcased the unique fanchant culture of Taiwanese baseball and attracted the attention of domestic and foreign media, allowing the world to see Taiwan. However, it is important to sustain the momentum brought by the cheerleading squad after the WBC and continue to increase the popularity of the affiliated professional baseball teams as well as expand the sports performance business. These are the potential directions that relevant authorities and promotional groups may actively work towards in the future.

**Key words:** Taiwan Excellence Classic Girls, Taiwanese-style cheering, sports performance business

**Correspondence: Chien-Hsin Wang, [chwang@gm.ntus.edu.tw](mailto:chwang@gm.ntus.edu.tw), +886-4-22213108  
ext 1502**

# 美國、英國、加拿大跨性別民眾參與 運動之政策規範分析

鄧閔仁

國立臺中教育大學 體育學系

**目的：**中華民國高級中等學校體育總會[高中體總]公告，自 112 學年度起開放跨性別運動員跨組別參與全中運，在臺灣的運動界掀起了一陣討論。在性別多元化的現代，運動界持續的跟進這樣的潮流，但在運動場上，如何做到讓不同性別的運動員能夠公平競爭，是目前尚未定論的一個議題，即使目前各國國際單項競賽已經有一些初步界定參與資格方式，但也未臻完美，因此若能在許多不同的規定中，找到相同的認定方式，或許更能對於制定規範有更好的幫助。本研究旨在檢視美國、英國以及加拿大對於國內跨性別運動員採取之政策及規範，以歸納分析出目前能夠將跨性別運動員參與運動賽事效益最大化的做法。**方法：**本研究使用內容分析法檢視美國、英國、加拿大三國對於跨性別民眾參與運動的政策及法規，將各國政策內容做出統整歸納與分析。**結果與討論：**研究發現：1. 英、美、加三國皆認為賀爾蒙對運動員表現是否有影響還有待查證，故不應以賀爾蒙決定運動員應參與之組別。2. 國內各級非職業賽事，應開放跨性別運動員依其性別認同參賽，以保障所有人之人權，不應以刻板印象限制了跨性別運動員的權利。3. 同一套政策無法滿足所有運動，各組織應視情況調整規章內容。**結論：**目前以英、美、加三國之跨性別運動政策而言，在有效的科學證據發現以前，任何人應該有權利參與其所欲參加之賽事，各組織在規章制定上需要有滾動式的修正，以確保所有人的權利。

**關鍵詞：**美國、英國、加拿大、跨性別、運動員

**通訊作者：**鄧閔仁，bpe110111@gm.ntcu.edu.tw, 0988675902。

# **An analysis of the policies and norms of the transgender public participation sports in the United States, the United Kingdom, and Canada**

**Min-Ren Teng**

Department of Physical Education, National Taichung University of Education, Taiwan

**Introduction:** The Chinese Taipei School Sport Federation announced that since the 112<sup>th</sup> school year, transgender athletes will be allowed to participate in the National Games across groups, which has sparked a discussion in Taiwan. In the modern age of gender diversity, the sports world continues to follow this trend, but how to make athletes of different genders compete fairly on the sports field is an issue that has not yet been settled. Some preliminarily defined participation qualification methods are not perfect, so if the same identification method can be found in many different regulations, it may be more helpful for the formulation of norms. This study aims to examine the policies and norms adopted by the United States, the United Kingdom, and Canada for domestic transgender athletes. It also summarizes and analyzes the current practices that can maximize the benefits of transgender athletes participating in sports events.

**Method:** This study uses the content analysis method to examine the policies and regulations on transgender people's participation in the United States, the United Kingdom, and Canada, and summarizes and analyzes the policy content of each country.

**Results and Discussion:** Research findings are as the followings: 1. UK, the US, and Canada believe that whether hormones have an impact on athletes' performance has yet to be verified, so hormones should not be used to determine the groups athletes should participate in. 2. Domestic non-professional competitions at all levels should allow transgender athletes to participate in accordance with their gender identity to protect the human rights of all people, and should not limit the rights of transgender athletes with stereotypes. 3. The same set of policies cannot satisfy all movements, and organizations should adjust the content of regulations according to the situation.

**Conclusion:** As far as the current policies of transgender sports in the UK, the US, and Canada are concerned, anyone should have the right to participate in the events they want to participate in before effective scientific evidence is discovered. Organizations need to have a rolling policy in formulating regulations. Amended to ensure rights for all.



**Keywords: United States, United Kingdom, Canada, transgender, athletes**  
**Correspondence: Min-Ren Teng, bpe110111@gm.ntcu.edu.tw, 0988675902.**

# 探討雙語體育課程中教師採用之教學策略

謝采育<sup>1</sup>楊皓文<sup>1</sup>劉佳鎮<sup>2</sup>

<sup>1</sup>國立臺中教育大學體育學系碩士班

<sup>2</sup>國立臺中教育大學體育學系

全球化及國際化的影響下，英語成為國際上主要溝通語言，因此臺灣積極推動雙語政策，透過政策的推動來營造優質的英語友善環境，藉此提升國人英語力。推動雙語政策已有一段時間，但在教育現場中實施雙語教學仍然面臨著困難與挑戰，以教師層面來說，包括教師課程設計能力、課堂中採用教學策略等；以學生層面來說，包括身體活動量的影響、學習動機、學習成效等。

**目的：**藉由國民中小學課程與教育資源整合平臺 (CIRN) 上提供的國民中小學雙語體育示範教學影片進行分析，探討教育現場中教師實施雙語體育課程，所採用的教學策略情形。**方法：**本研究採用內容分析法，研究對象為 CIRN 上提供的雙語體育示範教學影片，以國民中小學體育科為主，共 13 部，涵蓋 107 到 110 學年度，再經由 Mangold INTERACT 系統分析，並針對影片分析結果提出結論與建議。**結果：**一、教師在實施雙語體育課程時經常使用的教學策略為跨語言教學策略。二、在教師實施跨語言策略中使用頻率最高為指導性跨語言教學。三、師生在課堂上的互動歷程以雙語來進行跨語言互動，能提高師生之間互動。**結論：**教師在實施雙語體育課程時多數採用跨語言策略，可以提高學生的學習成效，其中主要以指導性跨語言教學為主。建議教育現場中的教師在實施雙語體育課程時可以善加運用跨語言教學策略於課程中。

**關鍵詞：**雙語體育、教學策略、雙語教學

**通訊作者：**謝采育，[BPE110104@gm.ntcu.edu.tw](mailto:BPE110104@gm.ntcu.edu.tw) 0906-712566

# Exploring the Teaching Strategies Adopted by Teachers in Bilingual Physical Education Curriculum

Under the influence of globalization and internationalization, English has become the primary language of communication worldwide. Therefore, Taiwan has actively promoted a bilingual policy to create a high-quality English-friendly environment and enhance the English proficiency of its people. While the bilingual policy has been in place for some time, implementing bilingual education in the classroom still faces difficulties and challenges. From the perspective of teachers, this includes curriculum design ability and the use of teaching strategies in the classroom. From the perspective of students, this includes the impact of physical activity levels, learning motivation, and learning outcomes. **Purpose:** The purpose of this study is to analyze the teaching strategies adopted by teachers in bilingual physical education curriculum in the educational setting, using the bilingual physical education demonstration teaching videos provided on the Curriculum and Instruction Resource Network (CIRN) platform for primary and secondary schools. The study used content analysis, with 13 videos covering the period from the 107 to 110 academic years, as the research object, and analyzed the results using the Mangold INTERACT system. The study also provided conclusions and recommendations based on the analysis results. **Results:** The results of the study showed that teachers frequently use cross-lingual teaching strategies when implementing bilingual physical education curriculum, with the most commonly used strategy being directive cross-lingual teaching. The interaction process between teachers and students in the classroom was conducted in bilingual, cross-lingual interaction, which can enhance interaction between teachers and students. **Conclusion:** Teachers mostly use cross-lingual strategies when implementing bilingual physical education curriculum, which can improve student learning outcomes, with directive cross-lingual teaching being the most commonly used strategy. The study suggests that teachers in the educational setting should make good use of cross-lingual teaching strategies in implementing bilingual physical education curriculum.

**Keywords:** bilingual physical education, teaching strategies, bilingual instruction.  
**Correspondence:** HSIEH, TSAI-YU, [BPE110104@gm.ntcu.edu.tw](mailto:BPE110104@gm.ntcu.edu.tw) 0906-712566

# 經絡踩躑暨下半身持續性調理對養身 保健研究

倪國順

佛光大學管理學系碩士在職專班-運動與健康促進管理組

**目的:**現今社會不論生活起居到工作上班，相較早期社會風俗習慣，坐著過日子的比例提昇，下半身因久坐氣血淤塞產生許多文明病。本研究以傳統整復踩躑工法針對下半身持續性保健調理，探討顧客滿意度、顧客行為意向及養生保健觀念相關影響。**方法:**針對本研究生職業經絡踩躑工作室顧客為對象，經踩躑工法調理筋絡前後之差異，其反應在顧客滿意度、顧客行為意向並進而促進養生保健觀念之相關影響分析，同時依據不同人口組成變項作為中介變數，利用 SPSS 統計軟體就描述性統計、因素分析、獨立樣本 t 檢定、單因子變異數分析、皮爾森績差相關分析及多元迴歸分析來探討資料。**結果與結論:**透過踩躑工法持續性調理下半身經絡，顧客在服務品質與滿意度的呈現上有正相關影響；而持續性調理的重購行為意向或推廣給他人的意願與其所得到的滿意度成正相關影響；且滿意度、行為意向與促進顧客養生保健觀念的形成間相關程度達到顯著結果，最後就不同人口組成變項獨立分析其對前項顧客各種行為感受的反應影響程度描述，讓現今社會大眾理解下半身經穴疏通對健康的重要性，進而重視定期且持續性的保健觀念，除可以增進百姓身心品質，並將處於亞健康的社會狀態，推廣邁向維持健康的生活習慣。

**關鍵詞:**顧客滿意度、行為意向、經絡踩躑。

# Research on health care by stepping on meridians and continuous conditioning of lower body

**Kuo Shun-Ni**

Department of Management, Fo Guang University-Sports and Health Promotion

**Purpose:** In today's society, from daily life to work, compared to early social customs and habits, the proportion of people living by sitting has increased, and many civilized diseases occur in the lower body due to prolonged sitting and congestion of qi and blood. This study aims to explore the impact of traditional rehabilitation techniques on continuous health care of the lower body, including customer satisfaction, customer behavior intention, and health care concepts. **Method:** Targeting the customers of our graduate student's professional meridian stepping studio, the differences between before and after conditioning the meridians using the stepping technique were analyzed, which were reflected in customer satisfaction, customer behavior intention, and the related impact of promoting health care concepts. At the same time, different demographic variables were used as mediators, and descriptive statistics, factor analysis, independent sample t-test, and one-way ANOVA were conducted using SPSS statistical software Pearson performance difference correlation analysis and multiple regression analysis are used to explore the data. **Results and Conclusion:** Through the continuous regulation of the lower body meridians through the stepping bridge technique, customers have a positive correlation between service quality and satisfaction; The intention to repurchase or promote to others through continuous adjustment is positively correlated with the satisfaction they receive; And there is a significant correlation between satisfaction, behavioral intention, and the formation of customer health concepts. Finally, an independent analysis of different demographic variables is conducted to describe the impact of their responses on the various behavioral feelings of customers in the previous item. This will enable the public to understand the importance of lower body meridian dredging for health, and then attach importance to regular and sustained health concepts, which can not only improve the physical and mental quality of the people, And we will be in a sub healthy social state, promoting healthy lifestyle habits.

**Keywords:** customer satisfaction, behavioral intention, meridian stepping.

**Correspondence:** Professor Lian-Gjun Chen, [kuoshun77@gmail.com](mailto:kuoshun77@gmail.com), 0925-193-577

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# 藻紅素抗疲勞特性的評估：從肌肉損傷、 氧化壓力和發炎反應機制探討

王旻榆、邱庭凌、曹榮鏞  
中國醫藥大學運動醫學系

**目的：**本研究旨在探討口服高劑量藻紅素對運動誘發氧化壓力、發炎反應、肌肉損傷和運動表現的影響。**方法：**10 名規律運動習慣健康參與者執行這次單盲交叉研究 (random crossover design)。參與者隨機分配至藻紅素試驗 (28 mg/day, 連續 4 天) 或安慰劑試驗。在 4 天的補充後，參與者進行 75%  $\dot{V}O_{2max}$  的自行車運動至力竭挑戰。本研究分別於運動前和運動後收集一次血液樣本，以確定運動誘發的肌肉損傷、發炎反應和氧化壓力並記錄參與者運動至力竭挑戰時間。**結果與結論：**研究結果顯示，口服藻紅素 4 天後，自行車運動至力竭挑戰時間明顯增加 ( $P < 0.05$ )。同時，血液數據顯示運動後肌肉損傷指標乳酸脫氫酶和肌酸激酶和氧化壓力丙二醛濃度明顯低於安慰劑試驗 ( $P < 0.05$ )。然而，總抗氧化能力、腫瘤壞死因子- $\alpha$  和 C-反應蛋白沒有顯著差異。結論：連續 4 天藻紅素補充可提升高強度自行車運動至力竭時間，這可能部分是由於減緩運動引起的肌肉損傷和氧化壓力。因此，短時間高劑量藻紅素補充，可作為提升高強度自行車運動表現的有效增補策略。

**關鍵詞：**藻紅素、增補劑、耐力運動表現

# **Evaluation Of Astaxanthin Properties On Anti-Fatigue: Mechanisms Of The Muscle Damage, Oxidative Stress And Inflammatory Response**

**Min-Yu Wang, Ting-Lin Chiu, Jung-Piao Tsao**

Department of sports medicine, China Medical University, Taiwan

**Aim:** Astaxanthin is a natural compound that has been for its potent antioxidant and anti-inflammatory properties. This study aimed to investigate the short-term effects of astaxanthin supplementation on exercise-induced oxidative stress, inflammatory response, muscle damage, and exercise performance. **Method:** 10 regular physical exercise subjects participated in a randomized, single-blind crossover trial. All the subjects underwent both astaxanthin (28 mg per day for 4 days) and placebo supplementation for 4 days under 75% VO<sub>2</sub>max cycling exercise to exhaustion. The blood sample would be collected both before and after the exercise for measuring the indicators of oxidative stress, inflammatory response, and muscle damage. The time to exhaustion exercise test would also be recorded. **Results and conclusion:** The results of the study revealed a significant improvement in cycling endurance performance ( $p < 0.05$ ) following a 4-day astaxanthin supplementation. The exercise-induced muscle damage was evidenced by significantly lower levels of lactate dehydrogenase (LDH) and creatine kinase (CK), as well as an attenuation in the oxidative stress level of malondialdehyde (MDA) ( $p < 0.05$ ). Nevertheless, it revealed no significant difference in total antioxidant capacity (TAC, an antioxidant marker), tumor necrosis factor- $\alpha$  (TNF- $\alpha$ , an inflammation marker), and C-reactive protein (a muscle damage marker) between the astaxanthin and placebo trials. **Conclusion:** Oral short-term, high-dose astaxanthin supplementation may have ergogenic properties, as it was found to attenuate exercise-induced levels of LDH, CK, and MDA. which results in improved cycling endurance performance.

**Key words:** astaxanthin, ergogenic property, cycling endurance performance

**Correspondence:** Assistant Professor Jung-Piao Tsao, [tjp1984@mail.cmu.edu.tw](mailto:tjp1984@mail.cmu.edu.tw), +886-4-22053366 ext 7622

# 探討評估運動防護員職業傷害與健康的研 究方法 - 範域文獻回顧

鄭冰森<sup>1</sup>，梁振威<sup>2</sup>，黃昱倫<sup>1</sup>

<sup>1</sup> 國立臺灣師範大學運動與休閒學院體育與運動科學系

<sup>2</sup> 美國佛羅里達州坦帕大學自然與健康科學學院健康科學與人類表現學系

**目的：**運動防護員（簡稱防護員）為身體活動參與者的健康照護專業人員。然因工時長、不規律與高負荷的體力需求，可能導致影響照護品質的職業傷害。為創造包容與健康的工作環境，研究防護員職業傷害的可靠工具，是了解流行病學的關鍵，然而尚無研究系統性評析過去相關研究的研究方法。本篇範域文獻回顧，旨在探討防護員職業傷害的研究方法。**方法：**2022年1月以三類關鍵詞組合（運動防護員、身體健康問題和工作相關背景）於四個電子數據資料庫進行文獻搜索。收案條件主題為防護專業人員的身體職業傷害的研究，而探討被照護對象的研究則被排除。**結果與結論：**共納入5篇研究，80%採用回顧性自填問卷（回應率>60%）；僅有一研究分析勞工賠償保險（回應率約為30%）。最常見的受傷部位為軀幹和上肢，特別是腰部區域。多數問卷研究調查時間區間為一年，此測量工具回應率高且收案較廣，但可能被回憶與社會偏差干擾。反之，分析保險索賠數據研究的優勢為詳細的傷害記錄，然而職業傷害率可能因部分沒申報而被低估（Kucera, 2016）。多數研究無測量工具的信效度資訊。綜觀上述測量工具的優缺點，當前的防護職業傷害率可能被低估。未來研究需設計更有效且可靠的評估方法，準確測量防護員的職業傷害，以改善工作環境，預防職業傷害。

**關鍵詞：**運動復健專業、工作、骨骼肌肉傷害



# The Assessment Method used to Measure Work-related Physical Injuries and Well-being among Athletic Trainers: A Scoping Review

Wing Sum Cheng <sup>1</sup>, Willie Leung <sup>2</sup>, Yu-Lun Huang <sup>1</sup>

<sup>1</sup> Department of Physical Education and Sport Sciences, National Taiwan Normal University, Taipei, Taiwan.

<sup>2</sup> Department of Health Sciences and Human Performance, College of Natural and Health Sciences, The University of Tampa, Tampa, FL, USA.

**Introduction:** Athletic Trainers (ATs) are healthcare professionals who provide care for physically active populations in a variety of work settings. Given the nature of healthcare providers, ATs often work under irregular schedules and long hours for various duration. Substantial physical demand associated with ATs' job duty can leave ATs susceptible to work-related physical injuries (WRPI) which compromise the quality of care. To create an inclusive and healthy work environment, identifying methods in assessing WRPI among ATs is crucial to enable future WRPI epidemiological study of the AT field. Although various WRPI assessment methods were used in previous research, no study has synthesized those methods systematically. Therefore, this scoping review aims to synthesize the ATs' WRPI assessment methods used in previous research. **Methods:** Literature searches were performed using four electronic databases in January 2022 with keywords in groups of "Athletic Trainer", "Physical Health Issues", and "Context of Work-related". The inclusion criteria for this scoping review included examined occupational injury with physical conditions and physical illness of ATs or related professionals worldwide. Studies that examined injuries of ATs' patients were excluded. **Results & Conclusions:** Only 5 studies examined the WRPI of ATs were identified. Eighty percent of the included studies employed retrospective self-reported questionnaires to measure ATs' WRPI in three countries with over sixty percent response rate. Only one of the included studies analyzed workers' insurance compensation data with about thirty percent response rate. Most common WRPI were located in trunk and upper extremities, especially the low-back area. A majority of studies used self-reported questionnaires over a 12-month period to measure WRPI. Based on evidence, this type of measurement has high response rate with the ability to reach more people but recall and social bias might affect participants' response. In comparison, one study analyzed insurance claim data with the advantage of having detailed injury records. However, previous research of Kucera et

al. has revealed that ATs likely underreported workers' compensation, leading to underestimated WRPI rates in 2016. Many of the included studies did not report reliability and validity evidence. Based on the pros and cons of measurement tools used in the previous studies, the reported WRPI rates might be underestimated. A valid and reliable assessment would be decided to accurately measure AT's WRPI for the working environmental improvement and AT's WRPI prevention strategy in further research.

**Keywords : Athlete Rehabilitator 、 Occupational 、 Musculoskeletal conditioning**

**Correspondence: Wing Sum Cheng, 61030054A@gapps.ntnu.edu.tw, +886-9-05075543**

# 單次口服大蒜萃取物補充對人體運動後肌肉肝醣回補之表現

劉正甯<sup>1</sup> 徐崇瑋<sup>2</sup> 廖于葦<sup>2</sup>

<sup>1</sup>國立臺中教育大學體育學系碩士班 <sup>2</sup>國立臺中教育大學體育學系碩士在職專班

**目的：**文獻中指出，補充大蒜萃取物具有抗氧化、抗發炎、改善胰島素敏感性等生理功能，然而補充大蒜萃取物是否能提升肌肉肝醣再合成和代謝仍不清楚，本研究欲探討人體運動後單次口服大蒜萃取物補充，是否能促進人體運動後肌肉肝醣再合成的能力。**方法：**本實驗招募 11 名平時有運動習慣之健康男性受試者，接受單盲交叉試驗，兩次試驗間隔至少 7 天。受試者隨機分配執行大蒜萃取物 (2000 毫克) 或安慰劑補充試驗。實驗當天執行 75% VO<sub>2</sub> max 腳踏車力竭運動 60 分鐘後立即單次補充大蒜萃取物 (2000 毫克) 或安慰劑膠囊，並依照受試者體重給予高碳水化合物飲食 (60% 碳水化合物、15% 蛋白質、25% 脂肪)。於受試者運動後與恢復期第 3 小時採集肌肉樣本；每 30 分鐘採集血液樣本；每 60 分鐘採集氣體樣本，分析肌肉肝醣濃度、葡萄糖、胰島素、甘油、游離脂肪酸和呼吸交換率氣體樣本。**結果：**單次補充大蒜萃取物和安慰劑試驗相比，運動恢復期 0 至 3 小時，大蒜組血清中之葡萄糖皆顯著低於安慰劑組；肌肉肝醣含量大蒜組則顯著高於安慰劑組；胰島素、游離脂肪酸濃度和呼吸交換率皆未達顯著差異。**結論：**運動後立即口服大蒜萃取物補充可增強運動恢復期人體骨骼肌肉肝醣再回補能力。

**關鍵詞：**運動表現、運動疲勞、強效補充劑

# **Effect of Acute Oral Garlic Extract Supplementation on Exercised Muscle Glycogen Resynthesis in Young Adults**

**Zheng-Ning Liu, Xu-Chong Wei, Yu-Ting Liao**

**Department of Physical Education, National Taichung University of Education, Taiwan**

**Introduction :** This study was to investigate the effect of oral post-exercise garlic extract supplementation on glycogen replenishment in exercised human skeletal muscle. **Method :** This experiment recruited 11 healthy male who usually had exercise habits, and accepted a single blind and cross-over study, with an interval of at least 7 days between two experiments. All participants were randomly assigned to receive garlic extract (GE, 2000 mg) or placebo (PLA, corn) supplementation. On the day of the experiment, all subjects performed a single bout of bicycle exhausted exercise with 75% VO<sub>2</sub> max for 60 minutes. Garlic extract (2000 mg) or placebo capsules were supplemented once immediately after exercise, and a high-carbohydrate diet (60% carbohydrates, 25% fat, 15% protein) was given according to the subjects' body weight. Muscle samples were collected by puncture from thigh at the 0th and 3rd hour of the exercise recovery period; biopsy muscle samples were collected every 30 minutes; gas samples were collected every 60 minutes to analyze muscle glycogen replacement concentration, glucose, insulin, glycerol, free fatty acid concentration and quantity. Measure the breath exchange rate of the gas sample. **Results :** Significant differences were found in the increase of muscle glycogen or decrease of serum glucose in GE group when compared to PLA group. However, there were no significant differences among insulin, free fatty acid concentrations, and respiratory exchange rate (RER) during the exercise recovery period from 0 to 3 hours between single garlic extract supplementation and placebo trials. **Conclusion :** This study revealed that single oral garlic extract supplementation immediately after exercise can enhance the glycogen resupplied ability to human skeletal muscle during exercise recovery.

**Keywords :** exercise performance; fatigue; ergogenic supplement

**Correspondence :** Zheng-Ning Liu, [bpe110112@gm.ntcu.edu.tw](mailto:bpe110112@gm.ntcu.edu.tw)

# 不同運動時機服用辣椒素全身脂肪氧化率 與有氧運動能力觀察:初步研究

賴凡鎧<sup>1</sup>、廖炳霖<sup>1</sup>、劉正甯<sup>1</sup>、吳佳芳<sup>2</sup>

<sup>1</sup>國立臺中教育大學體育學系碩士班

<sup>2</sup>國立臺中教育大學體育學系

**目的：**文獻指出辣椒素 (Capsaicin, CSN) 是一種脂肪燃燒劑，動物研究顯示辣椒素可以明顯提高小鼠體內中樞溫度，增加脂肪氧化作用。然而，人體辣椒素補充研究顯示補充生理效果參差不齊，可能有其他生理因素明顯影響人體辣椒素補充效果。因此，本次研究想要探討辣椒素在運動前後不同補充時機，是否影響辣椒素補充效果，包括安靜脂肪氧化作用和有氧運動能力的影響。**方法：**這次實驗招募6位健康大學體育系學生，執行單盲交叉試驗，6名受試者中每2名個別隨機分派至「運動前服用辣椒素組」與「運動後服用辣椒素組」以及「不運動服用辣椒素組」，實驗交叉期間有七天生理洗刷期 (washout-period)。受試者於實驗前一周進行最大攝氧量測量，實驗期間三組受試者每天於不同運動時間補充辣椒素，共4天 (運動前補充、運動後補充、不運動時補充)。於實驗第5天進行60分鐘安靜氣體收集，觀察呼吸商 (Respiratory quotient, RQ)，後續進行最大攝氧量測量。**結果：**在三種不同補充組別中，脂肪氧化速率在運動後補充相較其他兩組間達顯著差異 ( $p < .05$ )，而碳水化合物氧化速率與最大攝氧量能力在三組間皆無顯著差異，**結論：**我們推論運動後補充辣椒素有助於提升全身脂肪代謝效果，然而無法提升最大攝氧能力表現減少運動疲勞恢復時間。

**關鍵詞：**增補方法、脂肪燃燒、運動增能

# **Observation of Different Timing Regarding Oral Capsaicin Supplementation under Exercise Challenge on Whole-Body Fat Oxidation and Maximum Aerobic Capacity: A Pilot Study**

**Fan-Kai Lai, Bing-Lin Liao, Zheng-Ning Liu, Chia-Fang Wu**

Department of Physical Education, National University of Education, Taiwan

**Introduction :** The literature showed Capsaicin (CSN) is a famous fat burner supplement. Animal studies have shown that capsaicin significantly increases central temperature and fat oxidation. However, the results of Capsaicin supplementation on positive physiologic responses are inconsistent. Therefore, the present study investigated the effect of different ingesting timing of CSN under maximum aerobic exercise challenge on whole-body fat oxidation and maximum aerobic capacity in young adults. **Methods :** Six subjects were recruited from the Department of Physical Education to perform a single-blind cross-over study. Every two subjects were randomly assigned into three trials under the four-day supplement period including "capsaicin ingesting before exercise", "capsaicin ingesting after exercise" and "capsaicin ingesting under sedentary". On an experimental morning on the 5th study day, the respiratory quotient (RQ) and maximum oxygen uptake were measured after four-day treatment. **Results :** The results showed that whole-body fat oxidation was significantly higher in those of "capsaicin ingesting before exercise" than those of another two treatments ( $P < .05$ ). However, There was no significant difference in carbohydrate oxidation rate and maximum oxygen uptake capacity among the three treatments. ( $P > .05$ ). **Conclusion :** the ingestion timing on immediately after exercise challenge enhances the whole-body fat oxidation but not in maximum aerobic capacity improvement in young adults.

**Keywords:** Ergogenic property, supplementation, fat burner

# 比較動態熱身與慣性飛輪離心超負荷蹲舉 預處理對反覆衝刺跑後等速肌力表現 之影響

許芳瑜<sup>1</sup> 李祐丞<sup>1</sup> 趙泰禎<sup>2</sup> 陳哲修<sup>1</sup>

<sup>1</sup>國立臺灣體育運動大學競技運動學系 <sup>2</sup>國立臺灣體育運動大學運動科學研究中心

**目的：**本研究探討動態熱身與慣性飛輪離心超負荷蹲舉預處理對反覆衝刺跑後下肢等速肌力之影響。**方法：**徵召 12 名大專健康男性運動員(身高  $174.25 \pm 5.4$  公分，體重  $77.01 \pm 15.16$  公斤，年齡  $19.92 \pm 1.44$  歲)，隨機分派至動態熱身組或慣性飛輪熱身組(六下，兩回合蹲舉動作)，並且在熱身後進行反覆衝刺跑(12 趟，每趟 30 公尺)，並分別於熱身前、衝刺跑後、後 24、48 小時進行股四頭肌、腿後腱肌之等速肌力檢測，包含：60 度/秒、240 度/秒之股四頭肌、腿後腱肌等速向心肌力與 30 度/秒之腿後腱肌等速離心肌力。實驗數據以二因子混合變異數分析，顯著水準  $p < .05$ 。**結果：**兩組在股四頭肌、腿後腱肌向心及腿後腱肌離心肌力交互作用皆未達顯著( $p > .05$ )。60 度/秒，股四頭肌交互作用 ( $F = .42, p = .74$ )、腿後腱肌 ( $F = .15, p = .92$ )；240 度/秒，股四頭肌 ( $F = 1.97, p = .17$ )、腿後腱肌 ( $F = 1.06, p = .38$ )；30 度/秒，腿後腱肌離心肌力( $F = .88, p = .47$ )。**結論：**目前研究顯示，動態熱身與慣性飛輪熱身對反覆衝刺跑運動後等速肌力無影響，由於受試者樣本數過少，未來應持續增加樣本數量以利探討等速肌力變化。

**關鍵詞：**動態熱身、離心超負荷、等速肌力

**主要聯絡者：**許芳瑜，[hsufy0315@gmail.com](mailto:hsufy0315@gmail.com)，0985971076

# Compare the effects of dynamic warm-up and inertial flywheel eccentric overload squat preconditioning on isokinetic muscle strength performance after repeated sprints

**Fang-Yu Hsu<sup>1</sup> , You Cheng Li<sup>1</sup> , Tai-Chen Chao<sup>2</sup> , Che-Hsiu Chen<sup>1</sup>**

<sup>1</sup> Department of Sport Performance, National Taiwan University of Sport

<sup>2</sup> Sport Science Research Center, National Taiwan University of Sport

**Purpose:** To Compare the effects of dynamic warm-up and inertial flywheel eccentric overload squat preconditioning on isokinetic muscle strength of lower limbs after repeated sprinting. **Methods:** 12 healthy college male athletes (height  $174.25 \pm 5.4$  cm, weight  $77.01 \pm 15.16$  kg, age  $19.92 \pm 1.44$  years) were randomly assigned to the dynamic warm-up group or inertial flywheel warm-up group (six times, two sets of squatting), and repeated sprint running (12 x 30-m) after warming up. Isokinetic muscle strength of quadriceps femoris and hamstring (concentric strength set at  $60^\circ/\text{s}$  and  $240^\circ/\text{s}$  ; hamstring eccentric strength set at  $30^\circ/\text{s}$ ), were assessed before warming up, immediately, 24, and 48 hours after sprinting. The results were analyzed by two-factor mixed variance analysis, and the significance level was  $p < .05$ . **Results:** No significant interaction were found in quadriceps femoris, hamstring concentric torque and hamstring eccentric torque ( $p > .05$ ). For the  $60^\circ/\text{s}$  peak torque, the quadriceps femoris ( $F = .42, p = .74$ ), hamstring ( $F = .15, p = .92$ ). For the  $240^\circ/\text{s}$  peak torque, quadriceps femoris ( $F = 1.97, p = .17$ ), hamstring ( $F = 1.06, p = .38$ ). For hamstring eccentric peak torque ( $F = .88, p = .47$ ). **Conclusion:** The current research shows that dynamic warm-up and inertial flywheel warm-up preconditioning have no effect on isokinetic muscle strength after repeated sprinting. Due to the small number of subjects, the number of samples should be continuously increased in the future study to investigate changes in isokinetic muscle strength.

**Key word:** dynamic warm-up, eccentric overload, isokinetic muscle strength

**Correspondence:** Student Fang-Yu Hsu, [hsufy0315@gmail.com](mailto:hsufy0315@gmail.com), 0985971076



# 冰敷與按摩對過肩運動員於疲勞後的肩部

## 肌肉疼痛舒緩及活動度改善的立即效應

商景涵<sup>1</sup> 洪維憲<sup>1,\*</sup>

<sup>1</sup> 中國醫學大學運動醫學系

**目的：**肩部疼痛(shoulder pain)是過肩運動中常見的運動傷害，造成的運動障礙主要受急性和慢性疲勞的影響，冰療法已被廣泛使用在急性的疼痛舒緩，而軟組織按摩技術則用於治療肩部疼痛，然而，目前很少有證據表明冰敷結合按摩技術可作為主要疲勞恢復的手段。本研究的目的探討以冰敷及按摩治療對過肩運動員於疲勞後肩部肌肉疼痛及活動度的立即效果。**方法：**本研究招募10位平均年齡 $25.0\pm 5.0$ 歲網球運動員為受試者，以隨機順序接受三種不同舒緩狀況：(1)休息；(2)冰敷；(3)冰敷+按摩，兩種狀況之間隔一週，並於疲勞前、疲勞後、舒緩後、及舒緩後30分鐘等4個時間點進行參數的量測：疼痛舒緩指標包含疼痛量表(VAS)及壓力疼痛閾值；肩部活動度包含屈曲、外展及內轉。本研究採用重複量測變異數分析(repeated measures ANOVA)檢測不同舒緩狀況及時間點之間的各项參數的差異。**結果與結論：**冰敷+按摩後及舒緩後30分鐘於肩關節屈曲及外展活動度與壓力疼痛閾值皆明顯大於只冰敷或休息狀況( $p<0.05$ )；而內轉活動度則沒有明顯差異。VAS方面，冰敷+按摩舒緩後明顯小於休息和冰敷，而舒緩後30分鐘則冰敷及冰敷+按摩明顯小於休息時( $p<0.05$ )。結論：冰敷+按摩相較只冰敷或休息的舒緩狀況更能有效增加肩部活動度、降低疼痛強度(VAS)及增加壓力疼痛閾值。

**關鍵詞：**過肩運動、冰敷、軟組織按摩、疼痛舒緩、壓力疼痛閾值

# **Immediate Effects Of Ice Compress Combine With Massage On Shoulder Muscle Pain Relief And Range Of Motion Improvement After Fatigue For Overhead Players**

**Ching-Han Shang<sup>1</sup>, Wei-Hsien Hong<sup>1,\*</sup>**

<sup>1</sup>Department of Sports Medicine, China Medical University, Taiwan.

**Introduction:** Shoulder pain is a common injury in overhead sports, and the movement disorders was mainly caused by acute and chronic fatigue. Cryotherapy has been widely used in acute pain relief while soft tissue massage techniques are used in treating shoulder pain. However, to date, there is little evidence that ice compress combined with massage techniques can be used as a primary mean of recovery from fatigue. The purpose of this study was to investigate the immediate effects of ice compress combine with massage on shoulder muscle pain relief and range of motion improvement after fatigue for overhead players. **Methods:** 10 tennis players were recruited in this study, average age  $25.0 \pm 5.0$  years. Each subject was randomly ordered in three relief conditions: (1) rest; (2) ice compress; (3) ice compress + massage, and the interval between two conditions was one week. The parameters were measured at four time points: before fatigue, after fatigue, after relief, and 30 min after relief: pain relief indexes included visual analog scale (VAS) and pressure pain threshold (PPT), range of motion (ROM) of shoulder included flexion, abduction, and internal rotation. A repeated measures ANOVA was used to detect the differences of various parameters among relief conditions and time points. **Results & Conclusions:** At 30 min after ice compress + massage, the shoulder flexion and abduction ROM and PPT were significantly higher than those of rest or ice compress ( $p < 0.05$ ), and there was no difference in internal rotation ROM. The VAS was significant lower at ice compress + massage than those of the rest and ice compress conditions after relief, and both ice compress and ice compress + massage were significant lower than rest at 30 min after relief ( $p < 0.05$ ). In conclusion, ice compress combined with massage was more effective in increasing shoulder ROM, reducing pain intensity, and increasing pressure pain threshold than just ice compress or rest.

**Key words: overhead sports, ice compress, soft tissue massage, pressure pain threshold**

**Correspondence: Professor Wei-Hsien Hong, whhong@mail.cmu.edu.tw, +886-4-**

**22053366 ext 7603**

# 具有肌力感測與短波治療智慧護膝對肌肉 恢復能力的影響

陳恒殷<sup>1</sup>、柯宏憲<sup>1</sup>、劉篤<sup>1</sup>、邱志暉<sup>2</sup>、方致遠<sup>2</sup>

<sup>1</sup>工業技術研究院電光系統所

<sup>2</sup>國立臺灣體育運動大學運動健康科學系

**研究背景：**短波屬於深層的熱治療，具有促進深層血液循環以提升運動後肌肉恢復能力的效果。傳統上，短波儀器屬於大型儀器，會有攜帶不便的問題。本研究將短波技術微小化，並放置於護膝中，探討這樣的設備是否能有效增加肌肉在運動後的恢復能力。本研究目的為探討含有微小化短波的智能護膝，對於深蹲到衰竭後肌肉恢復能力的影響。**研究方法：**以 3 名有重量訓練經驗的成年男性為研究對象，隨機區分成短波介入組 (Shortwave trial, 簡稱 ST) 或是不開短波的控制組 (Control trial, 簡稱 CT)。受試者首先進行股直肌與股內側肌的最大等長收縮，使用肌電圖 (electromyography) 測量等長收縮時的肌電訊號。執行完成後，受試者使用 85% 最大肌力的重量進行深蹲，直到衰竭。ST 組在衰竭後會開啟短波治療 20 分鐘，CT 組則是不開啟短波，坐著休息 20 分鐘。在休息之後，重新測量股直肌與股內側肌的最大等長收縮，使用 Wilcoxon 符號檢定比較重訓前後兩組之間的最大等長收縮肌電訊號比值。**結果與結論：**在訓練到衰竭後，兩組的最大等長收縮比值在股內側肌( $p=0.109$ )和股直肌( $p=0.9$ )並沒有顯著差異。使用微小短波介入並不會影響衰竭運動後的肌肉恢復能力。

**關鍵字：** 深蹲、肌電圖、等長收縮

**通訊作者：** 方致遠，[ttps22101@gmail.com](mailto:ttps22101@gmail.com), +886-934281703

# Effect of muscle strength sensing and short wave therapy knee support on muscle recovery

Heng-Yin Chen<sup>1</sup>, Hung-Hsien Ko<sup>1</sup>, Chun Liu<sup>1</sup>, Chih-Hui Chiu<sup>2</sup>, Chih-Yuan Fang<sup>2</sup>

<sup>1</sup>Electronic and Optoelectronic System Research Laboratories, Taiwan

<sup>2</sup>Graduate Program, Department of Exercise Health Science, National Taiwan University of Sport, Taiwan.

**Introduction:** Short wave is a deep heat therapy, which has the effect of promoting deep blood circulation to enhance muscle recovery after exercise. Traditionally, short-wave devices are large devices that are inconvenient to carry. In this study, the short wave technology was miniaturized and placed in a knee support to investigate whether such a device could effectively increase muscle recovery after exercise. The purpose of this study is to investigate the effect of intelligent knee pads containing miniaturized shortwave technology on muscle recovery after squatting to exhaustion. **Methods:** Three adult males with weight training experience were randomly divided into a shortwave trial (ST) and a control trial (CT). The subjects first underwent maximum isometric contraction of the rectus and medial femoral muscles, and electromyography was used to measure the electromyographic signals during the isometric contraction. After performing the electromyography test, subjects performed squats with a weight of 85% of maximum muscle strength until failure. The ST trial turning on shortwave therapy for 20 minutes after failure and the CT trial resting for 20 minutes without turning on shortwave. After rest, the maximum isometric contraction of the rectus femoris and medial femoris muscles were re-measured and the maximum isometric signal ratios between the two trials before and after the training were compared using Wilcoxon sign verification. **Results & Conclusions:** After training to failure, the maximum isometric contraction ratio did not differ significantly between the two trials for the medial femoral muscle ( $p=0.109$ ) and the rectus femoris ( $p=0.9$ ). The use of miniaturized shortwave interventions did not affect muscle recovery after exhaustion.

**Key words:** squat, electromyography, isometric contraction

**Correspondence:** Mr Chih-Yuan Fang, [ttps22101@gmail.com](mailto:ttps22101@gmail.com), +886-934281703

# 新冠疫情間線上有氧舞蹈介入對於不同動作能力成年人其身體功能表現之效益

薛庭宜<sup>1</sup> 王采茵<sup>2</sup> 曾鈺婷<sup>3</sup>

<sup>1</sup>國立清華大學運動科學系 <sup>2</sup>國立清華大學運動科學系 <sup>3</sup>國立清華大學教育心智科學研究中心

**目的：**新冠疫情下居家遠距線上運動已成趨勢，過去研究指出有氧舞蹈是一居家訓練的安全選擇，透過全身性的有氧活動，能增進生心理效益。然而有氧舞蹈訓練在身體功能表現的效益是否因遠距線上的實施有所影響尚待確認。此外，對於不同動作能力有氧舞蹈訓練前後之增進情形仍然未知。本研究將探討不同動作能力成年人參與遠距線上有氧舞蹈訓練後其身體功能表現之增進情形。**方法：**本研究招募40名健康成年人，實驗組21人 (EXE, 年齡:  $22.09 \pm 2.14$  歲)、控制組19人 (CG, 年齡:  $22 \pm 2.7$  歲)。EXE組介入12週，每週3次，每次30分鐘的有氧舞蹈訓練，CG組不實施任何運動介入。兩組均在12週介入前後進行身體功能測驗 (包含敏捷、速度及爆發力)，並於運動介入間實施歐西瑞斯基動作能力測驗(BOT-2)。實驗數據以二因子重複測量變異數分析 (two-way repeated measures ANOVA) 和斯皮爾曼相關分析(Spearman rank correlation)進行統計分析。**結果與結論：**本研究發現，在身體功能增進情形上，EXE組在敏捷項目中的505測驗 (組別與時間交互作用:  $F = 18.824, p = 0.006$ )及爆發力項目中的雙腳立定跳遠測驗 (組別與時間交互作用:  $F = 9.015, p = 0.005$ ) 明顯優於CG組。此外，EXE組在BOT-2-LF中力量和敏捷度 (strength and agility)標準分數與T字測驗後測減前測的差值(秒)呈顯著負相關 (Spearman  $\rho = -0.513, p = 0.018$ )代表有著較佳的力量與敏捷度之有氧舞蹈訓練參與者，其敏捷度進步幅度較大。結論：本研究顯示，成年人在參與12週的遠距線上的有氧舞蹈訓練可提升其敏捷和爆發力等身體功能表現。此外，在力量與敏捷面向之動作能力越佳的參與者，在經過遠距線上有氧舞蹈訓練後，其敏捷能力之增進情況越大。

**關鍵詞：**有氧舞蹈、虛擬訓練、動作能力、身體功能

# The Effect Of Online Aerobic Dance Training On Physical Performance In Adults With Different Levels Of Motor Skill During The Covid-19 Pandemic

Ting-Yi Hsueh<sup>1</sup>, Cai-Yin Wang<sup>2</sup>, Yu-Ting Tseng<sup>3</sup>

<sup>1</sup> Department of Kinesiology, National Tsing Hua University, Hsinchu, Taiwan

<sup>2</sup> Department of Kinesiology, National Tsing Hua University, Hsinchu, Taiwan

<sup>3</sup> Research Center for Education and Mind Sciences, National Tsing Hua University, Hsinchu, Taiwan

**Introduction:** Home-based online exercise class has become a trend due to COVID-19 pandemic. Previous studies have shown that aerobic dance is a safe option for home training, as it can provide a variety of positive physical, psychological, and social benefits for individuals of all ages. At present, the effect of an online aerobic dance intervention on overall physical performance remains unclear. Additionally, how different levels of motor skill affect training benefits requires further investigation. This study aims to investigate the changes of physical performance in adults with different levels of motor skills after participating in online aerobic dance training. **Methods:** 40 healthy adults were recruited, 21 in the experimental group (EXE, age:  $22.09 \pm 2.14$  years), and 19 in the control group (CG, age:  $22 \pm 2.7$  years). Participants in the EXE underwent a 12-week aerobic dance intervention, with three 30-minute sessions per week, while CG did not receive any treatment. We obtained overall physical performance (i.e., agility, speed, explosive power) at the pretest and posttest for both groups. The Bruininks-Oseretsky Test of Motor Proficiency 2nd Edition Long Form (BOT-2-LF) was administered to assess the motor skill level. Two-way repeated measures ANOVA [2 GROUP (EXE vs CG) x 2 TIME (pretest vs posttest)] and Spearman rank's correlation were performed to verify the effect of online aerobic dance training on physical performance and its relation to participants' motor skills. **Results & Conclusions:** There were significant interaction effects between group and time in the standing long jump ( $F = 9.015, p = 0.005$ ) and 505 test ( $F = 18.824, p = 0.006$ ) for physical performance measures, indicating improved explosive power and agility in EXE compared to CG. In addition, a significant negative correlation was found between the standard score of strength and agility of BOT2 test and changes in times (post-pre) agility T-test in EXE (Spearman  $\rho = -0.513, p = 0.018$ ). In conclusion, this study shows that online aerobic dance training can improve physical performance (i.e., agility and

explosive power), and that individuals with better motor skill in strength and agility may see greater improvements in agility from online aerobic dance training.

**Key words: aerobic dance, virtual training, motor skill, physical performance**

**Correspondence\*: Yu-Ting Tseng, [yutingtseng@mx.nthu.edu.tw](mailto:yutingtseng@mx.nthu.edu.tw), +886-**



# 口服大蒜萃取物減緩耐力起運動引發炎反應但不能提升自由車耐力運動表現

廖炳霖 賴凡鎧 劉正甯

國立臺中教育大學體育學系研究所

**目的：**文獻指出大蒜萃取物可以促進人體抗氧化及抗發炎反應。本研究探討補充大蒜對健康成年男性運動引起的氧化反應及自由車耐力表現影響。**方法：**本次實驗招募了 11 名健康男性，進行單盲、交叉試驗。參與者隨機分配到大蒜（大蒜萃取物 1000 毫克/天，為期 4 週）或安慰劑試驗中。在補充 4 週後，所有受試者接受 40 公里自由車運動挑戰並觀察運動表現時間。另外，每 10 公里收集一次血液樣本，以觀察運動引起的氧化反應和肌肉損傷。**結果：**結果顯示補充大蒜 4 週後，運動時間沒有改善。然而，4 週的大蒜萃取物提高了全身抗氧化能力（總抗氧化能力，TAC），並在 40 公里的自由車運動中減緩丙二醛（MDA）（ $P < 0.05$ ）。血液葡萄糖、游離脂肪酸、尿素和肌酸激酶皆沒有明顯差異。**結論：**在 40 公里的耐力測試中，四週口服大蒜萃取物有助於提升人體抗氧化能力。然而，對於年輕成年人的自由車耐力運動表現並沒有顯著的影響。

**關鍵詞：**增補劑、耐力運動、氧化壓力

# **Oral Garlic Supplementation Enhanced Exercise-Induced Antioxidative Capacity But Not Improvement on Cycling Endurance Performance in Young Adults**

**Bing-Lin Liao, Fan-Kai Lai, Zheng-Ning Liu**

**Department of Physical Education, National Taichung University of Education, Taiwan**

**Background:** Garlic extract has been shown to promote antioxidant and anti-inflammation activities in humans. The present study explored the effects of garlic supplementation on cycling endurance performance, exercise-induced oxidative stress responses in healthy adults. **Methods:** Eleven healthy males were recruited to perform this single-blind crossover study. Participants were randomly assigned to either garlic (garlic extracts 1000 mg/d for 4 weeks) or placebo trials, the 40-km cycling time trial were challenged in all subjects following 4-wks of supplementation. Total cycling performance time and respiratory exchange ratio (RER) were recorded. Blood samples were collected every 10 km to determine exercise-induced oxidative stress, and muscle damage. **Results:** The cycling performance was not improved after 4-wks of garlic supplementation. However, 4-wk garlic supplementation significantly increased whole-body antioxidant capacity (total antioxidant capacity, TAC) and attenuated malondialdehyde (MDA) during the 40-km cycling exercise period ( $p < 0.05$ ). There were no significant differences among the blood biomarkers glucose, NEFA, UA, and CK respectively. The respiratory exchange ratio was similar between garlic and placebo trials. **Conclusion:** Four-week oral garlic supplementation increased whole body antioxidative capacity during a 40-km endurance test. However, it appeared that 4-wk oral garlic had no significant effect on cycling endurance performance in young adults. **Key words:** ergogenic aids, endurance performance, oxidative stress

# 桌球拉正手下旋球的重要關鍵姿勢分析

吳智鴻 陳意翔

國立臺中教育大學數位內容研究所

**目的：**本研究旨在探討大學桌球甲乙組選手在高品質正手拉下旋球技術中的姿態應用及其影響，以期增進選手對技術要素的認識和應用，進一步分析姿態對技術表現的影響，提高選手的比賽表現水平。**方法：**本研究採用問卷調查法，對清華大學、台中教育大學及聯合大學桌球甲乙組選手進行調查，共回收 40 份有效問卷。通過分析選手在高品質正手拉下旋球技術中的重要要素，比較甲乙組選手在認知上的差異，進而探究其對正手拉下旋球品質的影響。**結果與結論：**研究結果顯示，甲組選手在發力時所運用的肌肉群較大，遵循「腿帶腰、腰帶手」的發力框架，符合過去研究中對正手拉球技術的論述。因此，甲組選手更容易打出高品質的正手拉球。相比之下，乙組選手認為手指、手腕和臀部等較小肌肉群的控制更為重要，較注重小肌肉群的控制。相對於大肌肉群，小肌肉群對乙組選手更易於掌控。本研究對大學桌球甲乙組選手在高品質正手拉下旋球技術中的姿態應用進行了深入探討，有助於縮小甲乙組選手之間的技術水平差距。通過本研究之正手拉下旋球的關鍵動作分析，乙組選手可以更清晰地了解自身問題所在並進行相應改進，從而提高技術水平，提升比賽表現。

**關鍵詞：**桌球、正手拉、甲乙組選手、姿勢探討

# An Investigation of Key Strike Postures of Forehand Underspin Loop in Table Tennis

Chih-Hung Wu Yi-Xiang Chen

Graduate School of Digital Content and Technology

**Purpose:** The aim of this study is to investigate the application and impact of posture in the high-quality forehand loop technique of university table tennis players in professional and amateur levels, in order to enhance their understanding and application of technical elements, and further analyze the effect of posture on their technical performance, thus improving their competitive performance level. **Method:** This study used a questionnaire survey to investigate professional and amateur table tennis players from National Tsing Hua University, National Taichung University of Education, and National United University with 40 valid questionnaires. By analyzing the important elements of the high-quality forehand loop technique used by the players, and comparing the differences in cognition between the professional and amateur players, the study explores their impact on the quality of the forehand loop. **Results and conclusion:** The results of this study indicate that professional players use larger muscle groups when exerting force and follow the "legs, waist, and arm" framework for exerting force, which is consistent with description of the forehand loop technique in the previous study. Therefore, professional level players are more likely to hit high-quality forehand loops. In contrast, amateur level players consider the control of smaller muscle groups, such as fingers, wrists, and hips, to be more important, and focus more on controlling these smaller muscle groups. Compared to larger muscle groups, armature level players find it easier to control smaller muscle groups. This study provides a deep understanding of the application of posture in the high-quality forehand loop technique of university table tennis players in the professional and amateur level, which can help to narrow the gap in technical level between them. Through the analysis of the key movements in the forehand loop in this study, amateur players can better understand their own problems and make corresponding improvements, thereby improving their technical level and enhancing their competitive performance.

**Keywords:** Table tennis, Forehand loop, professional and amateur athlete, strike posture analysis.

Correspondence: Porfessor Chih-Hung Wu, chwu@mail.ntcu.edu.tw,+886 4-22183024, No.140, Minsheng Rd., West Dist., Taichung City 403514, Taiwan (R.O.C.)

5715131 ext. 71527

# 不同穿線配置對羽球子母線恢復係數比較

呂玟 卓筱晴 許太彥

國立臺中教育大學體育學系

**目的：**本研究乃探討子母線的不同穿線配置在同為磅數 24 磅時的羽球線恢復係數比較。**方法：**將兩支 Yonex Nanoflare 800 的球拍以萬向電磨支架垂直固定於工作桌上，利用羽球發球機以 144 km/hr 的速度發球撞擊其球拍之甜蜜點，每支球拍撞擊 24 次。本實驗採用 CASIO EX-F1 高速攝影機拍攝，擷取頻率為 300Hz。後續利用 Kwon3D 動作分析軟體從 24 次撞擊中取有效撞擊結果 18 次以平均值進行分析，並以 Excel 算出其恢復係數，最後使用 SPSS 22.0 統計軟體進行獨立樣本 T 檢定比較分析，顯著水準訂為  $\alpha=.05$ 。**結果與結論：**研究結果顯示未達顯著差異 ( $p=.409$ )，發現不同穿線配置的子母線在 24 磅時的恢復係數沒有明顯不同。

**關鍵詞：**穿線組合、拍面張力、反彈係數

通訊作者：呂玟，[wse8700320@gmail.com](mailto:wse8700320@gmail.com), 0911281263

# Comparison Of Different Threading Configurations On Coefficients Of Restitution Of Badminton Hybrid Strings

Wen Lu , Hsiao-Ching Cho , Tai-Yen Hsu

Department of Physical Education, National Taichung University of Education, Taichung, Taiwan

**Introduction :** This research is to explore the comparison of the restitution coefficient of badminton strings with different threading configurations of the hybrid strings at the same tension of 24 lbs badminton tension of string. **Method :** Two Yonex Nanoflare 800 rackets were vertically fixed on the work table with a universal electric grinding bracket, and the shuttlecock was used to hit the sweet spot of the rackets at a speed of 144 km/hr, and each racket hit 24 times. This experiment was shot with a CASIO EX-F1 high-speed camera with a capture frequency of 300Hz. In the follow-up, the Kwon3D motion analysis software was used to analyze the effective impact results of 18 times from the 24 impacts, and the recovery coefficient was calculated by Excel. Finally, SPSS 22.0 statistical software was used to conduct independent sample T-test comparative analysis, and the significance level was set as  $\alpha = .05$ . **Results & Conclusion:** The results of the study showed no significant difference ( $p = .409$ ), and found that the coefficients of restitution of hybrid strings with different threading configurations were not significantly different at 24 lbs badminton tension of string.

**Key words:** stringing combination, tension of string, COR

**Correspondence:** Wen Lu, [wse8700320@gmail.com](mailto:wse8700320@gmail.com), +886-9-11281263

# 呼拉圈體能活動對不同性別之 幼兒的靜態平衡能力影響

陳麗雪 黃怡婷 許太彥

國立臺中教育大學體育學系

**目的：**現今科技蓬勃發展，孩子常常分享自己在家的娛樂是手機、電腦等科技產品，大肌肉及協調性的能力也受影響，常常會有跌倒的情形發生，身處幼教現場，希望能透過體能課程改善孩子的動作發展，針對呼拉圈這項體能活動，不只是因該活動非常考驗孩子的核心及協調能力，更希望透過該活動精進幼兒的身體機能，進而改善其靜態平衡能力。本研究規劃4週的呼拉圈體能活動，探討呼拉圈體能活動對不同性別的幼兒靜態平衡能力之影響。**方法：**以臺中市某附設幼兒園25名4歲的幼兒為研究對象，第1週先以閉眼單足站立所能維持的秒數施以靜態平衡之前測，並進行為期4週的呼拉圈體能活動課程，每週5次，每次活動時間約為30分鐘，在第4週進行後測，將實驗所獲得之資料以SPSS進行t檢定，篩選出各5名體重、年齡、身高等數值皆相近的男女幼生，以其前後測秒數的差值進行獨立樣本t檢定之分析，探討性別在靜態平衡能力上是否有差異。**結果與結論：**本研究以男女幼生前後測秒數的差值計算平均數與標準差，並將數值進行獨立樣本t檢定分析，經過統計分析後，結果顯示 $p$ 皆大於.05，不具顯著性，即男女幼生在閉眼單足站立前後測的秒數上沒有顯著差異。

**關鍵詞：**呼拉圈體能活動、靜態平衡、性別差異

# **The Effect of Hula Hoop Exercise on Static Balance Ability in Toddlers of Different Genders**

**Chen-Li Xue, Huang YI Ting, Tai-Yen Hsu**

Department of Physical Education, National Taichung University of Education, Taiwan.

**Introduction:** With the rapid development of technology, children often share their entertainment at home through technological products such as mobile phones and computers. As a result, their gross motor skills and coordination abilities are affected, leading to frequent falls. As an educator, I hope to improve children's motor development through physical education programs. Hula hoop exercise is an ideal activity to test children's core and coordination abilities, and currently. Therefore, I aim to improve toddlers' physical abilities and static balance through this activity. This study plans to implement a 4-week hula hoop exercise program and investigate its effect on the static balance ability of toddlers of different genders. **Methods:** The study was conducted with 25 children aged 4 years from a preschool affiliated with Taichung City. In the first week, a pre-test of static balance was conducted by measuring the duration of single-leg standing with eyes closed. A 4-week hula hoop exercise program was then implemented, with five sessions per week and each session lasting approximately 30 minutes. In the fourth week, a post-test was conducted. The data obtained from the experiment were analyzed using t-tests in SPSS. Five boys and five girls with similar values for weight, age, height, etc. were selected and their independent sample t-tests were conducted on the difference in their pre- and post-test durations to investigate whether there were any gender differences in static balance ability. **Results & Conclusions:** In this study, the mean and standard deviation were calculated using the difference in the time (in seconds) between pre- and post-tests of boys and girls' ability to stand on one foot with their eyes closed. The obtained values were then subjected to an independent samples t-test analysis. The results of the statistical analysis indicated that all p-values were greater than .05, indicating a lack of significance. Therefore, there was no significant difference in the time taken for boys and girls to complete the pre- and post-tests of standing on one foot with their eyes closed.

**Key words:** Hula Hoop exercise, static balance, gender differences

**Correspondence:** Chen-Li Xue, [yg8647@gmail.com](mailto:yg8647@gmail.com), +886-0987610011



# 融合式適應體育內容分析之研究

曾苡瑄<sup>1</sup>劉佳鎮<sup>2</sup>

<sup>1</sup>國立臺中教育大學體育學系碩士班

<sup>2</sup>國立臺中教育大學體育學系

曾苡瑄

**緒論：**身心障礙者權利公約 (CRPD)第30條中以確保身心障礙者有權在與其他人平等基礎上參與文化生活、康樂、休閒與體育活動。而近期在特殊教育法修正草案第35條中新增第一項第六款「適應體育服務」，為的就是要讓所有特殊教育學生不因身體限制而影響到了進行運動的權利。**在政策與法規極力推動「適應體育」之下，透過分析國內對於融合式適應體育課程相關文獻，可供教學現場進行課程設計參考。**目的：本研究目的為1.探討2006年至2022年之文獻發表情形2.融合式適應體育文獻發表趨勢為何？**方法：**本研究採用內容分析法，自華藝線上圖書館、臺灣博碩士論文知識加值系統搜尋融合教育、適應體育相關文獻，共計245篇。其中刪除90篇重複及非融合教育文獻。以瞭解目前融合式適應體育之困境，嘗試找出其推動融入體育活動課程的方法。**結果：**一、國內文獻自2006年CRPD法案通過後每年適應體育相關文獻有明顯成長。二、近五年融合式適應體育相關文獻比例較多。三、研究主題以教學成效62篇為最多，其次為政策與現況，接著是教師適應體育知能專業，而家長期望僅1篇。**結論：**CRPD通過後國內逐漸重視適應體育教學發展。近年因十二年國民基本教育課程綱要願景強調「成就每一個孩子，適性揚才、終身學習」，對於個別化差異也開始重視，行政院會更在今年修正特教法強調適應體育的必要性，故研究者建議將來應進一步探討課程設計上與家長的合作模式，幫助特殊生於融合式適應體育達到「成就每一個孩子」的目標。

**關鍵詞：**融合教育、適應體育

**通訊作者：**曾苡瑄，ponl3isme@gmail.com

# A Study on the Fusion-based Analysis of Adaptive Sports

TSENG,I-HSUAN

**Introduction:** Article 30 of the Convention on the Rights of Persons with Disabilities (CRPD) ensures that persons with disabilities have the right to participate in cultural life, recreation, leisure and sports activities on an equal basis with others. Recently, the Ministry of Education (MOE) has added the term "adaptive sports services" in Article 35 of the draft amendment to the Special Education Act, with the aim of ensuring that all special education students have the right to participate in sports activities regardless of physical limitations. With policies and regulations promoting "adaptive sports", collecting relevant literature on adaptive physical education in inclusive education in Taiwan can provide reference for designing Adaptive Sports in teaching. **Purpose:** The purpose of this study is: 1. to explore the publication status of relevant literature from 2006 to 2022; 2. to investigate the trend of published papers on adaptive physical education in inclusive education. **Methods:** This study used content analysis to search for literature on inclusive education and adaptive physical education from the Airiti Library and the Taiwan Electronic Theses and Dissertations System. A total of 245 papers were collected, of which 90 duplicates and non-inclusive education literature were removed. And find ways to promote its integration into sports activities curriculum. **Results:** 1. The number of relevant literature on adaptive physical education has significantly increased annually in Taiwan since the passing of the CRPD in 2006. 2. In the past five years, there have been more papers on adaptive physical education in inclusive education. 3. The research topics were mainly about teaching effectiveness (62 papers), followed by policies and current situations, teacher's professional knowledge of adaptive physical education, and only one paper about parental expectations. **Conclusion:** After the passing of the CRPD, Taiwan has gradually attached importance to the development of adaptive physical education teaching. In recent years, with the emphasis of the 12-year Basic Education Curriculum Guidelines on "achieving every child, promoting individual talents and lifelong learning," individual differences have also been given more attention. The Executive Yuan has also emphasized the necessity of adaptive physical education in the amendment to the Special Education Act this year. Therefore, the researchers suggest further exploration of the cooperation model between curriculum design and parents in the future to help special students achieve the goal of "achieving every child" in adaptive physical education in inclusive education.

**Key words:** Adapted Physical Education, Inclusive education

**Correspondence: TSENG,I-HSUAN, [ponl3isme@gmail.com](mailto:ponl3isme@gmail.com)**

# 身體活動度、睡眠品質與老年人之 認知功能：前導性研究

李宥萱<sup>1</sup> 陳怡汶<sup>2</sup>

<sup>1</sup> 國立彰化師範大學運動學系應用運動科學碩士班

<sup>2</sup> 國立彰化師範大學運動學系

**目的：**近年來人口老化快速，失智人口亦急遽增長，未來恐造成社會及家庭健康照護之龐大壓力，故預防失智為一項迫切的議題。睡眠品質不良及身體活動量不足已被證實為認知功能退化之高風險因子，過去文獻亦指出睡眠及身體活動之間具有關聯性，然而，少有研究一併探討睡眠、身體活動及認知功能。因此本研究之目的為了解臺灣 65 歲以上老年人的身體活動度、睡眠、及認知功能，並針對三者之間的相關性進行初探。**方法：**本研究招募 65 歲以上，未被診斷為輕微認知功能障礙或失智之老年人。研究以問卷評估受試者的睡眠品質(中文版匹茲堡睡眠品質量表)、身體活動度(中文版老年人身體活動量表)及認知功能(中文版蒙特利爾認知評估問卷)。資料利用描述性統計法及皮爾森相關進行分析。**結果與結論：**本研究共徵召 14 名受試者(5 名男性, 9 名女性, 平均年齡 73.79±5.9 歲)，MoCA 平均 25.9 分，身體活動度平均 188.3 分，睡眠品質平均 6.1 分。身體活動度及認知功能、睡眠品質及認知功能、年齡及認知功能之間皆未達顯著相關 ( $p>0.05$ )。由於尚未將其他會影響認知功能之風險因子納入統計分析，因此認知功能與睡眠、身體活動度之間皆未呈現相關性。本研究將擴大樣本數，並針對可能影響認知功能的因子進行深入分析。

**關鍵詞：**睡眠品質、身體活動度、老年人、認知功能

# Physical Activity Levels, Sleep Quality And Cognitive Function Among Older Adults: A Preliminary Study

Yu-Hsuan Lee<sup>1</sup>, Yi-Wen Chen<sup>2</sup>

<sup>1</sup> Master program in Applied Sports Science, Department of Sports, National Changhua University of Education, Changhua, Taiwan

<sup>2</sup> National Changhua University of Education Department of Sports, Changhua, Taiwan

**Introduction:** The prevalence of dementia is increasing rapidly in Taiwan posing a significant economic burden on healthcare systems. Therefore, preventing dementia has become a critical issue. Poor sleep quality and insufficient physical activity are risk factors for cognitive impairment. Also, sleep and physical activities interact with each other, impacting cognitive function directly and indirectly. However, to the best of our knowledge, there has been no research investigating sleep, physical activity, and cognitive function concurrently in Taiwan. The aim of this study was to explore sleep quality, physical activity, and cognitive function among older adults in Taiwan as well as to conduct a preliminary investigation of the correlations between these three factors.

**Method:** We recruited participants aged above 65 who had not been diagnosed with mild cognitive impairment (MCI) or dementia. The inventories used in this study included the Chinese version of The Pittsburgh Sleep Quality Index (PSQI), the Chinese Version of the Physical Activity Scale for the Elderly (PASE-C), and the Chinese version of Montreal Cognitive Assessment (MoCA). The correlations between sleep, physical activity level, and cognitive function were analyzed by using Pearson Correlation. **Results & Conclusions:** Fourteen participants were recruited for this study (5 males, 9 females; mean age  $73.79 \pm 5.9$  years). The means of MoCA, PASE, and PSQI score were 25.9, 188.6, and 6.1, respectively. There were no significant correlations found between cognitive function and physical activity levels, cognitive function and sleep quality, cognitive function and age. As some other risk factors for cognitive impairment were not considered in this study, there was no correlation found between cognitive function and sleep, physical activity level. This study will expand the sample size and conduct further analysis on factors that may affect cognitive function in the future.

**Key words:** physical activity levels, sleep quality, cognitive function, old adults

**Correspondence:** Yu-Hsuan Lee, m1071107@gm.ncue.edu.tw

# 心肺適能對高齡者執行功能之影響：

## 橫斷式研究

黃彥寧<sup>1</sup> 林承佑<sup>1</sup> 陳豐慈<sup>1</sup> 陳奕良<sup>2</sup> 劉羿德<sup>2,3</sup>

<sup>1</sup>中國醫藥大學運動醫學系 <sup>2</sup>臺北市立大學競技運動訓練研究所 <sup>3</sup>國立彰化師範大學運動學系

**目的：**過去研究指出，身體活動與執行功能有其關聯性，其影響程度受許多因子所調節。其中，心肺適能對執行功能的議題在當代研究受到許多關注。為此，本研究嘗試以橫斷式研究之視角，探討心肺適能程度對高齡者執行功能之影響。**方法：**本研究共招募 20 位老年人（平均年齡為 71 歲），透過次最大循環測力計測試 (submaximal cycle ergometer test) 評估參與者的最大攝氧量，藉此分為前 50% 的高心肺適能組及後 50% 低心肺適能組。兩組別皆會進行倫敦塔測驗，以了解個體計畫相關執行功能之能力。在統計分析上，倫敦塔作業表現將利用獨立樣本 *t* 檢定來檢驗兩組別之差異。**結果與結論：**本研究結果發現，在倫敦塔作業表現上，總移動次數、總移動正確數、總起初時間、總執行時間，及總問題解決時間等指標皆無顯著之差異。然而，透過各項測驗指標的平均數來看，高心肺適能組在總移動次數、總起初時間、總執行時間，及總問題解決時間等測驗指標皆較低心肺適能組來得佳，顯示高心肺適能者仍有較佳倫敦塔作業表現之趨勢。**結論：**儘管本研究發現心肺適能程度在倫敦塔作業表現上並沒有統計上之差異性，不過高心肺適能者仍有較佳表現之趨勢。未來研究可能需增加其樣本數，進一步確立兩者間之關聯性。

**關鍵詞：**心肺適能、認知功能、最大攝氧量、執行功能、高齡者

通訊作者：劉羿德教授，[yliu@cc.ncue.edu.tw](mailto:yliu@cc.ncue.edu.tw)，04-7232105 #1883

# The Effect of Individual or Group Sports on Executive Function: A Cross-sectional Study

Seng-Iao Lin<sup>1</sup> Yan-Ning Huang<sup>1</sup> Chueh-Yin Chen<sup>1</sup> Feng-Tzu Chen<sup>1</sup> Yi-Liang Chen<sup>2</sup> Yi-Te Liu<sup>2,3</sup>

<sup>1</sup>Department of Sports Medicine, China Medical University, Taiwan

<sup>2</sup>Graduate Institute of Sports Training, University of Taipei, Taiwan

<sup>3</sup>National Changhua University of Education Departments of Sports

**Objective:** Previous research has shown a positive relationship between regular exercise and executive function, but no studies have been conducted to understand whether the “number of participants” in sports has different levels of impact on executive function. Therefore, the present study was to cross-sectionally examine the effect of individual or group sports on executive function. **Methods:** Forty-five university students (mean age = 21 years old) were recruited and categorized into three groups, including individual sports (n = 15), group sports (n = 15), and irregular exercise (n = 15), based on participants’ exercise experience. The three groups were examined via the Tower of London (TOL) Task to understand the planning aspect of executive function. In terms of statistical analysis, the five indicators of TOL task was examined using one-way ANOVA to examine the differences among the three groups. **Results and conclusion:** The results revealed that the individual and group sports performed better than the irregular exercise on five indicators (total correct score, total move score, total initiation time, total execution time, total problem-solving time), while there were no significant differences between the individual and group sports. This study further supports the existing positive effect of regular exercise on executive function and further updates that the beneficial effects are not influenced by sport types. Importantly, the study was the first to examine the effect of sport types on executive function and future research is needed to confirm the causal relationship.

**Key words:** individual, group, cognitive function, executive function, Tower of London

Corresponding Author: Professor Yi-Te Liu, [yliu@cc.ncue.edu.tw](mailto:yliu@cc.ncue.edu.tw) , 04-7232105 #1883

# 椅子瑜珈結合Wii Fit訓練對社區老年人 跌倒預防與平衡控制的影響

蔡晏榕<sup>1</sup>、洪維憲<sup>1,\*</sup>

<sup>1</sup> 中國醫藥大學運動醫學系

**目的：**基於椅子瑜珈的訓練可以提供高水平的平衡挑戰，值得將其作為老年人預防跌倒的有效策略。然而，很少有研究將椅子瑜珈和傳統體適能作為對照組來進行比較。此外，運動訓練結合認知比單獨訓練更有效，Wii fit 訓練被廣泛用於改善靜態和動態平衡、認知和減少跌倒。然而，目前沒有研究探討椅子瑜珈結合 Wii Fit 訓練計劃對老年人預防跌倒和平衡控制的影響。**方法：**本研究招募 24 名年齡在 65 歲以上的社區老年人，將他們隨機分配到三組：(1)椅子瑜珈組(n=8)；(2)椅子瑜珈+Wii Fit 組(n=8)；及(3)傳統體適能組(n=8)當成控制組。每次訓練 90 分鐘，每週兩次，為期 12 週。預防跌倒和平衡控制參數包含：國際跌倒效能量表(FES-I)、台灣版蒙特利爾認知評估(MoCA-T)、動態平衡評估包括 Tinetti 平衡步態評估量表(BGA)、計時起走(TUG)測試，靜態平衡評估包括在測力板上睜眼或閉眼時壓力中心(COP)的內側(mediolateral, ML) 和前後(*anteroposterior*, AP)的位移量。重複測量變異數分析用於檢測組間和測試前後在預防跌倒和平衡參數的比較， $p < 0.05$  表示有統計學差異。**結果與結論：**椅子瑜珈或瑜珈+WiiFit 訓練在跌倒預防(MoCA、FES- I 及 TUG)和傳統體適能一樣皆有明顯效益。三種訓練介入皆能提昇閉眼雙腳站立時的平衡；而在閉眼單腳站立時，椅子瑜珈或瑜珈+Wii fit 的介入能有效增進 ML 方向的平衡；功能性體適能的介入則無明顯變化。

**關鍵詞：**椅子瑜珈、老人體適能、Wii Fit 訓練、預防跌倒、平衡控制



# Effects Of Chair Yoga Combined With Wii Fit Training On Fall Prevention And Balance Control For Community-Dwelling Older Adults

Yen-Jung Tsai<sup>1</sup>, Wei-Hsien Hong<sup>1,\*</sup>

Department of Sports Medicine, China Medical University

**Objective:** Previous studies suggested that chair yoga-based exercise can provide a high-level balance challenge, it's worth making it effective strategy for older adults to prevent falls. However, few studies have compared chair yoga with traditional fitness as a control group. In addition, exercise training combined with cognition is more effective than training alone. The Wii fit training was widely used improve static and dynamic balance, cognition, and reduce falls. However, no study is to explore the effects of the chair yoga combined with Wii Fit training program on fall prevention and balance control for older adults. **Methods:** 24 community-dwelling older adults aged 65 years and above, and randomly assigned them to three groups: (1) chair yoga group (n=8); (2) chair yoga + Wii Fit group (n=8); and (3) traditional fitness group (n=8) as the control group. Each training session lasted 90 minutes and was conducted twice a week for 10 weeks. Fall prevention and balance control parameters included the Falls Efficacy Scale-International (FES-I), the Taiwanese version of the Montreal Cognitive Assessment (MoCA-T), dynamic balance assessment including Tinetti Balance Gait Assessment Scale (BGA), timed up and go (TUG) test, and the static balance assessment included mediolateral (ML) and anteroposterior (AP) displacements of center of pressure (COP) by eye-opened or eye-closed while standing on a force plate. Two-way repeated measure ANOVA was used to detect the differences in fall prevention and balance parameters among groups and between pre- and post-tests, and  $p < 0.05$  represented a statistical difference. **Results & Conclusions:** Both chair yoga and chair yoga + Wii Fit training had significant benefits for fall prevention (MoCA, FES-I, and TUG) and were as effective as traditional fitness intervention. All three interventions improved balance during eyes-closed double-leg stance, while chair yoga or chair yoga + Wii Fit intervention was effective in improving balance in the ML direction during eyes-closed single-leg stance. There was no significant change in functional fitness intervention.

**Keywords:** Chair Yoga, Functional fitness, Wii Fit Training, Fall Prevention, Balance Control

**Correspondence:** Professor Wei-Hsien Hong, [whhong@mail.cmu.edu.tw](mailto:whhong@mail.cmu.edu.tw), +886-4-

**22053366 ext 7603**

# 球類運動對國小學童動作發展影響之探究

余建霖 洪明興 胡暄宜 劉佳鎮

國立臺中教育大學體育學系

## 摘要

**目的：**旨在探討球類運動對國小學童動作發展之影響。**方法：**針對國小階段之族群（年齡為 7 至 12 歲），以華藝線上圖書館及臺灣博碩士論文知識加值系統搜尋「球類運動」與「動作發展」並進一步篩選以粗大動作質量表及發展測驗為工具之研究進行分析。相關文獻共四篇。**結果：**透過文獻回顧彙整出下列重點：一、學童在動作發展上與學童的語言發展、認知發展，甚至是社會發展有相關聯性。二、球類運動課程介入之下，與兒童的動作發展及身體協調能力有正向的關係。**結論：**整體研究結果皆表示球類運動課程介入對於動作發展具有正向關係，但仍有部分結果呈現實驗組與對照組對於移位能力未有顯著差異，除了測量工具的選擇，在練習時間及練習強度的不足，亦可能造成研究結果有所差異及限制，因此還需要更多的橫斷研究與縱貫研究來支持。往後不但能夠協助相關研究者分析球類運動對學童動作發展之影響，更可以讓研究者了解球類運動課程介入不同時程及強度之助益。目前在球類運動對兒童動作發展益處已有初步的發現，希望藉由實驗方法與工具不斷進步之下，提供相關人員對球類運動對兒童粗大動作發展的效益有更深入的了解，並設計出真正適合促進兒童動作發展的體育課程，以達兒童身心靈健全之目標。

**關鍵字：**粗大動作、籃球、TGMD-2、躲避球

主要聯絡者：余建霖

通訊地址：苗栗縣通霄鎮內湖里五鄰 45 號

聯絡電話：0938-518-805

電子郵件信箱(E-mail)：[aa757082@gmail.com](mailto:aa757082@gmail.com)

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# Exploring the Impact of Ball Sports on the Motor Development of Elementary School Children

**Jian-Lin Yu, Ming-Hsing Hung, Hsuan-Yi Hu, Chia-Chen Liu.**

Department of Physical Education, National Taichung University of Education

**Introduction:** This study aimed to explore the influences of ball sports on the motor development of elementary school students (seven years old to twelve years old). **Methods:** A literature review was conducted by using the keywords of "ball sports" and "motor development" in the Taiwan National Digital Library and Archives and the Taiwan Electronic Theses and Dissertations System. Furthermore, the study analyzed the research containing the gross motor quality assessment and the development test. Four relevant studies were identified. **Results:** The review of the literature summarized the following points: (1) There is a correlation between children's motor development and their language development, cognitive development, and even social development; (2) Ball sports programs have a positive relationship with children's motor development and physical coordination. **Conclusion:** Overall, the results of the present study indicated that ball sports programs have a positive impact on motor development. However, some results showed no significant difference between the experimental and control groups in terms of displacement capacity. The reasons may be the choice of measurement tools, insufficient training time, and training intensity, which could have caused differences and limitations in the results. Therefore, more cross-sectional and longitudinal studies are needed to explore for supporting these findings. The study can not only facilitate researchers to analyze the impact of ball sports on children's motor development, but also provide a better understanding of the benefits of ball sports programs at different periods and intensities. While there are initial findings that ball sports are beneficial for children's motor development, future studies will be necessary to be conducted for providing a deeper understanding of the benefits of ball sports on gross motor development, and then designing physical education programs that promote holistic child development by continued improvement in experimental methods and instruments.

**Keywords:** gross motor, basketball, TGMD-2, dodgeball

**Corresponding Author: Jian-Lin Yu Mailing Address: No. 45, Wulin, Neihu Village, Tongxiao Township, Miaoli County Contact Phone: 0938-518-805 Email Address: [aa757082@gmail.com](mailto:aa757082@gmail.com)**

# 急性震動訓練結合血流限制對中高齡者 神經認知表現的效果

陳姿蓉<sup>1</sup> 蔡佳良<sup>1</sup>

<sup>1</sup> 國立成功大學 體育健康與休閒研究所

**目的：**近年全身性震動訓練 (whole-body vibration, WBV)與血流限制 (blood flow restriction, BFR) 興盛，曾有學者指出這兩種急性介入皆可促進高齡者認知表現，但結合這兩種模式後對於神經認知表現之影響的相關研究仍付之闕如。因此，本研究將探討單次 WBV、WBV 結合 BFR、與休息介入對中老年人神經認知表現的急性影響。**方法：**47 位 60 歲以上中高齡者隨機分於震動合併血流限制組 (WBV+BFR, n=16)、震動組 (WBV, n=16)和休息組 (n=15)。兩運動組皆須穿上自身體重 10%的負重衣，而後於震動機台上維持膝屈 100°的等長深蹲 60 秒，共 10 組，組間休息 1 分鐘。血流限制則以 110mmHg 加壓於雙側大腿近端。介入前後皆施測 S1-S2 認知作業，同時量測大腦事件相關電位。所有實驗數據以混合設計重複量數變異數分析(mixed-model ANOVA with repeated measure) 進行統計分析。**結果：**雖然中老年人執行 S1-S2 認知作業時的正確率、反應時間、P3 潛時並未見到介入後的統計顯著效果，P3 振幅在時間 x 組別 x 電極點達顯著交互作用 ( $p = .028$ )，經事後比較發現：介入後 WBV+BFR 組 Fz ( $p = .002$ )、Fcz ( $p = .014$ )與 Cz ( $p = .003$ )以及 WBV 組 Fz ( $p = .017$ )、Cz ( $p = .046$ )、Pz ( $p = .043$ )電極點的 P3 振幅顯著提高。**結論：**急性震動訓練結合血流限制雖無法改善中老年人有關工作記憶的行為表現，但可促進他們部分神經生理(例如：P3 振幅)表現。

**關鍵詞：**急性運動、工作記憶、阻力訓練、全身性震動訓練、血流限制

# Acute Effect of Vibration Combined with Blood Flow Restriction on Neurocognitive Performance in Middle-aged and Elderly Adults

Zi-Rong Chen<sup>1</sup>, Chia-Liang Tsai<sup>1</sup>

<sup>1</sup>Institute of Physical Education, Health and Leisure Studies, National Cheng Kung University, Taiwan

**Introduction:** Whole-body vibration (WBV) and blood flow restriction (BFR) are two alternative exercise modalities that have been discussed for decades. However, little attention has been paid to the neurocognitive function of middle-aged and elderly individuals after performing the two exercise modes, particularly in combination. Therefore, this study aimed to explore the acute neurocognitive effects of WBV+BFR, WBV, and resting interventions in middle-aged and elderly people. **Methods:** Participants aged above 60 were divided into three groups: WBV+BFR (n=16), WBV (n=16), and Resting (n=15). Participants in the two exercise groups wore a weighted vest that was 10% of their body weight and maintained a 100° knee flexion on a vibration platform for 60 seconds in 10 sets, with a 1-minute rest between each set. Blood flow restriction was applied at 110mmHg pressure to the proximal thighs bilaterally. Before and after the intervention, a cognitive test (i.e., the S1-S2 paradigm) coupled with EEG measurement was conducted. Mixed-model ANOVA with repeated measures was performed to analyze the behavior and cognitive electrophysiological (i.e., event-related potential, ERP) data. **Results & Conclusions:** Although there were no statistically significant effects of the WBV+BFR, WBV, and resting interventions on accuracy rates, reaction time, and ERP P3 latency in the middle-aged and elderly individuals when performing the S1-S2 paradigm, P3 amplitude revealed a significant interaction of Time x Group x Electrode ( $p=.028$ ). Post hoc analyses indicated that P3 amplitudes at Fz ( $p=.002$ ), Fcz ( $p=.014$ ) and Cz ( $p=.003$ ) in the WBV+BFR group, Fz ( $p=.017$ ) · Cz ( $p=.046$ ) and Pz ( $p=.043$ ) in the WBV group were significantly larger post-intervention than pre-intervention, and The present study suggested that acute WBV exercise combined with BFR could partly improve the neurophysiological performance of working memory, but not the behavior, in the middle-aged and elderly adults.

**Key words:** acute exercise, working memory, resistance training, blood flow restriction, whole-body vibration

# 咖啡因口香糖對於女壘球投手的投球

## 表現的影響

張雅蕙<sup>1</sup>、林昀正<sup>2</sup>、邱志暉<sup>3</sup>

國立臺灣體育運動大學運動健康科學系

**研究背景:** 咖啡因的補充已經被許多研究證實可以增加爆發力、無氧能力、專注力、減少肌肉痠痛與反應時間。使用咖啡因口香糖的方式攝取，可以增加咖啡因的攝取速度。然而，對於女壘投手來說是否有提升運動表現的效果，目前仍不清楚。本研究目的為探討咖啡因口香糖介入對於女壘投手投球表現的影響。**研究方法:** 以 12 名 (年齡  $20.5 \pm 1.3$  歲；身高  $163.9 \pm 4.6$  公分；體重  $68 \pm 6.7$  公斤；咖啡因補充量  $2.94 \pm 0.28$  mg/kg) 受過專業訓練的成年女壘投手為研究對象，以交叉雙盲的實驗設計將受試者分為咖啡因咀嚼組(CAF)與安慰劑(PL)咀嚼組。受試者使用 200 毫克咖啡因口香糖或是安慰劑進行咀嚼 10 分鐘，休息 15 分鐘後執行投球能力檢測，包含 10 球直球及 5 球下墜球的球速、轉速、垂直位移及水平位移，一共進行 3 局的投球測驗。咖啡因組與安慰劑組之間的平均差異使用成對樣本 t 檢定分析，並將顯著性定義為  $\alpha < 0.05$ 。**研究結果:** 補充咖啡因口香糖與安慰劑相比，咖啡因組的直球球速 (CAF:  $81.5$  km/h; PL:  $80.8$  km/h;  $p = 0.005$ )、下墜球水平位移 (CAF:  $13.7$  in; PL:  $10.7$  in;  $p = 0.034$ ) 的表現，皆高於安慰劑組。直球轉速、直球水平位移或下墜球球速、下墜球轉速等，皆沒有顯著差異。**研究結論:** 經本研究證實，於賽前補充咖啡因口香糖可以顯著提升女壘投手的直球球速及下墜球的水平位移。

**關鍵詞:** 直球球速、直球、下墜球、下墜球水平位移

# The effect of caffeinated chewing gum on the pitching performance of female softball pitchers

Ya-Hui Chang<sup>1</sup>, Lin-Yun Zheng, Chih-Hui Chiu<sup>3</sup>

<sup>1</sup>Graduate Program, Department of Exercise Health Science, National Taiwan University of Sport, Taiwan.

**Background:** Previous studies have shown that caffeine intake during exercise can enhance muscle strength, endurance, and explosiveness, anaerobic capacity, focus, reduce muscle soreness, and reaction time. Using chewing gum that contains caffeine can increase the efficiency of caffeine absorption rate. However, it is still unclear whether this has a positive effect on the performance of female softball pitchers. The purpose of this study is to investigate the impact of intervention using caffeinated chewing gum on the pitching performance of female softball pitchers. **Methods:** The study involved 12 (age: 20.5±1.3 years; height: 163.9±4.6 cm; weight: 68±6.7 kg; caffeine supplementation volume: 2.94±0.28mg/kg) professionally trained female softball pitchers, who were randomly assigned to either the chewing gum that contains as caffeine trial (CAF) or a mint-flavored gum containing no caffeine as placebo trial (PL). This study using a double-blind cross-over design. The participants chewed either gum that contains 200 mg of caffeine gum or placebo gum for 10 minutes. After a 15-minute rest, and then performed pitching tests, including the speed, spin rate, vertical and horizontal movement of 10 fastballs and 5 drop balls, in a 3-inning pitching test. The differences between the caffeine and placebo trials were analyzed using a paired-sample t-test, and significance was defined as  $\alpha < 0.05$ . **Result:** Fastball speed (CAF: 81.5 km/h; PL: 80.8 km/h;  $p=0.005$ ) and horizontal movement of the drop ball (CAF: 13.7 in; PL: 10.7 in;  $p=0.034$ ) of the CAF trial were significantly higher than that of the PL trial. There were no significant differences in fastball spin rate, fastball horizontal movement, drop ball speed, or drop ball spin rate. **Conclusion:** The results of this study indicated that chewing gum that contains of 200 mg caffeine before softball pitching can significantly enhance fastball speed and horizontal movement of the drop ball for female softball pitchers.

**Key words:** fastball, fastball speed, drop ball, horizontal movement

**Correspondence:** Ya-Hui Chang, [yahuichang36@gmail.com](mailto:yahuichang36@gmail.com), +886978737454



# 國中體育班學生對運動禁藥認知情形之探討

許錦泉<sup>1</sup>劉佳鎮<sup>2</sup>

<sup>1</sup>國立臺中教育大學體育學系碩士班 <sup>2</sup>國立臺中教育大學體育學系

在現今科技發達的時代，運動員為了提高運動表現往往無所不用其極，其中有以科學去改善體態更有不少人以違規方式，最常見的就是利用藥物提升表現，從而得到好排名。**目的**：本研究旨在探討國中體育班對運動禁藥理解之差異及有否參與禁藥教育的差異。**研究方法**：採用問卷調查，對象為台中市某國中的體育班同學(13名男性、15名女性)，問卷內容為個人資料及WADA官方網站上的反禁藥知識的調查問卷來探討體育班學生對運動禁藥的認知情形。**結果**：根據回收問卷後分析，只有不到百分之二十的同學接受過運動禁藥的相關教育，雖然同學都了解藥品來源不清楚就不能亂服藥，但同學在對於「通知、採樣以及檢測的過程」、「對採樣人員以及採樣地方」相關題目出現較低分數，同學均不知道進行採樣是並不會提前通知，也對採樣人員及地方的規格也存在不理解，另外部分同學對於「WADA(世界反興奮劑組織)」和「TUE(治療用途豁免)」兩個英文簡稱得分率偏低，而最多人錯的題目是「關於樣本採集檢測後能保存多久」。**結論**：國中體育班同學能接受運動禁藥教育機會較少，對於「通知、採樣以及檢測的過程」、「對採樣人員以及採樣地方」的認知情形表現較低。建議未來應該於國中體育班訓練與課程計畫中加入運動禁藥教育相關課程或定期舉辦講座去提升同學對運動禁藥的認知，使學生了解自己擁有的權利，並避免因知識不足而落入誤用的陷阱。

**關鍵詞**：運動禁藥、禁藥教育、體育班

主要聯絡者：許錦泉

通訊地址：臺中市西區民生路 140 號

聯絡電話：0913-567117

電子郵件信箱(E-mail)：[redsea1995117@hotmail.com](mailto:redsea1995117@hotmail.com)

# A Study on the cognition of sport doping in Junior High School's PE Class

Kam-Chuen Hui<sup>1</sup>, Chia-Chen Liu<sup>2</sup>

<sup>1</sup>Department of Physical Education Master's Program, National Taichung University of Education, Taiwan

<sup>2</sup> Department of Physical Education, National Taichung University of Education, Taiwan

In today's era of advanced technology, athletes always use any ways to improve their sports performance. Some of them use science to improve their body gesture, and many athletes use illegal methods. The most common way is to use sports doping to improve performance, so as to get a good ranking. **Aim:** The study aims to explore the differences in understanding of sports doping in junior high school PE class and the differences whether participate in doping education. **Methods:** Using a questionnaire survey, the subjects were students in a physical education class in a junior high school in Taichung City (13 males and 15 females), The content of the questionnaire is personal data and Anti-doping knowledge test on official website of WADA to explore the cognitive situation of students in PE class on sports doping. **Results:** According to the analysis after the questionnaires were collected, less than 20% of the student received education sports doping. Although the student all understand that the source of the medicine is not clear, you cant take the medicine. However, the student had low scores on the questions related to "notification, sampling and testing process" and "sampling personnel and sampling place". The student didn't know whether the sampling would be carried out and wouldn't notify in advance, they also lack of understanding of the sampling personnel and the sampling place specification. In addition, some student low scoring rate on English abbreviations of "WADA(World Anti-Doping Agency)" and "TUE(Therapeutic Use Exemption)". The most erroneous question is "how long the samples can be stored after collection and testing". **Conclusion:** PE classes' student have fewer opportunities to receive sports doping education in junior high school. The cognitive situation of "notification, sampling and testing process", "sampling personnel and sampling place" is low. It is suggested that in the future, sports doping education should be added to the training and curriculum plans in PE class of junior high school or regular lectures are held to enhance students cognitive of sports doping. Make student aware of their rights and avoid the trap of misuse due to lack of knowledge.

**Key words: sports doping, doping education, PE class**

# 熱滅活植物乳桿菌TWK10對運動表現及 身體組成之影響

李珈嘉<sup>1</sup>, 李孟謙<sup>2</sup>, 程怡蓁<sup>1</sup>, 許涵茵<sup>1</sup>, 林金生<sup>1</sup>, 渡邊幸一<sup>1,3\*</sup>, 黃啟彰<sup>2\*</sup>

<sup>1</sup>生合生物科技股份有限公司菌種研究所

<sup>2</sup>國立體育大學運動科學研究所

<sup>3</sup>國立臺灣大學動物科學技術學系

**目的:** 愈來愈多的研究證實攝取益生菌能有效改善精英運動員和普通人群的健康狀況及運動表現。植物乳桿菌TWK10可視為一種益生菌菌株，臨床實證顯示TWK10能顯著提升運動表現、減少疲勞、優化身體組成以及改善衰老相關的退化。本研究針對TWK10活菌、熱滅活TWK10在調節運動表現和身體組成等方面進行了比較分析。**方法:** 53名未受過專業運動訓練的健康成年人依據其個人的運動能力均分為三組，包括對照組、TWK10組（TWK10活菌， $3 \times 10^{11}$  cfu/天）和TWK10-hk組（熱滅活TWK10， $3 \times 10^{11}$  細胞/天）。運動耐力表現是在85%  $VO_{2max}$ 的運動強度下以跑步機執行；而疲勞的相關評估則是在60%  $VO_{2max}$ 固定強度的運動挑戰下執行，並在特定的時間點採集血液樣本，包括基線(0)、開始運動5分鐘(E5)、10分鐘(E10)、15分鐘(E15)和30分鐘(E30)，以及運動挑戰後的20分鐘(R20)、40分鐘(R40)、60分鐘(R60)和90分鐘(R90)。身體組成是由生物電阻抗分析儀(InBody 770)進行檢測。**結果與結論:** 在六週的介入後，與對照組相比，TWK10活菌、熱滅活TWK10皆可有效提升運動表現以及減少疲勞症狀，並能降低運動引起的發炎反應。此外，TWK10活菌可透過增加肌肉質量和減少脂肪量來優化身體組成，其效果與熱滅活TWK10相比更為顯著。

**關鍵詞:** 植物乳桿菌、TWK10、運動表現、身體組成

**通訊作者:** 渡邊幸一博士, [koichi\\_wtnb@yahoo.co.jp](mailto:koichi_wtnb@yahoo.co.jp), +886-2-3366-4138; 黃啟彰教授, [john5523@ntsu.edu.tw](mailto:john5523@ntsu.edu.tw), +886-3-3283201 分機 2409

# The effects of heat-killed *Lactiplantibacillus plantarum* TWK10 on exercise performance and body composition

Chia-Chia, Lee<sup>1</sup>, Mon-Chien Lee<sup>2</sup>, Yi-Chen Cheng<sup>1</sup>, Han-Yin Hsu<sup>1</sup>, Jin-Seng Lin<sup>1</sup>, and Koichi Watanabe<sup>1,3\*</sup>, Chi-Chang Huang<sup>2\*</sup>

<sup>1</sup>Culture Collection & Research Institute, SYN BIO TECH INC., 82151, Kaohsiung, Taiwan.

<sup>2</sup>Graduate Institute of Sports Science, National Taiwan Sport University, 33301, Taoyuan, Taiwan.

<sup>3</sup>Department of Animal Science and Technology, National Taiwan University, 10672, Taipei, Taiwan.

**Introduction:** Emerging evidence supports the role of probiotics supplementation in improving the health status and exercise performance of elite athletes and the general population. *Lactiplantibacillus plantarum* TWK10, a probiotic strain, has been demonstrated to exert beneficial effects on exercise performance, reducing fatigue, improving body composition, and ameliorating aging-related declines in humans. In this study, a comparative analysis of viable and heat-killed TWK10 in the regulation of exercise performance and body composition was performed. **Methods:** Fifty-three healthy adults without professional athletic training were recruited and equally assigned to three groups, including control, TWK10 (viable TWK10,  $3 \times 10^{11}$  cfu/day), and TWK10-hk (heat-killed TWK10,  $3 \times 10^{11}$  cell/day) groups based on individual exercise capacity. Endurance performance was assessed on the treadmill at 85%  $VO_{2max}$  workload. For the assessment of fatigue-related indices, blood samples were collected at indicated time points, including baseline (0), 5 min (E5), 10 min (E10), 15 min (E15), and 30 min (E30) during the 60%  $VO_{2max}$  fixed intensity exercise challenge, and at 20 min (R20), 40 min (R40), 60 min (R60), and 90 min (R90) after exercise challenge. Body composition was measured by a bioelectrical impedance analyzer (InBody 770, Seoul, Korea). **Results and Conclusions:** After six weeks of administration, subjects receiving either viable or heat-killed TWK10 showed significantly improved exercise performance and fatigue-related features, and reduced exercise-induced inflammatory responses as compared to the controls. Furthermore, viable TWK10 significantly contributed to the improvements of body composition by increasing muscle mass and reducing fat mass, and the efficacy was greater than that observed with heat-killed TWK10.

**Keywords:** *Lactobacillus plantarum*, TWK10, Exercise performance, Body composition

**Correspondence: Dr. Koichi Watanabe, [koichi\\_wtnb@yahoo.co.jp](mailto:koichi_wtnb@yahoo.co.jp), +886-2-3366-4138; Prof. Chi-Chang Huang, [john5523@ntsu.edu.tw](mailto:john5523@ntsu.edu.tw), +886-3-3283201 ext. 2409**

# 不同性別的自由車耐力選手身體 運動素質之探討

卓筱晴 魏文亮 許太彥  
國立臺中教育大學體育學系

**目的：**本研究目的在探討不同性別的自由車耐力型選手的身體運動素質是否有差異。**方法：**本研究招募 8 名自由車耐力型大專現役選手，分別 4 男 4 女，訓練時間皆 6 年以上。利用 AfaScan 測驗身體運動素質。接受測驗前一個月的平時訓練內容皆相同。將受試者依性別分組後進行測驗，項目內容有下肢爆發力、上肢力量、核心力量、柔軟度、敏捷性、平衡和耐力。**結果與結論：**自由車耐力型的男女選手身體運動素質大多並無顯著差異，只有在細項裡的核心平均角度、柔軟度的伸展時間有達顯著差異，可能原因是自由車同等距離選手的訓練課表及訓練強度不分性別皆相同，所以導致男、女身體運動素質沒有顯著性差異。建議未來相關研究可以觀察相同距離但階級不同的自由車選手身體素質之影響。

**關鍵詞：**自由車、耐力選手、身體素質

# **Discussion on the Physical Fitness of Endurance cyclists of Different Genders**

**Hsiao-Ching Cho , Wen-Liang Wei , Tai-Yen Hsu**

Department of Physical Education, National Taichung University of Education,  
Taichung, Taiwan

**Introduction:** The purpose of this study is to explore whether there are differences in the physical fitness of freewheel endurance athletes of different genders. **Methods:** This study recruited 8 active athletes of cycling endurance college, 4 males and 4 females, the training time is more than 6 years, and tested their physical fitness by using AfaScan. The content of the usual training in the month before the test was the same. The subjects were divided into gender groups and then tested. The items included lower body power. Upper body strength. Core strength, flexibility, agility, balance and endurance. **Results & Conclusions:** There is no significant difference in physical fitness between men and women of cycling endurance type. Only the average core angle, softness and stretch time in the detailed items have significant differences. The possible reason is the training schedule and training intensity of cycling athletes with the same distance. It is the same regardless of gender, so there is no significant difference in physical fitness between men and women. It is suggested that future related research can observe the effect of the same distance but different class free cyclist's physical function.

**Key words:** cycling 、 endurance athletes 、 physical fitness

**Hsiao-Ching Cho, [fall842132004@gmail.com](mailto:fall842132004@gmail.com), 0920304102**

# 中斷久坐對無規律運動者餐後血壓的影響

曾傑聖<sup>1</sup> 許哲偉<sup>1</sup> 陳勇志<sup>1</sup>

<sup>1</sup>國立臺灣師範大學體育與運動科學系

**研究背景：**無規律運動且長時間久坐者有較高機會罹患高血壓，增加心血管疾病風險，然而中斷久坐是否能影響血壓目前仍不清楚，也缺乏不同族群的比較。**方法：**本研究招募無規律運動習慣的健康成年人，針對體重正常 (研究 1：10 人，年齡：25 ± 4，BMI：21 ± 2 kg/m<sup>2</sup>，腰圍：73 ± 6 cm) 和體重過重 (研究 2：12 人，年齡：29 ± 7，BMI：29 ± 5 kg/m<sup>2</sup>，腰圍：97 ± 6 cm) 族群進行久坐 (實驗期間維持坐姿) 和中斷久坐 (每 20 分鐘進行時速 6.4 公里的 2 分鐘快走，總計 30 分鐘) 實驗，實驗總長度為 320 分鐘，並採隨機次序分配。血壓 (收縮壓、舒張壓及平均動脈壓) 於餐後每小時測量，共 6 次 (基礎值、第 65、125、185、255 和 315 分鐘)，並以 2 因子重複量數變異數分析檢驗不同介入與時間的差異，顯著水準為  $p < 0.05$ 。**結果：**研究 1 和研究 2 結果皆顯示久坐與中斷久坐間收縮壓、舒張壓及平均動脈壓均無顯著差異。**結論：**不論體重正常或體重過重族群，中斷久坐的身體活動皆未能立即性降低血壓。

**關鍵詞：**無規律運動、快走、坐式行為、高血壓

通訊作者：陳勇志，yc.chen@ntnu.edu.tw，+886-2-7749-6979



# Effect of Breaking Prolonged Sitting on Postprandial Blood Pressure in Individuals without Regular Exercise Habit

Chieh-Sheng Tseng<sup>1</sup>, Che-Wei Hsu<sup>1</sup>, Yung-Chih Chen<sup>1</sup>

<sup>1</sup>Department of Physical Education and Sport Sciences

**Introduction:** Daily irregular physical activity and prolonged sitting are associated with a higher risk of developing hypertension and cardiovascular diseases. However, it is currently unclear whether breaking prolonged sitting can affect postprandial blood pressure, and there is a lack of comparison among different populations. **Methods:** Healthy adults without regular exercise habit were recruited and divided into study 1: normal weight group (N=10, age:  $25 \pm 4$ , BMI:  $21 \pm 2$  kg/m<sup>2</sup>, waist circumference:  $73 \pm 6$  cm), and study 2: overweight group (N=12, age:  $29 \pm 7$ , BMI:  $29 \pm 5$  kg/m<sup>2</sup>, waist circumference:  $97 \pm 6$  cm). Participants underwent prolonged sitting (maintaining a sitting position throughout the experiment) and breaking up prolonged sitting (walking on a treadmill at a speed of 6.4 km/h for 2 minutes every 20 minutes, total of 30 minutes of brisk walking). Blood pressure (systolic, diastolic, and mean arterial pressure) was measured at baseline, 65, 125, 185, 255, and 315 minutes during the experiment. **Results:** The results of study 1 and study 2 both showed no significant differences in systolic, diastolic, and mean arterial pressure between prolonged sitting and breaking up prolonged sitting. **Conclusion:** Breaking up prolonged sitting with intermittent short bouts of physical activity, regardless of normal weight or overweight/obese, did not immediately lower blood pressure.

**Key words:** irregular exercise, brisk walking, sedentary behaviour, high blood pressure

**Correspondence:** Dr. Yung-Chih Chen, yc.chen@ntnu.edu.tw, +886-2-7749-6979

# Women'S Portrayal In The Sports Media : How Far Have We Come?

**Cindy Vanderveken and Noémie Vanderveken**

Department of Physical Education, National Taichung University of Education, Taiwan.

**Introduction:** From the 1900 Olympic Games allowing the first (yet few) female athletes to the 2024 Games which are expected to achieve full gender balance, women's involvement in sports has come a long way. However, despite gender equality continuing to make its way in the field of sports, women still face numerous obstacles. Their depiction in the media is one of them. Therefore, this study aims to provide an empirical insight into how women are portrayed in the media, with a particular focus on advertising, and to examine whether actual progress has been made.

**Methods:** The methodology consisted of a review of the literature and a qualitative visual analysis. To conduct the latter, data were drawn from print advertisements. The sample consists of three print advertisements from Nike, the world's largest sports brand. To examine whether there have been any significant textual and visual changes over time in women's portrayal in sports advertisements, three different periods of publishing time were chosen: the 1990s, 2000s and 2010s.

**Results and Conclusions:** The literature review indicates that women in sports advertising are still often portrayed in a stereotypical and sexualized manner relative to their athletic accomplishments. However, the visual analysis of the Nike print advertisements showed a shift towards more positive female portrayals. By depicting women's athletic abilities in sports advertisements, other women may feel inspired to exercise, which can increase female participation and engagement in sport and physical activity, as well as improve their health and well-being.

**Key words: sportswomen; media portrayal; print advertisements; gender equality**

# 韓國運動賽事永續發展目標政策與 策略分析

金修煥

國立體育大學國際運動管理與創新博士學位學程

**目的：**韓國永續發展政策(Sustainable Development Policy)的開始，是從聯合國環境與發展會議通過里約宣言以來所啟動規劃，並在 2002 年全世界永續發展高峰會之後，制定了第一個國家永續發展規劃，即 2006 年的永續發展五年計畫。第 123 屆國際奧林匹克委員會的委員大會，票選出韓國平昌作為 2018 冬季奧林匹克運動會的主辦城市，韓國政府、平昌東奧組委會與 IOC 攜手合作打造永續發展性國際運動賽會。**方法：**為了深入瞭解韓國大型運動賽事政策，透過採用文獻分析法及系統性文獻回顧。**結果與結論：**為了 COVID-19 後經濟恢復及失業率下降，2020 年 7 月韓國政府發表‘New Deal’政策，到 2025 年政府投資三大部門，數字化 (Digitalization)、環保 (Green Policy)、社會安全 (Social Security)，2018 平昌冬奧將環境、社會及經濟領域選定為永續奧林匹克遺產，將永續奧運遺產的原則全面應用於奧運賽會籌備、執行與賽後管理等所有賽事辦理的每一階段。此外，作為以舉辦永續發展冬奧會為願景，文化奧運、環境奧運、和平奧運、經濟奧運與 ICT 奧運被選為平昌冬奧會的核心目標。韓國平昌冬奧組織委員會為了永續發展政策更制定了企業社會責任(Corporate Social Responsibility)方案，鼓勵與支持參與組織、合作集團與贊助商之企業社會責任管理與推廣。

**關鍵詞：**韓國運動賽事、國際運動賽事、永續發展目標

# **Policies and Strategies for Sustainable Development of Mega Sport Event in Korea**

**Su-Hwan Kim**

Doctoral Program for Transnational Sport Management and Innovation, National Taiwan Sport  
University, Taiwan.

**Introduction:** Korea's Sustainable Development Policy began with the Rio Declaration adopted at the United Nations Conference on Environment and Development, and after the World Summit on Sustainable Development in 2002, the first national sustainable development plan was formulated, the 2006 Five-Year Plan for Sustainable Development. The 123rd IOC voted to host the 2018 Winter Olympic Games in PyeongChang, Korea, and the Korean government, the PyeongChang East Olympic Organizing Committee and the IOC are working together to create a sustainable international sports event. **Methods:** A literature analysis and systematic literature review were used to gain insight into Korea's major sports event policies. **Results & Conclusion:** In order to recover the economy and reduce the unemployment rate after COVID-19, the Korean government released the 'New Deal' policy in July 2020, and the government will invest in three major sectors by 2025: digitalization, green policy, and social security, The 2018 PyeongChang Winter Olympics identified the environmental, social and economic areas as the sustainable Olympic legacy, and applied the principles of sustainable Olympic legacy to all stages of the Games, including preparation, execution and post-event management. In addition, as a vision for a sustainable Winter Olympics, the Cultural Olympics, Environmental Olympics, Peace Olympics, Economic Olympics and ICT Olympics have been selected as the core objectives of the PyeongChang Winter Olympics. The PyeongChang Winter Olympic Organizing Committee has also established a Corporate Social Responsibility program to encourage and support the CSR management and promotion of participating organizations, partner groups and sponsors for the purpose of sustainable development policy.

**Key words:** korea sport event, international sports events, sustainability goals

**Correspondence:** Su-Hwan Kim, [hwan3135@gmail.com](mailto:hwan3135@gmail.com), +886-983133627

# **Investigation Of The Different Factors Linked To The Sedentary And Physical Inactivity Behaviours Of Children And Adolescents In France**

**Noémie Vanderveken and Cindy Vanderveken**

Department of Physical Education, National Taichung University of Education, Taiwan.

**Introduction:** Physical inactivity in children and adolescents is associated with poor physical ability and increased morbidity and mortality in adulthood, among other health problems. Currently, three in four adolescents are not physically active enough and fail to meet the recommended amount of exercise set by the WHO. The low rates not only show a concerning lack of physical activity (PA) among young people globally, but also sedentary behaviours seem to become omnipresent in their lives. In order to have a better understanding of the current situation, this paper undertakes an analysis of the lack of PA and sedentary lifestyles tendencies among French children and adolescents.

**Methods:** Methodologically, this study uses a literature review approach to highlight factors responsible for such behaviours, and focuses on the situation in France. Previous and new scientific studies conducted by experts and researchers in the field of health and sport were used to have a better understanding of the different factors and consequences of physical inactivity, and solutions were suggested to tackle the issue.

**Results and Conclusions:** Despite not being an isolated case, insufficient funding, efforts and strategies reinforce difficulties to efficiently tackle physical inactivity, leading to growing health concerns in France. Therefore, it is important to raise awareness of the adult population about this growing issue, as there should be more qualified professionals and experts working on education and knowledge, role modelling, encouragement and counselling in PA. Moreover, regional and local authorities should encourage the construction of safe play areas that provide access to outdoor play areas, especially in bigger cities. By promoting exercise integration and sport participation – essential to children’s everyday life – we can minimize health problems that can occur later and help young people develop healthy habits and lifestyles.

**Key words:** children and adolescents; physical inactivity; sedentary behaviours; health issues

# 個人或團體運動對執行功能之影響：

## 橫斷式研究

林承佑<sup>1</sup> 黃彥寧<sup>1</sup> 陳珏縈<sup>1</sup> 陳豐慈<sup>1</sup> 陳奕良<sup>2</sup> 劉羿德<sup>2,3</sup>

<sup>1</sup>中國醫藥大學運動醫學系 <sup>2</sup>臺北市立大學競技運動訓練研究所 <sup>3</sup>國立彰化師範大學運動學系

**目的：**先前已有研究指出，規律運動與執行功能有其正向關聯性。然而，尚未有研究了解「運動參與的人數」是否對執行功能有不同程度之影響。為此，本研究係以橫斷式研究之方式，探討「個人」與「團體」運動對執行功能之影響。**方法：**本研究共招募 45 位大學生（平均年齡為 21 歲），藉參與者過去參與之運動型態（至少維持一年以上），將之分為個人運動組（n=15）、團體運動組（n=15），及無規律運動組（n=15）。所有參與者皆會進行倫敦塔作業之檢測，進而了解其計畫相關執行功能。在統計分析方面，倫敦塔作業表現是利用單因子變異數分析來檢驗三組別之差異。**結果與結論：**本研究結果顯示，個人運動組及團體運動組在倫敦塔作業的多項指標（總移動次數、總移動正確數、總起初時間、總執行時間，及總問題解決時間）皆優於無規律運動組，而個人運動組及團體運動組則無顯著之差異性。綜合上述，本研究進一步支持規律運動對執行功能表現是有其正向效益，而該效益並不會受到個人或團體運動型態有所影響。該研究為首次以橫斷式研究探討個人與團體運動對執行功能之影響，未來研究建議可以介入性研究來確認其因果關係。

**關鍵詞：**身體活動、認知功能、執行功能、倫敦塔作業

通訊作者：劉羿德教授，[ytliu@cc.ncue.edu.tw](mailto:ytliu@cc.ncue.edu.tw)，04-7232105 #1883

# The Effect of Individual or Group Sports on Executive Function: A Cross-sectional Study

Seng-Iao Lin<sup>1</sup> Yan-Ning Huang<sup>1</sup> Chueh-Yin Chen<sup>1</sup> Feng-Tzu Chen<sup>1</sup> Yi-Liang Chen<sup>2</sup> Yi-Te Liu<sup>2,3</sup>

<sup>1</sup>Department of Sports Medicine, China Medical University, Taiwan

<sup>2</sup>Graduate Institute of Sports Training, University of Taipei, Taiwan

<sup>3</sup>National Changhua University of Education Departments of Sports

**Objective:** Previous research has shown a positive relationship between regular exercise and executive function, but no studies have been conducted to understand whether the “number of participants” in sports has different levels of impact on executive function. Therefore, the present study was to cross-sectionally examine the effect of individual or group sports on executive function. **Methods:** Forty-five university students (mean age = 21 years old) were recruited and categorized into three groups, including individual sports (n = 15), group sports (n = 15), and irregular exercise (n = 15), based on participants’ exercise experience. The three groups were examined via the Tower of London (TOL) Task to understand the planning aspect of executive function. In terms of statistical analysis, the five indicators of TOL task were examined using one-way ANOVA to examine the differences among the three groups. **Results and conclusion:** The results revealed that the individual and group sports performed better than the irregular exercise on five indicators (total correct score, total move score, total initiation time, total execution time, total problem-solving time), while there were no significant differences between the individual and group sports. This study further supports the existing positive effect of regular exercise on executive function and further updates that the beneficial effects are not influenced by sport types. Importantly, the study was the first to examine the effect of sport types on executive function and future research is needed to confirm the causal relationship.

**Key words:** physical activity, cognitive function, executive function, Tower of London

Corresponding Author: Professor Yi-Te Liu, [yliu@cc.ncue.edu.tw](mailto:yliu@cc.ncue.edu.tw) , 04-7232105 #1883

# 新舊課綱下國民小學健體領域教科書變化情形

楊皓文<sup>1</sup>謝采育<sup>1</sup>劉佳鎮<sup>2</sup>

<sup>1</sup>國立臺中教育大學體育學系碩士班

<sup>2</sup>國立臺中教育大學體育學系

**緒論：**教育部於 2014 年發布了十二年國民基本教育課程綱要，並以「核心素養」的概念作為課程發展的主軸，而在健康與體育課程綱要的學習表現中新增了「行為」這項指標。因此隨著課綱的改變，教科書的內容勢必會做出調整以符合新課綱所訂定之指標。**目的：**本研究目的為探討國民小學健康與體育教科書在新舊課綱下的改變情形，以及教科書的編輯是否符合教學現場的實際狀況及新課綱所訂定之指標。並提供相關意見給教科書廠商，以針對教科書設計提出更貼近現場教師的需求。**方法：**本研究採用內容分析法，分析南一、康軒及翰林三家出版社所出版的 107 及 110 學年度第一、二冊健康與體育教科書。研究者會依據課綱所訂定之核心素養、學習表現及學習內容進行分析類目的建立，並邀請兩位在職教師依據所建立之類目進行內容分析的劃記。**結果：**一、核心素養中的規劃執行與應變創新及藝術涵養與美感素養在 107 學年度的教科書中明顯多於 110 學年度的教科書。二、107 及 110 學年度的教科書內的指標皆以身心素質與自我精進為最多。三、學習內容中 107 學年度比 110 學年度更重視技能。**結論：**雖然分析結果都是身心素質與自我精進這項指標最高，但研究者建議將來應進一步探討不同學習階段之教科書，以確認教科書編排的適切性。

**關鍵詞：**健康與體育教科書、十二年國教、核心素養

**通訊作者：**楊皓文，[ape106122@gm.ntcu.edu.tw](mailto:ape106122@gm.ntcu.edu.tw), 0983580692



# The changes in health and physical education textbooks for elementary schools under the new and old curriculum guidelines

Hao-Wen Yang<sup>1</sup>, Tsai-Yu Hsieh<sup>1</sup>, Jia-Zhen Liu<sup>2</sup>

<sup>1</sup>Master's Program in Physical Education, National Taichung University of Education

<sup>2</sup>Department of Physical Education, National Taichung University of Education

**Introduction:** The Ministry of Education released the 12-Year Basic Education Curriculum Guidelines in 2014, with the concept of "core competencies" as the main focus of curriculum development. In the learning outcomes of the Health and Physical Education curriculum guidelines, the indicator of "behavior" was added. Therefore, with the changes in the curriculum, the content of textbooks is expected to be adjusted to align with the new indicators set by the curriculum. **Purpose:** The purpose of this study is to investigate the changes in elementary school Health and Physical Education textbooks under the old and new curriculum guidelines, and whether the content of the textbooks aligns with the actual situation in the classroom and the indicators set by the new curriculum. The study aims to provide feedback to textbook publishers to design textbooks that better meet the needs of teachers in the classroom. **Method:** This study uses content analysis to analyze the first and second volumes of Health and Physical Education textbooks published by three publishers, namely Nan-I, Kang-Hsuan, and Han-Lin, for the academic years 107 and 110. The researchers will establish analysis categories based on the core competencies, learning outcomes, and learning content set by the curriculum guidelines, and invite two in-service teachers to conduct content analysis based on the established categories. **Results:** 1. In the core competencies, "planning and execution", "adaptation and innovation", and "aesthetic cultivation and appreciation" are more prominent in the 107 academic year textbooks than in the 110 academic year textbooks. 2. The indicators in the textbooks of both 107 and 110 academic years focus mostly on "physical and mental fitness" and "self-improvement". 3. In terms of learning content, the 107 academic year textbooks place more emphasis on skills than the 110 academic year textbooks. **Conclusion:** Although the analysis results show that "physical and mental fitness" and "self-improvement" are the highest indicators, but the researchers suggest that future studies should further investigate textbooks for different learning stages to confirm the appropriateness of textbook arrangement.

**Key words:** Health and Physical Education Textbook 、 Twelve-Year Basic Education 、 core competencies

**Correspondence: Hao-Wen Yang,**[ape106122@gm.ntcu.edu.tw](mailto:ape106122@gm.ntcu.edu.tw),0983580692

# 路跑參與者參與動機、滿意度與再參與意願之關係—以2022年慢城山水馬拉松為例

吳昱樵<sup>1</sup> 李國維<sup>2</sup> 賴昱瑄<sup>3</sup>

<sup>123</sup> 國立臺中教育大學體育學系

**研究目的：**近年來各具特色的路跑活動如雨後春筍般出現，惟路跑賽會之差異可能導致參與者「參與動機」、「滿意度」、「再參與意願」不盡相同。因此本研究期望透過探討慢城山水馬拉松路跑參與者的參與動機、滿意度、再參與意願之關係，進而提供賽事主辦單位後續舉辦賽會之參考。**研究方法：**本研究採問卷調查法，以簡單隨機抽樣方式針對路跑參與者發放問卷，發出 340 份問卷，扣除無效問卷後，回收 312 份問卷，問卷回收率 91.7%，並使用 SPSS 進行獨立樣本 T 檢定、單因子變異數分析、皮爾森積差相關及迴歸分析。**研究結果：**(一)女性及學歷高中職(含以下)者於新奇體驗構面顯著高於男性及學歷研究所以上者；55 歲以上參與者於社交構面及再參與意願構面顯著高於 25~40 歲參與者；每年參加 2~5 次及 6~9 次之參與者於身心健康構面顯著高於每年參加 1 次者；報名 42km、21km 及 10km 之參與者成就挑戰構面顯著高於報名 4km 的參與者。(二)參與動機、滿意度與再參與意願三變項之間有中度正相關存在。(三)參與動機對再參與意願有 31.8% 預測力；滿意度對再參與意願有 48.3% 預測力。

**關鍵詞：**參與動機、滿意度、再參與意願、慢城山水馬拉松

# **The Relationship between Participation Motivation, Satisfaction and Re-participation Intention of Road Runners on the 2022 Slow City Mountains and Rivers Marathon**

**Yu-Chiao Wu<sup>1</sup>, Guo-Wei Lee<sup>2</sup>, Yu-Shiuan Lai<sup>3</sup>**

<sup>123</sup>Development of Physical Education, Naitonal Taichung University of Education

**Purpose of the study:** In recent years, road running events with different characteristics have sprung up, but the differences in road running events may lead to different "motivation", "satisfaction", and "re-participation intention" of participants. Therefore, this study aimed to investigate the relationship between participants' motivation, satisfaction, and re-participation intention in the Slow City Mountains and Rivers Marathon, and to provide a reference for the race organizers to organize future races.

**Methodology:** In this study, 340 questionnaires were distributed to road running participants by simple random sampling, and after deducting invalid questionnaires, 312 questionnaires were collected. 91.7% of the questionnaires were collected, and independent sample t-testing, one-way analysis of variance, Pearson correlation and regression analysis were conducted using SPSS. **Results:** (1) The novelty experience component was significantly higher for females and those with high school education (including below) than for males and those with graduate school or above; the socialization component and re-participation component were significantly higher for participants aged 55 or above than for those aged 25-40; the physical and mental health component was significantly higher for participants who participated in road running 2-5 times and 6-9 times per year than for those who participated once per year; the achievement challenge component was significantly higher for participants who registered for 42km, 21km and 10km than for those who registered 4km. (b) There was a moderate positive relationship between the three variables of motivation, satisfaction and re-participation intention. (3) Motivation of participate had 31.8% predictive power on re-participation intention.; satisfaction had 48.3% predictive power on re-participation intention.

**Keywords:** participation motivation, satisfaction, re-participation intention, the 2022 Slow City Mountains and Rivers Marathon

# FACEBOOK 互動及關係品質之研究

## -以統一7-ELEVEn獅隊為例

劉昭廷

國立臺灣體育運動大學 運動事業管理學系

### 摘要

體育相關之研究大部分檢驗了職業運動球團和球員對社群媒體的使用，但較少研究會評估社群媒體行銷的影響，尤其是在和球迷建立關係方面。當關係行銷被當作使用社群媒體的架構時，它同時也應該被用來評估社群媒體之效用。**研究目的：**檢驗球迷在 Facebook 上與他們最喜歡之職棒球隊的互動對關係品質、購買意願和推薦意願的影響。**研究方法：**本研究在使用文獻探討後針對中華職棒統一 7-ELEVEn 獅隊 Facebook 粉絲團成員及洲際球場現場觀賽之獅迷，於 2022 年 9 月中旬至下旬進行問卷調查，使用立意抽樣法並利用結構方程模型對數據進行分析。本研究所有構念（面）變項信度值介於.78~.89 意謂問卷變項的內部一致性是可以被接受的，一共發放出了 188 份問卷，總計回收 180 份有效樣本。**研究結果與結論：**臉書互動對關係品質有顯著正向影響(BETA=0.79； $P<0.001$ )；關係品質對購買意願有顯著正向影響(BETA=0.58； $P<0.001$ )；臉書互動對購買意願（以關係品質為中介）有顯著正向影響(BETA=0.46； $P<0.001$ )。根據結果，職棒球團可以使用關係行銷做為評估職業球隊社群媒體行銷效果的變項，且社群媒體互動確實改善並加強了球迷與球隊之間的關係，而關係品質與臉書互動對購買及推薦意願皆有顯著的影響，可做為職棒球團行銷人員提高使用者購買及推薦意願的參考。**關鍵詞：**統一 7-ELEVEn 獅、社群行銷、關係品質、購買意願、推薦意願

通訊作者：劉昭廷 連絡電話：0919832552 E-mail：11005013@gm.ntus.edu.tw

# Research on FACEBOOK Interaction and Relationship Quality-A Case Study of the Uni-President 7-Eleven Lions

Chao-Ting Liu

Department of Sport Management, National Taiwan University of Sport

## Abstract

Much of the sports-related research has examined the use of social media by professional sports teams and players, but fewer studies have assessed the impact of social media marketing, especially in building relationships with fans. While relationship marketing is used as a framework for using social media, it should also be used to evaluate the effectiveness of social media. **Introduction:** To examine the effect of fans' Facebook interactions with their favorite professional baseball team on relationship quality, purchase intention, and recommendation intention. **Research method:** After using the literature review, this study aimed at the members of the Uni-President 7-ELEVEN Lions Facebook fan group of the China Professional Baseball Team and the Lions fans who watched the game at the Intercontinental Stadium, from mid to late September 2022, using the intentional sampling method, the data were analyzed using structural equation modeling. In this study, the reliability values of all construct (surface) variables ranged from .78 to .89, which means that the internal consistency of the questionnaire variables is acceptable. A total of 188 questionnaires were distributed, and a total of 180 valid samples were recovered. **Research results & conclusions:** Facebook interaction has a significant positive impact on relationship quality (BETA=0.79;  $P<0.001$ ); relationship quality has a significant positive impact on purchase intention (BETA=0.58;  $P<0.001$ ); Facebook interaction has a significant positive impact on purchase intention (mediated by relationship quality) has a significant positive effect (BETA=0.46;  $P<0.001$ ). According to the results, professional baseball teams can use relationship marketing as a variable to evaluate the effectiveness of professional team social media marketing, and social media interaction does improve and strengthen the relationship between fans and teams, while Both relationship quality and Facebook interaction have a significant impact on purchase and recommendation intentions, which can be used as a reference for professional baseball team marketing staff to improve users' purchase and recommendation intentions.

**Keywords:** Uni-President 7-ELEVEN Lions, social marketing, relationship quality, purchase intention, recommendation intention

**Correspondence: Chao-Ting Liu Tel: 0919832552 E-mail:  
11005013@gm.ntus.edu.tw**

# 職業運動員使用社交媒體之分析-

## 以STAR模型分析

徐子晴、林明宏

國立中興大學運動與健康管理研究所

**目的：**本文目的探討現役及退役之職業網球選手使用 Facebook 粉絲專業社交媒體之情形。**方法：**採用 STAR 模型(故事性 storytelling、觸發 trigger、娛樂 amusement、反應 reaction) 以及定量定性研究法來分析兩位職業網球選手 Dominic Thiem 及 Roger Federer，自 2023 年 01 月 14 日至 2023 年 04 月 14 日經營情況，內容及數據收集自原始社交網站及 Fanpage Karma 網站。**結果：**最高互動之貼文為 Dominic Thiem 所發布，內容提及賽事心情及與寵物狗之愉快時光，此篇貼文故事性及娛樂效果極佳，獲得遠高於雙方之貼文互動率，也成為最佳貼文。Roger Federer 則連續多篇不斷地分享與他人合作之內容，綿延故事性及提供觸發點。雖不是每篇皆獲得較好之數據，但其中有獲得最多按讚數，及被分享次數最高之貼文。雖相比雙方與粉絲互動率，Federer 略顯較差，但因其固有粉絲數已非常眾多，其所獲得之廣告效益高於 Thiem 近乎 10 倍。**結論與建議：**分享具有故事性及娛樂性之貼文，或個人生活趣事，皆有提高互動率及黏濁度之效果，並且更加地推廣至新粉絲及贊助商的眼中。雖 STAR 模型中的四個維度並非強制，但交叉使用可以使粉絲參與互動的水平更高，甚至轉變為可持續性的消費。最後依據發現之研究結果提出建議，建議現役職業運動員以 STAR 模型做為經營 Facebook 粉絲專業之策略，維持粉絲互動率及黏濁度，進而提高價值效益。

**關鍵詞：**社群媒體、粉絲專業、貼文分析、廣告價值



# **Analysis of Professional Athletes' Use of Social Media - Analyzing with the STAR Model.**

**Tz-Ching Hsu, Ming-Hung Lin**

Graduate Institute of Sport and Health Management, National Chung Hsing University, Taiwan.

**Introduction:** The purpose of this article is to explore the use of Facebook fan pages by current and retired professional tennis players on social media. **Methods:** The STAR model (storytelling, trigger, amusement, reaction) and quantitative and qualitative research methods were used to analyze the management and content of the Facebook fan pages of two professional tennis players, Dominic Thiem and Roger Federer, from January 14, 2023 to April 14, 2023. The data was collected from the original social media sites and the Fanpage Karma website. **Results:** The post with the highest interaction was posted by Dominic Thiem, which mentioned his feelings about the game and the happy time with his pet dog. This post had a great storytelling and entertainment effect, and received a much higher interaction rate than the posts of both parties, becoming the best post. Roger Federer continuously shared content about his collaborations with others, with a continuous story and trigger points. Although not every post received better data, some received the most likes and the highest number of shares. Although Federer's interaction rate with fans is slightly lower than Thiem's, his inherent number of fans is already very large, and the advertising benefits he receives are nearly 10 times higher than Thiem's. **Conclusion and Suggestions:** Sharing posts with storytelling and entertainment elements, or personal life anecdotes, can effectively increase interaction and engagement, and further promote to new fans and sponsors. Although the four dimensions of the STAR model are not mandatory, cross-use can increase the level of fan participation and even transform into sustainable consumption. Finally, based on the research findings, it is recommended that active professional athletes use the STAR model as a strategy for managing their Facebook fan pages, maintaining fan interaction and engagement, and ultimately increasing value and benefits.

**Keywords:** social media, fan pages, post analysis, advertising value.

**Correspondence:** Tz-Ching Hsu, llunna998@gmail.com, +886-986365538

# 有無力竭之阻力運動對於健康年輕男性的 食慾及食物偏好影響

郭伊芹 鄭皓謙 余珮璇 葉冠岑 江沂柔 劉宏文

國立臺灣師範大學運動與休閒學院 體育與運動科學系

**背景：**過往研究顯示，運動除了具有消耗熱量的效果外，亦通過暫時性食慾抑制作用，進而減少能量攝取。然而，先前研究多著重於有氧運動所產生的食慾調節反應，目前阻力運動對於進食行為影響的文獻甚少。**目的：**本研究欲探討在相同負荷強度及組間休息下，進行自主力竭與固定次數的阻力運動對健康年輕男性食慾及食物偏好的影響。**方法：**12 位年輕健康男性（年齡 21-25 歲），執行三次隨機交叉試驗：力竭 (Repetition to Failure, RF)；無力竭 (Non Repetition to Failure, NRF)；休息控制 (Control, CON) 試驗。動作次序為：槓鈴深蹲、槓鈴臥推與六角槓硬舉。運動強度與組數：70% 1 RM，每項動作各三組，NRF 每組執行七下。試驗過程中測量受試者之主觀食慾、乳酸、能量攝取及食物偏好。所得數據將以混合線性模型 (linear-mixed model) 進行分析。**結果：**主觀食慾於運動後立即，RF 顯著低於 NRF 及 CON ( $p < 0.001$ )，且 NRF 也顯著低於 CON ( $p = 0.031$ )。乳酸於運動後立即、運動後 30 分鐘、60 分鐘，RF 顯著高於 NRF 及 CON ( $p < 0.001$ )，且 NRF 於運動後立即及運動後 30 分鐘顯著高於 CON ( $p < 0.05$ )。RF 對高脂肪食物偏好顯著低於 NRF 及 CON，且 NRF 低於 CON ( $p = 0.012$ )。能量攝取在三組間則無顯著差異。**結論：**本研究發現力竭性之阻力運動產生較高的乳酸濃度、抑制食慾與影響脂肪類食物偏好等效果，然而在能量攝取沒有影響。

**關鍵詞：**阻力運動、血乳酸、食慾、能量攝取、食物偏好

# Effects of resistance exercise with and without failure on appetite and food preference in healthy young men

Yee-Chin Kuo, Hao-Chien Cheng, Pei-Hsuan Yu, Kuan-Tsen Yeh, Yi-Jou Chiang, Hung-Wen Liu

Department of Physical Education and Sport Sciences College of Sports and Recreation, National Taiwan Normal University, Taiwan.

**Introduction:** Increased energy expenditure and reduced energy intake are observed following acute exercise. Previous research has mainly focused on the regulation of appetite responses during and after aerobic exercise. There is currently little literature on the appetite regulation effects of resistance exercise. **Purpose:** This study was to investigate the effects of with and without failure resistance exercise on appetite and food preference in healthy young men. **Methods:** Twelve healthy young men (aged 21-25) completed three randomized crossover trials (RF: Repetition to Failure; NRF: Non Repetition to Failure; CON: Control condition). Participants performed resistance exercise in the following order: squat, bench press, deadlift. Each exercise was performed 3 sets with 70% 1RM (RF: each set to failure; NRF: 7 repetitions for each set). Subjective appetite perceptions, lactate and food preference were measured pre-exercise, 0-, 30-, 60-, 90-min post-exercise. Energy intake was recorded on the day before the experiment, the day of the experiment, and the day after the experiment. **Results:** Subjective appetite perceptions in the RF was significantly lower than that in the NRF and CON ( $p < 0.001$ ), and it was also significantly lower in the NRF than in the CON ( $p = 0.031$ ). Lactate in the RF was significantly higher than that in the NRF and CON immediately, 30 minutes, and 60 minutes post-exercise ( $p < 0.001$ ), and lactate in the NRF was significantly higher than that in the CON immediately and 30 minutes post-exercise ( $p < 0.05$ ). RF had a significantly lower preference in high fat food than NRF and CON, and NRF was lower than CON ( $p = 0.012$ ). However, there were no significant differences in energy intake between the three trials. **Conclusion:** This study found that resistance exercise to failure produced higher lactate concentrations, suppressed appetite, and lowered high fat food preference, but had no effect on energy intake.

**Key words:** appetite, resistance exercise, blood lactate, food preference, energy intake **Correspondence:** Yee-Chin Kuo, +886-922673322, ariel810807@gmail.com

# 基於深度學習方法推薦對戰桌球削球選手 最佳致勝模式

魯姍妤<sup>1</sup> 何丁武<sup>2</sup> 許銘華<sup>3</sup>

<sup>1</sup>臺灣 臺中市 402 國立中興大學資訊工程學系

<sup>2</sup>臺灣 臺中市 404 國立臺灣體育運動大學圖書資訊處

<sup>2,3</sup>臺灣 臺中市 402 國立中興大學運動與健康管理研究所

## 摘要

**目的：**本研究不同以往資料採礦的方式，利用深度學習方法並結合桌球選手的技戰術特徵，發展出對抗削球類型選手最佳致勝技戰術模式之推薦機制，以作為選手賽訓模擬之用。**方法：**本研究以頂尖桌球削球選手為研究對象，以 3S (Speed、Spin、Spot) 技戰理論建構桌球技戰術鏈，共分成 5 個維度 (正反拍、技術、速度、旋轉、落點)，以 3T Magic 所開發的「桌球技戰術智能分析系統」作為資料蒐集工具，共建立 144 場國際重要比賽資訊，再採用深度學習中之 GRU 演算法來建立戰術勝負預測模型。**結果：**經分析後發現削球型選手每一分球的平均板數約為 5.4 板，且約有 80% 以上的機率在 7 板內結束。在模型預測中將前 4 板的資訊放入，其預測準確度可達 72%，若放入前 7 板的資訊，其預測準確度就可高達 82%，顯示出選手只要掌握前 7 板技戰術發揮將能取得致勝關鍵。最後依照所建立之戰術趨勢圖來生成技戰術趨勢組合，再透過訓練模型的驗證後即可成功推薦出最佳的戰術模式。**結論：**本研究所推薦之技戰術組合模型相當符合實際比賽情境，應可作為日後對戰削球型選手打法策略參考之用，後續研究亦可針對不同類型選手之技戰術進行情蒐並開發致勝致模式。

**關鍵字：**桌球、技戰術、GRU 模型、3S 理論

**通訊作者：**許銘華，[mhhsu@mail2000.com.tw](mailto:mhhsu@mail2000.com.tw), +886-4-22840845 ext 888

# Recommendation for the Best Winning Patterns to Play Against Table Tennis Chop Players Based on Deep Learning

Pei-Yu Lu<sup>3</sup> Ting-Wu Ho<sup>2</sup> Ming-Hua Hsu<sup>3</sup>

<sup>1</sup>Department of Computer Science and Engineering, National Chung Hsing University, Taichung 402, Taiwan

<sup>2</sup> National Taiwan University of Sport Office of Library and Information Service, Taichung 404, Taiwan

<sup>3</sup>Graduate Institute of Sports and Health Management, National Chung Hsing University, Taichung 402, Taiwan

## Abstract

**Purpose:** This study is different from the previous data mining approach. We adopted a deep learning method and combined the technical and tactical characteristics of table tennis (TT) players to develop a recommended model of the best winning patterns to fight against chop players as a simulation for players' training. **Methods:** The selected subjects were top table tennis players, and the 3S principle (Speed, Spin, Spot) was applied to construct a TT tactical chain, which was divided into 5 dimensions (forehand & backhand, technique, speed, spin, and spot). “The Intellectual System in Competitive TT” developed by the 3T Magic team was adopted as a data collection tool. 144 international matches were created, and the GRU algorithm in deep learning was used to build the prediction model for winning and losing. **Results:** We found that the average number of shots per point for chop players was about 5.4, and the probability of the rallies ended within 7 shots was approximately 80%. With the information of the first 4 shots included in the model, the prediction accuracy was 72%, and with the information of the first 7 shots included in the model, the prediction accuracy was 82%. It showed that players who mastered the first 7 shots of the game could achieve the key to victory. Finally, the tactical trend combinations were generated based on the created tactical trend chart, and then the best tactical patterns were successfully recommended through the training model validation. **Conclusion:** The tactical patterns recommended in this study are well suited to the actual game situation, and may serve as a reference for TT players in playing strategies when facing chop players. In addition, the subsequent research can be conducted in order to collect and develop winning patterns for different types of players' technical style.

**Keywords:** table tennis, technique and tactics, Gated Recurrent Unit Model, 3S Principle

**Correspondence: Ming-Hua Hsu, [mhsu@mail2000.com.tw](mailto:mhsu@mail2000.com.tw), +886-4-22840845 ext 888**

# 阻力運動在不同月經週期對於進食行為 之影響-前導實驗

余珮璇 鄭皓謙 郭伊芹 葉冠岑 江沂柔 劉宏文

國立臺灣師範大學運動與休閒學院 體育與運動科學系

**背景：**運動訓練藉由能量赤字與抑制食慾，以作為有效管理體重的策略。近期研究顯示女性有氧運動抑制食慾的效果在月經黃體中期減弱。然而尚無研究針對月經週期的不同階段，進行阻力運動對進食行為的影響。**目的：**本研究探討單次阻力運動，在月經週期的不同階段對於進食行為之影響。**方法：**6名經期規律的健康女性（年齡  $23.3 \pm 1.4$  歲），依平衡次序法執行四次試驗：濾泡早期運動 (Exercise Follicular phase, EF)；黃體中期運動 (Exercise Luteal phase, EL)；濾泡早期休息 (Control Follicular phase, CF)；黃體中期休息 (Control Luteal phase, CL)。阻力運動以 70% 1 RM 強度，執行三組七下，動作依序為：槓鈴深蹲、槓鈴臥推與六角槓硬舉。並測量乳酸、主觀食慾、食物偏好與能量攝取。所得數據以混合線性模型 (Linear-mixed model) 進行分析。**結果與討論：**乳酸之曲線下面積（運動前至後 90 分鐘），EF 顯著高於 CF ( $p = 0.001$ )，且 EL 亦顯著高於 CL ( $p = 0.019$ )。整體主觀食慾之曲線下面積，EF 顯著低於 CF ( $p = 0.012$ )，且 EL 有低於 CL 的趨勢 ( $p = 0.059$ )。在食物偏好與能量攝取上，各組間無顯著差異。本研究結果顯示於濾泡早期進行阻力運動產生較高的乳酸濃度，並造成抑制主觀食慾的效果。阻力運動於黃體中期抑制食慾之反應減弱與有氧運動相似，然而在能量攝取及食物偏好上沒有影響。

**關鍵詞：**阻力訓練、食慾、食物偏好、濾泡期、黃體期、乳酸

# Effects of menstrual cycle on appetite, food preference, and energy intake in response to resistance exercise-A pilot study

Pei-Hsuan Yu, Hao-Chien Cheng, Yee-Chin Kuo, Kuan-Tsen Yeh, Yi-Jou Chiang, Hung-Wen Liu

Department of Physical Education and Sport Sciences, College of Sports and Recreation, National Taiwan Normal University, Taiwan.

**Introduction:** Exercise training-induced appetite suppression and energy expenditure can help weight management. Recent studies have shown that intense aerobic exercise-induced appetite suppression is blunted in the luteal phase compared to the follicular phase. However, the effects of resistance exercise on appetite regulation in women remains largely unclear. **Purpose:** This study was to investigate the effects of menstrual cycle (early-follicular phase and mid-luteal phase) on appetite, food preference and energy intake in response to resistance exercise in healthy young women. **Methods:** Six healthy young women (aged:  $23.3 \pm 1.4$ ) completed four counter-balanced trial including: exercise follicular phase (EF), exercise luteal phase (EL), control follicular phase (CF), and control luteal phase (CL). Participants performed resistance exercise in the following order: squat, bench press, deadlift. Each exercise was consisted of 3 sets per exercise and 7 repetitions with a load of 70% 1RM. Subjective appetite perceptions and lactate were measured pre-exercise, 0-, 30-, 60-, 90-min post-exercise. Energy intake was recorded on the day before the experiment, the day of the experiment, and the day after the experiment. **Results & Conclusion:** The area under the curve (AUC) of lactate was significantly higher in the EF trial than in the CF trial ( $p = 0.001$ ), and the EL trial was significantly higher than the CL trial ( $p = 0.019$ ). The AUC of overall subjective appetite rating was significantly lower in the EF trial than in the CF trial ( $p = 0.012$ ), and the EL trial was tended to be higher than the CL trial ( $p = 0.059$ ). There were no significant differences in energy intake and food preference between four trials. The present study found that resistance exercise-induced hyperlactatemia suppresses subjective appetite in the follicular phase. Similar to aerobic exercise, suppression of subjective appetite following resistance exercise is blunted in the luteal phase. Nevertheless, resistance exercise did not affect energy intake and food preference.



**Key words: resistance exercise, appetite, food preference, follicular phase, luteal phase, lactate**

# 2020 東京奧運男子三級跳遠助跑

## 過程之分析

蔡侑庭<sup>1</sup>、趙榮瑞<sup>2</sup>

<sup>1</sup>國立臺灣體育運動大學競技運動學系、<sup>2</sup>國立臺灣體育運動大學球類運動學系

**目的：**針對 2020 東京奧運田徑男子三級跳遠助跑之啟動至踏板及起板後三步騰空時間之分析。**對象：**以 2020 東京奧運會田徑比賽男子三級跳遠前八名選手為主。**方法：**自世界奧運田徑委員會網站取得之影帶，再透過 TV 慢動作讀取整個比賽過程之分析。**結果與結論：**一、啟動至踏板之間的時間分析：結果顯示第一名為 4.15 秒最快，第八名則為 5.44 秒最慢，二、踏板後第一、二、三步之間的騰空時間之分析：第一步(單足跳)騰空時間，第一名 0.79 秒優於其他選手的平均 0.61 秒~0.72 秒之間，第二步(跨步跳)騰空時間，8 位選手較為平均在 0.64 秒，第三步(跳躍)較優成績為 1.05 秒，其他選手則平均在 0.92~0.94 秒之間。因此，可以發現助跑速度對於三級跳遠選手來講是非常重要的，不應該為了準確踩踏板而減低速度。另外，三級跳遠勝負的關鍵在於選手須具備良好的助跑速度以及起板後如何藉由本身的技術繼續維持水平速度。

**關鍵字：**奧運會、三級跳遠、助跑過程

**通訊作者：**蔡侑庭，Email:highjump183@yahoo.com.tw，0912412369

**通訊地址：**404 台中市北區雙十路一段 16 號

# Analysis of the approach run in the men's triple jump at the 2020 Tokyo Olympics

YU TING TSAI<sup>1</sup> 、 Zhao Rongrui <sup>2</sup>

<sup>1</sup>National Taiwan Sport University Department of Athletic Performance 、 <sup>2</sup> National Taiwan Sport University Department of Ball Game Sports.

**Purpose:** To analyze the time from start to board contact and the airborne time of the first three steps after board contact in the men's triple jump at the 2020 Tokyo Olympics. **Object:**The top eight male triple jumpers in the 2020 Tokyo Olympics. **Methods:** Video footage obtained from the World Athletics website was analyzed in slow motion using TV technology. **Results and conclusions:** 1. Analysis of the time from start to board contact showed that the first-place athlete had the fastest time of 4.15 seconds, while the eighth-place athlete had the slowest time of 5.44 seconds. 2. Analysis of airborne time during the first, second, and third steps after board contact showed that the first step (single-leg jump) had an airborne time of 0.79 seconds for the first-place athlete, which was better than the average time of other athletes ranging from 0.61 to 0.72 seconds. The second step (hop) had an average airborne time of 0.64 seconds for the eight athletes, while the third step (jump) had the best performance with a time of 1.05 seconds, while other athletes had an average time ranging from 0.92 to 0.94 seconds. Therefore, it can be concluded that speed during the run-up is very important for triple jumpers, and they should not reduce their speed to ensure accurate contact with the board. In addition, the key to success in the triple jump lies in the athlete's ability to maintain horizontal speed through their own technique after takeoff, in addition to having a good run-up speed.

**Keywords:** Olympics, triple jump, running approach

**Corresponding author:** Yu-Ting Tsai, Email: [highjump183@yahoo.com.tw](mailto:highjump183@yahoo.com.tw), +886-912-412369

Mailing address: No. 16, Section 1, Shuangshi Road, North District, Taichung City 404, Taiwan (R.O.C.)

# 舉重槓鈴自動辨識系統之信度與效度

高佳玲<sup>1</sup> 莊銘修<sup>2</sup> 張立羣<sup>1</sup>

<sup>1</sup> 國立臺灣體育運動大學競技運動學系 <sup>2</sup>Max 肌力與體能工作室

**目的：**評估 WL analysis 舉重槓鈴自動辨識系統之信度與效度。**方法：**以世界大學舉重錦標賽 10 位男性選手為研究對象，利用架設在舉重台右側的一部數位攝影機拍攝全程比賽過程，選取選手試舉最高重量之影像進行分析。由兩位觀察者分別利用 WL analysis 與 Kwon 3D 動作分析系統，依系統標準程序進行影像處理，其中一位觀察者在相隔七天後，以相同程序再進行一次影像處理。獲得 6 項槓鈴技術評估指標數據，包括槓鈴運動的垂直與水平位移與速度指標，利用組內相關係數(ICC)和皮爾遜積差相關來評估兩種系統之再測信度與同時效度。**結果與結論：**在觀察者內信度，WL analysis 和 Kwon 3D 系統都有相當高的 ICC 數值介於 0.925-1.000；在觀察者間信度，兩種系統同樣有相當高的 ICC 數值介於 0.882-0.990，只有最大槓鈴垂直速度指標的 ICC 僅為 0.507。在同時效度方面，WL analysis 和 Kwon 3D 系統的 6 項槓鈴技術評估指標皆達顯著相關，有 5 項指標的相關係數數值介於 0.800-0.974，只有最大槓鈴垂直速度指標的相關係數僅為 0.641。本研究顯示，WL analysis 舉重槓鈴自動辨識系統具有良好的再測信度與同時效度，相較 Kwon 3D 系統，更能大幅縮短評估舉重槓鈴運動的時間，可提供給舉重教練、肌力與體能教練使用，是一種簡便且有科學效益的應用軟體。

**關鍵詞：**抓舉、再測信度、同時效度

**通訊作者：**張立羣，lichun@ntus.edu.tw, +886-4-22213108 ext. 6411

# The Reliability And Validity Of Automatic Recognition System For Barbell In Weightlifting

Chia-Ling Kao<sup>1</sup>, Ming-Hsiu Chuang<sup>2</sup>, Li-Chun Chang<sup>1</sup>

<sup>1</sup>Department of Sport Performance, National Taiwan University of Sport, Taiwan

<sup>2</sup>Max Power Fitness, Taiwan

**Purpose:** To evaluate the reliability and validity of the WL analysis's barbell automatic recognition system. **Method:** Ten male lifters participated in the World University Weightlifting Championship. A digital camera was set up on the right side of the weightlifting platform to capture the entire competition. The most successful lifts were selected for analysis using standard procedures in the WL analysis and the Kwon 3D motion analysis system, which were performed by two observers. One of the observers repeated the processing using the same procedures seven days later. Six indicators of the barbell movement, including vertical and horizontal displacement, and velocity of the barbell were analyzed. The intraclass correlation coefficient and Pearson product-moment correlation coefficient was used to evaluate the test-retest reliability and concurrent validity. **Results and Conclusion:** The results showed very high ICC values for intra-observer (ICC = 0.925-1.000) and inter-observer (ICC = 0.882-0.990) reliability of both the WL analysis and the Kwon 3D motion analysis systems. However, the ICC of the maximal vertical velocity was only 0.507. Additionally, significant correlations were found in all six indicators between the WL analysis and the Kwon 3D motion analysis systems. The correlation coefficients of five indicators ranged from 0.800-0.974, while the correlation coefficient of the maximum vertical velocity was only 0.641. This study demonstrates that the WL analysis's barbell automatic recognition system has good test-retest reliability and concurrent validity. Compared to the Kwon 3D motion analysis system, it significantly reduced the time required to evaluate the movement of lifting the barbell. This system can be utilized by weightlifting and strength and conditioning coaches. WL analysis is a simple and scientifically beneficial application software.

**Key word:** snatch, test-retest, concurrent validity

**Correspondence:** Li-Chun Chang, lichun@ntus.edu.tw, +886-4-22213108 ext. 6411

# 不同道次彎道跨欄動作之運動學分析

林玉婕<sup>1</sup> 張立羣<sup>1</sup> 陶武訓<sup>2</sup>

<sup>1</sup>國立臺灣體育運動大學競技運動學系 <sup>2</sup>國立臺灣體育運動大學球類運動學系

**目的：**探討田徑400公尺跨欄在不同道次的彎道跨欄動作之特徵與差異。**方法：**以一名大專公開組女子400公尺跨欄運動員為研究對象，測試運動員在第二道與第八道的彎道跨欄動作。利用兩台數位攝影機拍攝運動員執行不同道次的彎道跨欄動作過程，擷取起跨腳著地瞬間至前導腳下欄後離地瞬間的動作，利用動作分析系統進行三度空間影像數位化處理，獲得各動作階段的動作時間和身體肢體動作之運動學資料，比較兩個道次的彎道跨欄動作。**結果與結論：**在動作時間參數方面，第二道與第八道在動作瞬間和動作階段的時間幾乎相同。各動作階段的身體重心高度，第二道高於第八道，在起跨速度與起跨角度，則第八道高於第二道。在身體肢體動作參數方面，第二道在各個階段的左側髖關節角位移變化比第八道大，大腿左右腳的內收-外展角度差異大。**結論：**雖然不同道次的彎道跨欄動作時間相似，由於第二道的彎道較彎，運動員需抵抗更大離心力，使得起跨速度較慢。由於在不同道次的彎道跨欄動作有所差異，掌握好彎道跨欄技術才能取得優異成績。

**關鍵詞：**田徑、400公尺跨欄、動作分析

**通訊作者：**張立羣，lichun@ntus.edu.tw, +886-4-22213108 ext. 6411

# Kinematics Analysis Of Curved Hurdle Motion In Different Lanes

Yu-Chieh Lin<sup>1</sup>, Li-Chun Chang<sup>1</sup>, Wu-Shiun Tao<sup>2</sup>

<sup>1</sup>Department of Sport Performance, National Taiwan University of Sport, Taiwan

<sup>2</sup>Department of Ball Sport, National Taiwan University of Sport, Taiwan

**Introduction:** This study aimed to investigate the characteristics and differences of the 400-meter hurdles in track and field, specifically in different lanes of curve hurdles. **Methods:** A female 400-meter hurdler from the professional group of colleges was selected as the research subject, and her hurdling motion in the second and eighth lanes was examined. Two digital cameras were utilized to capture the movement process of the athlete as she performed the different lanes and hurdles. The footage was analyzed using a motion analysis system to carry out three-dimensional image digital processing, which allowed for the measurement of the motion time of each phase, as well as the kinematic data of the body and limb movements. By comparing the curve hurdle motions of the two lanes, we were able to obtain a comprehensive understanding of the characteristics and differences of the 400-meter hurdles in track and field in different lanes of curve hurdles. **Results & Conclusion:** The results showed that the time of the second and eighth lanes was almost the same at the moment of motion and during the motion phase. The height of the center of gravity of the body in each motion phase was higher in the second lane than in the eighth lane, while the eighth lane had a higher take-off speed and take-off angle. Moreover, the angular displacement of the left hip joint in the second lane changed more than that in the eighth lane at each phase, and the adduction-abduction angle difference of the left and right thighs was large. In conclusion, although the hurdle motion time of the curves in different lanes is similar, the curve on the second lane requires athletes to resist greater centrifugal force, making the hurdles slower. Therefore, mastering the curve hurdle technique is essential to achieving excellent results due to differences in curve hurdle motions in different lanes.

**Key words:** track and field, 400-meter hurdles, motion analysis

**Correspondence:** Li-Chun Chang, [lichun@ntus.edu.tw](mailto:lichun@ntus.edu.tw), +886-4-22213108 ext. 6411

# 法式滾球成功射擊和失敗射擊上下肢肌肉 肌電訊號之比較

<sup>1</sup>陳佳儀、<sup>2</sup>吳鴻文、<sup>1</sup>吳國勳、<sup>1</sup>張怡雯

<sup>1</sup>國立臺灣體育運動大學運動健康科學學系 <sup>2</sup>國立臺灣體育運動大學體育學系

良好的身體協調性和神經肌肉控制對於投擲運動表現是相當重要的。本研究目的為比較法式滾球射擊動作，成功射擊和失敗射擊時上下肢肌肉肌電訊號的差異。本研究共招募 15 位男性滾球選手，平均年齡 26.0 歲，平均體重 70.1 公斤，平均身高 173.2 公分。本研究使用 Vicon 動作分析系統和 Noraxon 無線肌電訊號收集系統，同步測量滾球射擊動作的上肢運動學，以及投擲側上下肢肌肉的肌電訊號，並同時紀錄每一次滾球射擊的成績。運動學主要用以定義滾球射擊動作的後擺期和前擺期。滾球射擊模式包含 4 種不同射擊距離和 5 種不同目標球排列方式，共 20 種不同射擊模式的資料收集，每位受試者的資料收集會重複 4 次。統計方法使用獨立樣本 t 檢定，以比較成功射擊和失敗射擊的差異。結果顯示在滾球射擊的後擺期，和失敗射擊相比較下，成功射擊時的股二頭肌、肱二頭肌和肱三頭肌具有顯著較低的肌電活化訊號( $p < 0.05$ )。在滾球射擊的前擺期，和失敗射擊相比較下，成功射擊時的中三角肌和股直肌具有顯著較低的肌電活化訊號( $p < 0.05$ )。本研究結果發現相較於失敗射擊，成功射擊時的後擺期具有較低的膝屈肌、肘屈肌和肘伸肌的肌肉活化性，前擺期則具有較低的膝伸肌和肩外展肌的活化性。本研究結果顯示除了上肢肌肉收縮會影響滾球射擊表現之外，下肢肌肉亦可能對滾球射擊表現具有影響性，此結果可以提供教練或選手於滾球射擊訓練時的參考。

**關鍵詞：**滾球射擊、肌電訊號、運動表現

通訊作者：張怡雯，台中市雙十路一段 16 號, 04-22213108 分機 3484,  
[changyw@ntus.edu.tw](mailto:changyw@ntus.edu.tw)



# **Comparison of the Electromyographic Signals in Upper and Lower Limb Muscles between Successful and Failed Petanque Shootings**

**<sup>1</sup>Chia-Yi Chen, <sup>2</sup>Hong-Wen Wu, <sup>1</sup>Guo-Xun Wu, <sup>1</sup>Yi-Wen Chang**

<sup>1</sup>Department of Exercise and Health Science, National Taiwan University of Sport, Taiwan.

<sup>2</sup>Department of Physical Education, National Taiwan University of Sport, Taiwan.

Good body coordination and neuromuscular control are critical in the throwing sport performance. The purposes of this study were to compare the differences of electromyography (EMG) activities between successful and failed petanque shootings. There were fifteen male petanque players participated in this study (age: 26.0 years; body weight: 70.1 kgw; body length: 173.2 cm). Vicon Nexus motion capture system and Noraxon wireless surface EMG recording system were used. The kinematics and the EMG signals in petanque shooting were measured in four different shooting distances and five different target boule arrangements, with a total of 20 different shooting conditions. Each condition was repeatedly measured for four times for each subject. The EMG signals were measured at the throwing side. The kinematics was used for define the timing of backward and forward phases during petanque shooting. The petanque shooting performance, successful or failed, was also recorded for each trial. Independent t test was used to compare the differences between successful and failed petanque shooting. The results showed that the significantly lower EMG activities on biceps femoris, biceps brachii and triceps brachii were found in successful petanque shooting compared to the failed shooting during backward phase ( $p < 0.05$ ). Also, significantly lower EMG activities on middle deltoid and rectus femoris were found in successful petanque shooting compared to the failed shooting during forward phase ( $p < 0.05$ ). Our results showed that the successful petanque shooting demonstrated lower muscle activities on the knee flexor, elbow flexor and extensor in backward phase and lower muscle activities on the knee extensor and shoulder abductor in forward phase. The change of EMG activities in upper and lower limb muscles might be associated with the petanque shooting performance. This information might be beneficial for the coach or athletes in the training of petanque shooting.

**Keywords: Petanque shooting, Electromyography, Sport performance**

Correspondence: Yi-Wen Chang, No. 16, Sec. 1, Shuangshi Rd., Taichung, Taiwan, +886-4-22213108 ext 3484 , [changyw@ntus.edu.tw](mailto:changyw@ntus.edu.tw)

# 國小年齡層擊劍運動員聲光反應時間 之探討

林洧丞<sup>1</sup>

<sup>1</sup>國立中興大學運動與健康管理研究所

**目的：**擊劍運動是一種屬於反應快、爆發力強的運動，視覺主導個體對於外界活動的主要知覺系統，在競技運動賽場中，選手對於視覺訊息的處理能力和反應能力對於勝負影響甚大，對於運動員來說提早接觸運動的運動員在未來更有機會取得優異成績，本研究為了解國小年齡層的擊劍運動員簡單、複雜反應時間，分析國小擊劍運動員對於反應時間的快慢程度與差異性。**方法：**學校分級年齡層作為研究目標，並由國小擊劍運動員為受試者，以 12 名健康無受傷且持續進行擊劍訓練的運動員進行聲光反應時間測驗，方式為燈光與音頻測驗，分別為 3 種不同顏色的光源紅、黃、綠以及 500HZ、1000HZ、3000HZ 不同頻率的聲頻進行數據統計，測驗採用擊劍的預備姿勢，聽到指令後跳開壓力版的時間為反應時間，數據以統計軟體 SPSS 27 進行資料處理及分析，以獨立樣本 T 檢定檢視簡單、複雜反應時間、性別、年齡有無差異性，單因子變異數分析比較不同劍種的關聯性。**結果與結論：**國小擊劍運動員在性別上對於燈光與聲音反應時間未達顯著差異，而年齡層較大的擊劍運動員整體反應時間優於低年級組，應加強其對於反應能力相關的訓練，提高擊劍運動的反應表現，總結可以透過動態反應相關的訓練，加強反應能力，也能將反應能力列入選材的參考與訓練建議。

**關鍵詞：**聲光感測、動態反應、爆發力

# Discussion on the Reaction Time of Sound and Light of Elementary School Fencers

**Lin-Wei-Cheng**<sup>1</sup>

<sup>1</sup> Graduate Institute of Sport and Health Management, National Chung Hsing University, Taiwan.

**Introduction:** Purpose: Fencing is a fast-response and explosive sport. Vision dominates the individual's main perception system for external activities. In competitive sports, the player's ability to process and respond to visual information has a great impact on the outcome. For athletes It is said that athletes who get in touch with sports early will have more chances to achieve excellent results in the future. This study aims to understand the simple and complex reaction times of elementary school fencers, and analyze the speed and differences of elementary school fencers' reaction time. Methods: The age group of the school was used as the research object, and the elementary school fencing athletes were used as the subjects. The sound and light reaction time test was carried out on 12 healthy and uninjured athletes who continued fencing training. The methods were light and audio tests, respectively. 3 different colors of light sources red, yellow, green and 500HZ, 1000HZ, 3000HZ different frequencies of audio for data statistics, the test adopts the preparation posture of fencing, the time to jump off the pressure plate after hearing the command is the reaction time, and the data is calculated by statistical software SPSS 27 for data processing and analysis, using independent sample T-test to examine whether there are differences in simple and complex reaction time, gender, and age, and single-factor variance analysis to compare the correlation of different sword species. **Results & Conclusions:** There is no significant difference in the reaction time of light and sound among elementary school fencers in terms of gender, but the overall reaction time of older fencers is better than that of the younger group. It is necessary to strengthen the training related to their reaction ability and improve their response time. The response performance of fencing sports can be summarized through dynamic response-related training to strengthen the response ability, and the response ability can also be included in the reference and training suggestions for material selection.

**Key words:** sound and light sensing, dynamic response, explosive force

**Correspondence:** Wei-Cheng Lin, [wilson890704@gmail.com.tw](mailto:wilson890704@gmail.com.tw), +886-915315007

# 柔道選手賽前減重對身體素質之影響

張婷、黃怡婷、許太彥

國立臺中教育大學體育學系碩士班

**目的：**本研究乃探討選手賽前減重前後身體素質之差異。**方法：**徵召大專校院柔道專長之男性運動選手 7 名參加實驗，先進行前測(減重前)，然後進行為期兩週的減重，再進行後測(減重後)。本研究透過使用科學儀器人體運動機能評估系統 Afascan 來檢測選手身體素質並轉化成準確且可量化的數值，測驗項目包括：下肢爆發力(單次垂直跳)、上肢肌力(30 秒伏地挺身)、核心肌力(60 秒仰臥起坐)、柔軟度(單次體前彎)、敏捷性(15 秒原地小碎步快跑)、平衡性(單腳站立 30 秒)、肌耐力(30 秒高抬腿跑)。**結果與結論：**研究七項身體素質分析結果顯示，選手前後測的體重( $p=.004$ )、上肢肌力( $p=.007$ )皆達到顯著差異。減重是大多數技擊運動員比賽時要面臨的問題，若是以合理且漸進的方式進行減重，則可以達成目標及效果，降低減重所造成的不良影響，來提升選手在競賽場上之表現。

**關鍵詞：**人體運動機能評估系統、技擊運動、運動表現

主要聯絡者：張婷

通訊地址：台中市西區民生路 140 號 體育學系

電話：0932-561560

傳真：04-2218-3410

電子郵件信箱(Email):a0932561560@gmail.com

# The Effect Of Before The Competition Weight Loss On The Fitness Of Judo Athletes

Chang,Ting , Yi-Ting Huang , Tai-Yen Hsu

Department of Physical Education,National Taichung University of Education

**Purpose:** This study is to investigate the difference in physical fitness of athletes before and after weight loss before competition. **Method:** 7 male athletes who were specialized in judo from colleges and universities were recruited to participate in the experiment. The pre-test was conducted first, and then a two-week weight loss was carried out, and then the post-test was conducted. This study uses the scientific instrument human kinesiology evaluation system AfaScan to detect the physical fitness of the players and convert it into accurate and quantifiable values, The test items include: lower body explosive power(single vertical jump), upper body strength(30 seconds of push-ups), core strength(60 seconds of sit-ups), flexibility(single forward bend), agility(15 seconds of brisk walking in place), balance(30 seconds of stading on one foot), and muscular endurance(high knee run for 30 seconds). **Result and conclusion:** The analysis results of the seven physical fitness items showed that there were significant differences in the body weight( $p=.004$ ) and upper limb muscle strength( $p=.007$ ) of the contestants before and after the test. Weight loss is a problem faced by most combat sporter. If weight loss is carried out in a reasonable and gradual manner, the goal and effect can be achieved, and the adverse effects caused by weight loss can be reduced to improve the performance of the players on the field .

**Key words:** AfaScan ScanLeader, Combat sports, Sports Performance

**Correspondence:** Chang,Ting , a0932561560@gmail.com, 0932-561560

# 十六週漸進式阻力訓練對國中生下肢運動 能力之影響

鄭淳之 魏文亮 許太彥

國立臺中教育大學體育學系

**目的：**本研究探討中長期阻力訓練對青少年下肢運動能力之影響。**方法：**本實驗以臺中市某國中男學生7人為研究對象，分為實驗組3人與控制組4人，並對實驗組介入為期16週、每週2次、每次45分鐘的漸進式阻力訓練。在介入前先對所有受試者進行前測，測驗項目為六角槓鈴硬舉1RM與立定跳遠，以了解受試者的下肢肌力與爆發力。訓練介入後，再對受試者施以後測。本研究採成對樣本t檢定進行兩組組內前後測之參數比較，並以獨立樣本t檢定考驗兩組前後測成績進步百分比之差異性。顯著水準定 $\alpha = .05$ 。**結果與結論：**經16週阻力訓練，實驗組的組內前後測之參數，在六角槓鈴硬舉1RM與立定跳遠測驗的表現能力皆有顯著的進步( $p < .05$ )；而控制組的組內前後測之參數在兩項測驗的表現能力皆未達顯著性的進步( $p > .05$ )。然而，比較兩組前後測差值百分比，雖然實驗組進步許多，但在兩項測驗上，未與控制組比較達顯著差異( $p > .05$ )。故本研究發現，中長期阻力訓練有提升國中生下肢最大肌力與爆發力表現的趨勢，若未來能擴大樣本數並增加測量方法，或許會有更進一步的發現。

**關鍵詞：**阻力訓練、國中生、下肢運動能力

# The Effect Of Resistance Training On Motor Ability Of Lower Limbs In Junior High School Students

Chun-Jhih Jheng, Wen-Liang Wei, Tai-Yen Hsu

Department of Physical Education, National Taichung University of Education, Taichung, Taiwan

**Introduction:** The purpose of this study was to investigate the effects of 16-week resistance training on junior high school male students' motor ability of lower limbs. **Methods:** This experiment took junior high school students as subjects from a junior high school in Taichung. They were separated into the experimental group and the controlled group, and the experimental group participated in progressive resistance training. The total duration of this training was 16 weeks, 2 times a week and 45 minutes each time. All subjects participated in pre-tests and post-tests before and after training. The test items included 1RM Trap bar deadlift and standing long jump to understand the lower limb muscle strength and power of the subjects. Paired Sample t test of statistical methods was used to compare the parameters between pre tests and post tests of the same group. Independent Sample t test was applied to compare the progress percentage between the two groups, the experimental group and the controlled group. The level of significance was set as  $\alpha=.05$ . **Results & Conclusions:** According to the analysis of Paired Sample t test for the experimental group, there was significant progress in performance of 1RM Trap bar deadlift and standing long jump ( $p < .05$ ) ; comparatively for the control group, performance of 1RM Trap bar deadlift and standing long jump were no significant difference ( $p > .05$ ). Based on the analysis of Independent Sample t test, the strength and the power of lower limb was improved, but no significant difference of training effects were found among the experimental group and the control group ( $p > .05$ ). It was showed that resistance training has a tendency to improve junior high school students' muscle strength and power. If the sample size and measurement methods can be expanded in the future, further discoveries may be found.

**Key words:** resistance training, junior high school students, motor ability of lower limbs

**Correspondence:** Chun-Jhih Jheng, [alice6962951@gmail.com](mailto:alice6962951@gmail.com), +886-978-095-169

# 大專籃球選手身體組成與下肢肌力之 相關性研究

周德鈞

輔仁大學體育學研究所

**目的:**探討大專籃球選手體脂肪率、下肢肌肉量與下肢最大肌力之相關性。**方法:**本研究針對 17 位輔仁大學男性籃球選手，透過雙能量 X 光骨質密度吸收測量儀 (DXA) 及等速肌力訓練儀檢測其身體組成及慣用腳膝關節伸直之最大轉矩。實驗數據以皮爾森積差相關進行統計分析。**結果:**研究顯示下肢肌肉量與下肢最大肌力之間達到中度正相關( $r=.666, p=.004$ )；體脂肪率與下肢最大肌力之間未達到顯著的相關( $r=-.060, p=.820$ )。**結論:**研究顯示大專籃球選手下肢肌肉量與下肢最大肌力之間有中度的相關性，體脂肪率與下肢最大肌力之間沒有顯著相關性。因此，本研究建議肌力與體能訓練相關人員在提升籃球選手下肢肌力時，能將下肢肌肉量作為主要評估的重要因子，而未來則可以進一步探討籃球選手下肢肌肉量與下肢最大肌力關係之評估。

**關鍵詞:**體脂肪率、下肢肌肉量、下肢最大肌力



# The Correlation Between Lower Extremity Strength And Body Composition Of College Basketball Player

Te-Chun Chou

Graduate Institute of physical education, Fu Jen University, Taiwan.

**Introduction:** This study examined the relationship between body fat percentage, lower extremity muscle mass and lower extremity strength of college basketball players.

**Method:** 17 collegiate men's basketball players using Dual-energy X-ray bone density absorptiometry (DXA) and Biodex system to detect their body composition and knee extension maximum torque of dominant foot. Pearson product-moment correlation coefficients( $r$ ) were performed on all measured to identify whether any significant relationships were presented between body fat percentage, lower extremity muscle mass and lower extremity strength. **Result:** Significant correlation were observed between lower extremity muscle mass and lower extremity strength ( $r=.666$ ,  $p=.004$ ), nonsignificant correlation between body fat percentage and lower extremity strength( $r=-.060$ ,  $p=.820$ ). **Conclusion:** This study has shown that there is a middle correlation between lower extremity muscle mass and lower extremity strength, and there is no significant correlation between body fat percentage and lower extremity strength. Therefore, this study suggests that muscle strength and conditioning coaches can use lower extremity muscle mass as an important factor in the main evaluation when improving lower extremity strength of basketball players. In the future, the evaluation of the relationship between basketball players' lower extremity muscle mass and lower extremity strength can be further explored.

**Key words:** body fat percentage, lower extremity muscle mass, lower extremity strength

**Correspondence:** Te-Chun Chou, [hankchou9803@gmail.com](mailto:hankchou9803@gmail.com), 0903151930

# 大專籃球選手身體組成與心肺適能之 相關性研究

周德鈞

輔仁大學體育學研究所

**目的:**探討大專籃球選手體重、體脂肪率與心肺適能之相關性。**方法:**本研究針對 17 位輔仁大學男性籃球選手，透過雙能量 X 光骨質密度吸收測量儀(DXA)及人體呼吸代謝測量系統檢測其身體組成及最大攝氧量。實驗數據以皮爾森積差相關進行統計分析。**結果:**研究顯示體重與最大攝氧量之間達到高度負相關( $r=-.734$ ， $p=.001$ )；體脂肪率與最大攝氧量之間未達到顯著的相關( $r=.001$ ， $p=.997$ )。**結論:**研究顯示大專籃球選手體重與最大攝氧量之間有高度的相關性，體脂肪率與最大攝氧量之間沒有顯著相關性。因此，本研究建議肌力與體能訓練相關人員在提升籃球選手心肺適能時，能將體重作為主要評估的重要因子，而未來則可以進一步探討籃球選手體重與心肺訓練關係之評估。

**關鍵詞:**體重、體脂肪率、心肺適能

# The Correlation Between Cardiorespiratory Fitness And Body Composition Of College Basketball Player

Te-Chun Chou

Graduate Institute of physical education, Fu Jen University, Taiwan.

**Introduction:** This study examined the relationship between body weight, body fat percentage and cardiorespiratory fitness of college basketball players. **Method:** 17 collegiate men's basketball players using Dual-energy X-ray bone density absorptiometry (DXA) and human respiratory metabolism measurement system to detect their body composition and maximum oxygen consumption (VO<sub>2</sub>max). Pearson product-moment correlation coefficients(*r*) were performed on all measured to identify whether any significant relationships were present between body weight, body fat percentage and maximum oxygen consumption (VO<sub>2</sub>max). **Result:** Significant correlation were observed between body weight and VO<sub>2</sub>max( $r=-.734$  ,  $p=.001$ ), nonsignificant correlation between body fat percentage and VO<sub>2</sub>max( $r=.001$  ,  $p=.997$ ).

**Conclusion:** This study has shown that there is a high correlation between the body weight and the maximum oxygen uptake, and there is no significant correlation between the body fat percentage and the maximum oxygen uptake. Therefore, this study suggests that muscle strength and conditioning coaches can use body weight as an important factor in the main evaluation when improving the cardiorespiratory fitness of basketball players. In the future, the evaluation of the relationship between basketball players' body weight and cardiorespiratory fitness can be further explored.

**Key words:** body weight, body fat percentage, cardiorespiratory fitness

**Correspondence:** Te-Chun Chou, [hankchou9803@gmail.com](mailto:hankchou9803@gmail.com), 0903151930

# 咖啡因口香糖對籃球選手飛輪慣性阻力訓練裝置運動表現之影響之探討

王安瑜<sup>1</sup>

<sup>1</sup> 國立臺灣體育運動大學運動健康科學系

**目的：**咖啡因不論在國內外皆為廣泛被使用的運動增補劑之一，而咖啡因補充方式除了常見的咖啡、膠囊及運動飲料外，其他透過口腔黏膜吸收的形式(如：口香糖、漱口水)與腸道吸收相比可以更快的被吸收，咖啡因快速的吸收可增強肌肉力量、速度和爆發力，進而增強運動表現。本研究旨在為探討咖啡因口香糖咀嚼對於籃球選手從事飛輪慣性阻力訓練運動表現是否具有效果。**方法：**本研究招募 13 位受過專業訓練的男性籃球運動員為受試者，利用隨機交叉單盲實驗設計，分為咖啡因口香糖實驗組(CAF)及一般口香糖安慰組(PLA)進行交叉測試，受試者口香糖每次咀嚼 10 分鐘，並於咀嚼後休息 15 分鐘執行飛輪慣性阻力訓練裝置 (Excentric KBOX) 測驗，完成 3 組 6 下測驗，並經由 kMeter 系統取得平均功率(Average Power)、向心功率峰值(Concentric Peak Power)、離心功率峰值(Eccentric Peak Power)、平均力量(Average Force)、平均速率(Average Speed)、峰值速率(Peak Speed)及總功(Total Work)等數據。實驗數據以相依樣本 T 檢定分析及雙因子變異數分析進行統計分析。**結果：**本研究結果發現 CAF 組的平均功率(P=0.012)、向心功率峰值(P=0.013)、離心功率峰值(P=0.013)、平均力量(P=0.028)、及總功(P=0.010)皆顯著高於 PLA 組，其餘參數之間則是沒有顯著差異。**結論：**籃球選手在執行飛輪慣性阻力訓練前，使用咖啡因口香糖有助於維持或提升慣性阻力訓練裝置的運動品質。

**關鍵字：**飛輪、離心訓練、咖啡因口香糖

**通訊作者：**王安瑜，[giting1126@gmail.com](mailto:giting1126@gmail.com), +886-911655465

# Effects Of Caffeinated Chewing Gum On Flywheel Resistance Training Performance In Basketball Player

An-Yu Wang<sup>1</sup>

<sup>1</sup>Department of Exercise and Health Science, National Taiwan University of Sport

**Background:** Caffeine is one of the most widely used ergogenic aids both domestically and internationally. In addition to coffee, capsules and sports drinks, other forms of caffeine supplementation that are absorbed through the oral mucosa (e.g., chewing gum, mouthwash) can be absorbed more rapidly than intestinal absorption. The rapid absorption of caffeine can enhance muscle strength, speed and explosive power, thereby enhancing athletic performance. The purpose of this study is to investigate whether caffeinated chewing gum has an effect on the athletic performance of basketball players engaged in flywheel resistance training. **Methods:** Thirteen male basketball players who engaged in professional training at least three years were recruited as subjects in this study. The crossover randomised single-blind trial was used to divide the subjects into the experimental group of caffeinated chewing gum and the control group of general gum for crossover trails. The subjects chewed the gums ten minutes each time and took a fifteen minutes break, after chewing to perform 3 sets of 6 repetitions on a flywheel device( Exxentric KBOX ). Finally, the average power, concentric peak power, eccentric peak power, average force, average speed, peak speed and total work were obtained by the kMeter. The experimental data was statistically analyzed by the paired sample t-test and the two-way analysis of variance (ANOVA).**Results:** The results of the research showed that average power (P=0.012), concentric peak power (P=0.013), eccentric peak power (P=0.013), average force (P=0.028), and total work (P=0.010) of CAF group were found to be significantly higher than those of PLA group, while the rest of the data were not significantly different.**Conclusions:** Before performing flywheel resistance training for basketball players, the use of caffeinated chewing gum helps maintain or enhance the movement quality of flywheel device.

**Keywords:** flywheel, resistance training, caffeinated chewing gum

## 碳水化合物漱口對女壘球打者的表現影響

林淑君<sup>1</sup>、徐意杰<sup>2</sup>、邱志暉<sup>3</sup>

國立臺灣體育運動大學運動健康科學系

**研究背景：**過去研究顯示，補充少量碳水化合物或是利用碳水化合物漱口就能透過口腔中的受體刺激中樞神經，增加運動員的運動表現。然而，使用碳水化合物漱口對於女壘球打者是否有提升運動表現結果，目前仍不清楚。本篇研究目的探討碳水化合物漱口對於女壘球打者打擊表現的影響。**研究方法：**使用隨機交叉單盲的實驗設計，以 15 名（年齡：20.2±1.3 歲；身高：159.4±5.1 公分；體重：58.0±6.9 公斤）受過專業訓練的大專女壘打者為研究對象，在充分熱身後進行 5 下 5 組的 T 座打擊測試，並在每組測試前，分別使用 25mL 含 6.4% 麥芽糊精水溶液 (maltodextrin trial, MR) 或安慰劑 (placebo trial, PLA) 漱口 20 秒後吐掉，並使用 Rapsodo 機器測量擊球初速、擊球仰角，並將擊球仰角的標準差視為擊球一致性之指標。MR 組與 PLA 組之間使用成對樣本 t 檢定分析，顯著水準定為  $\alpha=0.05$ 。**研究結果：**碳水化合物漱口組與安慰劑組相比，擊球仰角一致性 (MR：5.06°±0.90°；CON：5.81°±1.51°；p=0.02) 顯著低於安慰劑組。然而，在擊球初速 (MR：96.68±4.74 km/h；PLA：96.75±4.85 km/h；p=0.79) 與擊球仰角 (6.65°±2.86°；CON：6.41°±2.57°km/h；p=0.57) 並無顯著差異。**研究結論：**利用碳水化合物漱口可以有效維持較佳的擊球穩定程度，然而，對於擊球初速和擊球仰角沒有顯著影響。

**關鍵詞：**擊球初速、擊球仰角、擊球仰角一致性

# The Impact Of Carbohydrate Mouth Rinsing On Softball Hitting Performance

Shu-Jun Lin<sup>1</sup>, Yi-Jie Shiu<sup>2</sup>, Chih-Hui Chiu<sup>3</sup>

**Background:** Previous studies have found that taking small amounts of carbohydrates or gargling with carbohydrates can improve athletic performance by stimulating the central nervous system through receptors in the mouth. However, it is still unknown whether carbohydrate gargling has performance-enhancing effects on female softball players. This study aimed to investigate the effects of carbohydrate gargling on female softball players' batting performance. **Method:** A randomized crossover single-blind experimental design was used to test 15 professionally trained female college softball players (age:  $20.2 \pm 1.3$  years; height:  $159.4 \pm 5.1$  cm; weight:  $58.0 \pm 6.9$  kg). After a thorough warm-up, the players underwent 5 sets of 5 T-base batting tests, with 25 mL of maltodextrin solution (6.4%) administered before each set. The standard deviation of batting elevation angle was used as an indicator of batting consistency. Paired samples t-test analysis was performed between the carbohydrate gargle group (MR) and placebo group (CON) with the significance level set at  $\alpha = 0.05$ . **Results:** The carbohydrate mouth rinsing group showed a significantly lower batting elevation consistency (MR:  $5.06^\circ \pm 0.90^\circ$ ; CON:  $5.81^\circ \pm 1.51^\circ$ ;  $p=0.02$ ) compared to the placebo group. However, there was no significant difference in initial batting speed (MR:  $96.68 \pm 4.74$  km/h; PLA:  $96.75 \pm 4.85$  km/h;  $p=0.79$ ) and batting elevation angle ( $6.65^\circ \pm 2.86^\circ$ ; CON:  $6.41^\circ \pm 2.57^\circ$  km/h;  $p=0.57$ ). **Conclusion:** Carbohydrate mouth rinsing was effective in maintaining better batting consistency, but it did not have a significant effect on initial batting speed and batting elevation angle.

**Key words:** batting velocity, batting elevation, and batting elevation consistency

**Correspondence:** Shu-Jun Lin, [s7779993@yahoo.com.tw](mailto:s7779993@yahoo.com.tw), +886975292658

# 咖啡因口香糖對於 籃球選手的無氧衝刺能力表現的影響

陳宗誠<sup>1</sup>、邱志暉<sup>2</sup>

國立臺灣體育運動大學競技運動學系

**研究背景:** 咖啡因在許多研究已被證實能有效增加耐力表現。使用咖啡因口香糖的方式攝取，可以增加咖啡因的攝取速度。然而，對於籃球選手來說是否有提升運動表現的效果，目前仍不清楚。本研究目的為探討咖啡因口香糖介入對於籃球選手無氧衝刺表現能力的影響。**研究方法:** 本研究以 14 名(平均身高  $181\pm 5.92$  公分、體重  $76.97\pm 7.2$  公斤；攝取 3 毫克咖啡因/公斤)受過專業訓練的籃球成年運動員為研究對象。使用隨機交叉的實驗設計，分咖啡因口香糖實驗組(caffeine trail，簡稱 CAF)以及一般口香糖安慰劑組(Placebo trial，簡稱 PL)。受試者在嚼食咖啡因或安慰劑口香糖 10 分鐘之後，休息 5 分鐘進行熱身約 15 分鐘。熱身後隨進行無氧能力測試受測者聽到口令後，立即以最快速度進行 35 公尺衝刺，直到通過終點線才可放慢速度。受測者通過終點線(35 公尺處)，須回到 35 公尺處，為下一趟衝刺的起點。使用光柵紀錄單趟衝刺時間，本測驗共進行 6 趟 35 公尺衝刺，每次衝刺間隔 10 秒。進行完第一次的實驗之後，受試者經過 7-10 天的休息恢復，隨即進行下一次的分組實驗使用成對樣本 t 檢定比較咖啡因組和安慰劑組之間指標的差異，並將顯著性定義為  $\alpha=0.05$ 。**研究結果:** 補充咖啡因口香糖與安慰劑相比，咖啡因組的疲勞指數(CAF:  $0.47\pm 1.62$ (瓦特/秒數)；PL:  $0.79\pm 2.76$ (瓦特/秒數)； $p=0.009$ )，顯著低於於安慰劑組。然而，最大無氧功率則是沒有顯著差異((CAF:  $1354.86\pm 46$ (瓦特).19；PL:  $1326.69\pm 78.31$ (瓦特)； $p=0.328$ )。研究結論: 經本研究證實，於賽前補充咖啡因口香糖可以顯著降低籃球選手的無氧衝刺的疲勞指數

**關鍵詞:**無氧動力、疲勞指數



# The Effect Of Caffeinated Chewing Gum On The Running Based Anaerobic Sprint Test Performance Of Basketball Player

Zong-Cheng Chen<sup>1</sup>, Chih-Hui Chiu<sup>2</sup>

<sup>1</sup>Graduate Program, Department of Sport Performance, National Taiwan University of Sport, Taiwan.

**Background:** Caffeine has been shown in many studies to be effective in increasing endurance performance. The use of caffeine gum has been shown to increase the efficiency of caffeine absorption rate. However, it is still unclear whether it is effective in enhancing athletic performance for basketball players. The purpose of this study was to investigate the effect of caffeine gum intervention on anaerobic sprint performance of basketball players. **Methods:** The study involved 14 trained adult basketball players (average height  $181 \pm 5.92$  cm, weight  $76.97 \pm 7.2$  kg; intake 3mg caffeine/kg) were used as the participants in this study. A randomized crossover experimental design was used, with a caffeine trial (CAF) and a placebo trial (PLA). Participants chewed either caffeine or placebo gum for 10 minutes and then rested for 5 minutes to warm up. After 15 min warm-up, RAST (Running Based Anaerobic Sprint Test) The test subject will pass the finish line (35 meters) and return to 35 meters for the start of the next sprint. Use grating to record single trip sprint time. The test was conducted in six 35-meter sprints at 10-second intervals, and the testers needed all the test time and parameters. was performed. After the first experiment, the subjects recovered after 7-10 days of rest and then proceeded to the next subgroup experiment. **Result:** The fatigue index of the caffeine group (CAF:  $0.47 \pm 1.62$  (watts/second); PL:  $0.79 \pm 2.76$  (watts/second);  $p=0.009$ ) was significantly lower in the caffeine supplemented gum compared to the placebo group. However, the maximum anaerobic power was not significantly different ((CAF:  $1354.86 \pm 46.19$  (watts); PL:  $1326.69 \pm 78.31$  (watts);  $p=0.328$ )). **Conclusion:** This study confirmed that pre-game caffeine gum supplementation significantly reduced anaerobic sprint fatigue in basketball players. **Correspondence: E-mail: c791203@gmail.com**

# 咖啡因口香糖對於籃球專項運動 表現的影響

劉後劭、邱志暉

國立臺灣體育運動大學運動健康科學學系

**目的：**本研究的研究目的為探討咀嚼咖啡因口香糖是否會影響籃球選手的運動表現。**方法：**本研究以 14 名(20.6±2.4 歲、181±9 公分、76.9±13 公斤)受過專業訓練的籃球成年運動員為研究對象。使用隨機交叉的實驗設計，分咖啡因口香糖實驗組 (Caffeine Chewing Gum trial, 簡稱 CG)以及一般口香糖安慰劑組 (Placebo trail, 簡稱 PL)。受試者在咀嚼 3mg/kg 咖啡因或安慰劑口香糖 10 分鐘之後，休息 5 分鐘進行熱身約 15-20 分鐘。熱身後隨即依序進行靜止罰球測試、T 型敏捷測試、反向跳測試、20 公尺分段衝刺測試(0-10m)、(10-20m)、(0-20m)。進行完第一次的實驗之後，受試者經過 7-10 天的休息恢復，隨即進行下一次的分組實驗。使用成對樣本 t 檢定比較 CG 組和 PL 組之間各項指標的差異，並將顯著性定義為  $\alpha < 0.05$ 。**結果：**本研究發現補充咖啡因口香糖在靜止罰球測試的分析比較後達顯著差異 ( $p=0.012$ )；T 型敏捷測試的分析比較後未達顯著差異 ( $p=0.571$ )；反向跳測試的分析比較後未達顯著差異 ( $p=0.094$ )；20 公尺分段衝刺測試的分析比較後未達顯著差異，0-10m ( $p=0.375$ )、10-20m ( $p=0.541$ )、0-20m ( $p=0.202$ )。**結論：**本研究顯示咀嚼 3mg/kg 咖啡因口香糖可以提升受過專業訓練的籃球選手靜止罰球測試的準確度，但無法有效提升敏捷、跳躍高度及加速度能力。

**關鍵詞：**罰球、爆發力、敏捷力

**通訊作者：**劉後劭，11006104@gm.ntus.edu.tw, +886-935304597

# Effects Of Caffeine Chewing Gum On Basketball-Specific Performance

Hou-Shao Liu, Chih-Hui Chiu

Department of Exercise and Health Science, National Taiwan University of Sport, Taiwan

**Introduction:** The purpose of this study was to investigate whether caffeine chewing gum affects the basketball-specific performance on basketball athletes. **Methods:** Fourteen ( $20.6 \pm 2.4$  years;  $181 \pm 9$  cm;  $76.9 \pm 13$  kg) basketball adult athletes who have received professional training were taken as the research participants. Using the randomized crossover design, they were divided into caffeine chewing gum trial (CG) and placebo trail (PL). After chewing 3 mg/kg caffeine or placebo gum (without caffeine) for 10 minutes, the participants rested for 5 minutes then warm up for 15-20 minutes. After warm-up, they performing the static free throw test, T-test, counter movement jump test and 20-meter segmented dash test (0-10m; 10-20m; 0-20m). The washout time were 7-10 days. The difference of each index between CG group and PL group was analyzed by paired T test, and the significance was defined as  $\alpha < 0.05$ . **Results:** The static free throw test score was significantly higher in CG trail compared to PL trial. No significant difference was found in T-test ( $p=0.571$ ), counter movement jump( $p=0.094$ ) and 20-meter segmented dash test (0-10m,  $p=0.375$ ; 10-20m,  $p=0.541$ ; 0-20m,  $p=0.202$ ). **Conclusions:** This study shows that chewing 3 mg/kg caffeine gum for ten min improves accuracy of static free throw test but not agility, jump height and acceleration in professionally trained basketball players.

**Key words:** free throw, power, agility

**Correspondence:** Hou-Shao Liu, [11006104@gm.ntus.edu.tw](mailto:11006104@gm.ntus.edu.tw), +886-935304597

# 咖啡因口香糖對女壘打者運動表現之影響

戴敬文<sup>1</sup> 李韋慶<sup>2</sup> 邱志暉<sup>1</sup>

<sup>1</sup>國立臺灣體育運動大學運動健康科學系 <sup>2</sup>國立臺灣體育運動大學運動競技學系

**研究背景：**咖啡因口香糖在過去研究被證實具有提升爆發力、無氧能力、專注力等促進運動表現之功能。本研究目的為探究咖啡因口香糖的介入，對於女壘球員打擊表現的影響。**研究方法：**14名(年齡 $20.6\pm 1.3$ 歲；身高 $160.0\pm 4.9$ 公分；體重 $59\pm 6.1$ 公斤)接受過專業訓練的女壘選手，以隨機交叉單盲的實驗設計，分成咖啡因口香糖組(caffeine gum, 簡稱CM)與安慰劑口香糖組(placebo trail, 簡稱PL), 受試者進行完第一次實驗後，經過至少7天的恢復期，再進行下一組實驗。實驗中，受試者先咀嚼咖啡因口香糖(內含200毫克咖啡因)或是安慰劑(不含咖啡因的一般口香糖)10分鐘，咀嚼後休息熱身15分鐘，進行打擊能力檢測，使用T座打擊的方式測試，受試者須將球擊至目標位置，5球為一組，總共進行3組，中間休息10分鐘，預計測量擊球初速及擊球仰角，作為分析受試者打擊控制能力的指標。**研究結果：**比較實驗組及控制組，發現補充咖啡因口香糖組，在擊球初速(CM:98.6 km/h; PL: 97.1 km/h;  $p=0.032$ )及最大擊球初速(CM:103.3 km/h; PL: 101.7 km/h;  $p=0.029$ )的表現皆高於安慰劑組。在擊球仰角及擊球穩定性則無顯著差異。**研究結論：**本研究顯示運動前咀嚼咖啡因口香糖，可以顯著提升女壘球員的擊球初速及最大擊球初速表現。

**關鍵詞：**擊球初速、擊球仰角、最大擊球初速

# The Effects Of Caffeinated Chewing Gum On Hitting Performance Of Trained Female Softball Players

Ching-Wen Tai<sup>1</sup>, Lee Wei-Ching<sup>2</sup>, Chih-Hui Chiu<sup>1</sup>

<sup>1</sup>Department of Exercise Health Science, National Taiwan University of Sport, Taiwan.

<sup>2</sup> Department of Sport Performance, National Taiwan University of Sport, Taiwan.

**Background:** Caffeinated gum has been reported to improve exercise performance by elevating power, anaerobic capability and concentration. This study investigated the effects of caffeine chewing gum on hitting performance of trained female softball players. **Methods:** 14 (age: 20.6±1.3 years; height: 160.0±4.9 cm; weight: 59±6.1 kg) female trained softball players completed caffeine gum trial (CM) and placebo trial (PL) in a single-blind cross-over design with random order separated by at least 7 days. The participants chewed either 200 mg of caffeinated gum (CM) or placebo gum (PL) without caffeine for 10 min. After a 15-minute rest and warming up, the participants hit 5 balls in the batting tee for 3 times with 10 min rest. The exit velocity and exit angle were used to analyze a batter's ability. **Result:** Exit velocity (CM: 98.6 km/h; PL: 97.1 km/h; p=0.032) and max exit velocity (CM: 103.3 km/h; PL: 101.7 km/h; p=0.029) of the CM trial were significantly higher than that of the PL trial. There were no significant differences in exit angle and swing stability. **Conclusion:** The results of this study indicated that chewing caffeinated gum before softball hitting can significantly enhance exit velocity and max exit velocity for female softball players.

**Key words:** exit velocity, exit angle, max exit velocity

**Correspondence:** Ching-Wen Tai, [11106009@gm.ntus.edu.tw](mailto:11106009@gm.ntus.edu.tw), +886972757736

# 碳水化合物漱口對於女壘投手運動 表現影響

林懷佑<sup>1</sup>、徐意杰<sup>1</sup>、邱志暉<sup>1</sup>

<sup>1</sup> 國立台灣體育運動大學運動健科科學學系

**背景：**碳水化合物漱口有許多研究證實可以降低疲勞感覺，促進運動表現。然而對於女壘投手表現是否有運動表現增益，目前尚不清楚。本研究目的為探討介入碳水化合物漱口對於女壘投手投球表現的影響。**方法：**以 6 名（年齡  $20.83 \pm 1.17$  歲；身高  $161.17 \pm 2.48$  公分；體重  $63.67 \pm 4.27$  公斤）受過專業訓練的成年女壘投手為研究對象，以單盲交叉實驗設計將受試者分為碳水化合物漱口（Metabolic rising, MR）組與安慰劑（Placebo, PL）組。受試者使用 25mL 含 6.4% 麥芽糊糖水溶液或是安慰劑進行漱口 20 秒，旋即執行投球能力檢測，共三局，每局包含 10 球直球與 5 球變化球，並使用 rapsodo 儀器記錄球速、轉速、垂直位移與水平位移。碳水化合物漱口組與安慰劑組之間的平均差異使用成對樣本 t 檢定，並將顯著性定義為  $p < 0.05$ 。**結果：**碳水化合物組的直球球速（MR： $78.54 \pm 6.05$  km/h；PL： $79.88 \pm 6.14$  km/h； $p = 0.051$ ）、下墜球球速（MR： $63.50 \pm 6.70$  km/h；PL： $64.49 \pm 8.60$  km/h； $p = 0.46$ ）、直球轉速（MR： $1043.21 \pm 244.89$  rpm；PL： $1080.13 \pm 256.37$  rpm； $p = 0.34$ ）、下墜球轉速（MR： $760.28 \pm 139.21$  rpm；PL： $806.78 \pm 130.35$  rpm； $p = 0.22$ ）、直球垂直位移（MR： $-5.03 \pm 10.35$  in；PL： $-3.75 \pm 11.18$  in； $p = 0.29$ ）下墜球垂直位移（MR： $-13.16 \pm 4.14$  in；PL： $-11.18 \pm 4.05$  in； $p = 0.14$ ）、直球水平位移（MR： $-3.01 \pm 1.87$  in；PL： $-4.26 \pm 4.15$  in； $p = 0.34$ ）、下墜球水平位移（MR： $-10.15 \pm 6.11$  in；PL： $-10.40 \pm 7.70$  in； $p = 0.88$ ）均無顯著性差異。**結論：**經本研究證實利用碳水化合物漱口並不會增進女子壘球投手投球表現。

**關鍵字：**碳水化合物漱口、壘球、直球球速、直球、變化球球速、直球垂直位移

# The Impact of Carbohydrate Mouth Rinse on the Performance of Female Softball Pitchers

Lin, Huai-Yu, Shiu Yi-Jie, Chih, Chiu, Chih-Hui

Department of Exercise Health Science, National Taiwan University of Sport, Taiwan.

**Background:** Carbohydrate mouth rinsing had been shown to reduce fatigue and enhance exercise performance. However, it is unclear whether carbohydrate mouth rinse provides performance benefits for female softball pitchers. The purpose of this study was to investigate the effects of carbohydrate mouth rinse on the pitching performance of female softball pitchers. **Methods:** Six professionally trained adult female softball pitchers (aged  $20.83 \pm 1.17$  years; height  $161.17 \pm 2.48$  cm; weight  $63.67 \pm 4.27$  kg) were recruited for this study. Using a single-blind crossover experimental design, the participants were randomly assigned to either the carbohydrate mouth rinse (Metabolic rising, MR) trial or the placebo (Placebo, PL) trial. The participants rinsed with 25 mL of a 6.4% maltodextrin solution or a placebo for 20 seconds before undergoing pitching performance testing. Three innings were performed, with each inning consisting of 10 fastballs and 5 drop balls. The ball speed, spin rate, vertical displacement, and horizontal displacement were recorded by rapsodo. The mean differences between the MR trial and PL trial were analyzed using paired-sample t-tests, with significance defined as  $p < 0.05$ . **Results:** There were no significant differences between the carbohydrate and placebo trials in fastball speed (MR:  $78.54 \pm 6.05$  km/h; PL:  $79.88 \pm 6.14$  km/h;  $p = 0.051$ ), drop balls speed (MR:  $63.50 \pm 6.70$  km/h; PL:  $64.49 \pm 8.60$  km/h;  $p = 0.46$ ), fastball spin rate (MR:  $1043.21 \pm 244.89$  rpm; PL:  $1080.13 \pm 256.37$  rpm;  $p = 0.34$ ), drop ball spin rate (MR:  $760.28 \pm 139.21$  rpm; PL:  $806.78 \pm 130.35$  rpm;  $p = 0.22$ ), fastball vertical displacement (MR:  $-5.03 \pm 10.35$  in; PL:  $-3.75 \pm 11.18$  in;  $p = 0.29$ ), drop ball vertical displacement (MR:  $-13.16 \pm 4.14$  in; PL:  $-11.18 \pm 4.05$  in;  $p = 0.14$ ), fastball horizontal displacement (MR:  $-3.01 \pm 1.87$  in; PL:  $-4.26 \pm 4.15$  in;  $p = 0.34$ ), or drop ball horizontal displacement (MR:  $-10.15 \pm 6.11$  in; PL:  $-10.40 \pm 7.70$  in;  $p = 0.88$ ). **Conclusion:** The results of this study indicate that using carbohydrate mouth rinse does not enhance the pitching performance of female softball pitchers.

**Keywords:** carbohydrate mouth rinse, softball, fastball speed, fastball, changeup speed, fastball vertical displacement.

# 混和成分營養補充品利得勁提升

## 橄欖球運動員衝刺爆發力

黃王享<sup>1</sup> 薛長立<sup>1</sup> 莊國禎<sup>2</sup> 林威名<sup>2</sup> 胡煜<sup>3</sup> 呂明真<sup>3</sup> 張薇婷<sup>3</sup> 張天鴻<sup>3</sup> 張振崗<sup>1</sup>

<sup>1</sup>國立臺灣體育運動大學競技運動學系 <sup>2</sup>國立臺灣大學體育室 <sup>3</sup>利統股份有限公司

利得勁包含支鏈胺基酸、薑黃素、雞精、蘋果萃取物等成分，具有抗氧化、抗發炎、促進酸鹼平衡等生理功能。本實驗目的為探討在訓練期補充利得勁對橄欖球專項體能表現影響，以及對疲勞和肌肉疼痛影響。方法：研究對象為大學一般組男性橄欖球員 18 名(身高:  $173.61 \pm 6.39$  公分；體重:  $77.61 \pm 12.57$  公斤)，排除 1 個月內有肌肉或骨骼受傷者，採用雙盲平行設計，隨機分為利得勁組(n=8)與安慰劑組(n=10)，分別補充利得勁組或安慰劑，為期 14 日，於每日訓練前補充兩錠。補充前後進行橄欖球專項體能，包含 10、20、40 m 衝刺、30 m 折返跑 6 次、zig zag 變換方向能力測試、反應敏捷、反動作跳、20 kg 負重反動作跳、藥球推遠、prone Yoyo Intermittent Recovery Test level 1；每次訓練後，收集球員自覺疲勞量表(ratings of perceived exertion)並以視覺類比量表(visual analogue scale)評估股四頭肌酸痛程度。各項數值以成對 T 檢定或無母數分析，比較各組內前後測差異。結果與結論：利得勁組 20 公尺衝刺速度顯著提升(前測: $3.19 \pm 0.25$  s，後測: $3.07 \pm 0.17$  s,  $p < 0.001$ )，其餘體能測驗前後測皆無顯著差異；訓練日之自覺疲勞與肌肉疼痛在補充前後皆無顯著差異。結論:補充利得勁可能可以提升大學一般組男性橄欖球員爆發力，但對其他專項體能項目以及訓練後疲勞與肌肉疼痛無顯著影響。

**關鍵詞：**橄欖球、爆發力、肌肉疼痛



# Mixed-component supplementation Lesscramp significantly elevated sprint power of rugby players

Wang-Shiang Huang<sup>1</sup>, Chang-Li Hsueh<sup>1</sup>, Kuo-Chen Chuang<sup>2</sup>, Wei-Ming Lin<sup>2</sup> Yu Hu<sup>3</sup>, Mingjhen Lu<sup>3</sup>, Weiting Chang<sup>3</sup>, Tienhung Chang<sup>3</sup>, Chen-Kang Chang<sup>1</sup>

<sup>1</sup>Department of Sport Performance, National Taiwan University

<sup>2</sup>The Athletic Department, National Taiwan University

<sup>3</sup>Lytone Enterprise, Inc

**Introduction:** Lesscramp is a mixed component supplement which contains branched-chain amino acids, curcumin, chicken essence, and apple extracts. The components have antioxidative, anti-inflammatory, and buffering capacities. This study investigated the effect of Lesscramp supplementation on rugby-specific physical performance, pain(visual analogue scale) and fatigue(ratings of perceived exertion). **Methods:** Eighteen recreational university male rugby players participated in this study (height : $173.61 \pm 6.39$  cm; weight: $77.61 \pm 12.57$  kg). This study used a double-blind parallel design. The participants were randomly assigned to Lesscramp (n=8) or control (n=10) trial. The participants consumed the respective supplement for 14 days. One tab of supplement was consumed each day before the training. Before and after trial, a set of rugby-specific performance tests were conducted, including 10, 20, 40 m sprint, 30 m x 6 repeated sprint, zig zag test, reactive agility, countermovement jump, 20 kg loaded countermovement jump, medicine ball push, and prone Yoyo Intermittent Recovery Test level 1. Record player ratings of perceived exertion(RPE) and quadriceps dominant leg visual analogue scale (VAS) after training. Paired t-test, or nonparametric tests were used the analyze of before and after test in two trials. **Results & Conclusions:** Rugby-specific physical performance showed significantly improvement in 20m sprint (pre:  $3.19 \pm 0.25$  s, post:  $3.07 \pm 0.17$  s,  $p < 0.001$ ) after Lesscramp supplementation. Other tests were similar in all participants before and after the supplementation in both trials. On the training day, there was no significant difference in fatigue and muscle pain before and after supplementation. **Conclusions:** Lesscramp supplementation may improve explosive power in recreational male rugby players. No effect of supplement on fatigue nor on muscle pain after training.

**Key words:** rugby, explosive power, muscle pain, fatigue

**Correspondence:** Wang-Shiang Huang, [11004021@gm.ntus.edu.tw](mailto:11004021@gm.ntus.edu.tw), 0963214213

# 不同運動訓練對老化停經之胰島素阻抗和 胰島素誘導之血管功能的影響

董玠均 劉馨璟 楊艾倫

臺北市立大學運動科學研究所

**背景與目的：**現今全球停經後期婦女的人口比例持續上升，而停經與心血管疾病有相當大的關聯。過去的文獻證實，無論有氧或阻力訓練，皆有助於改善老年人及停經婦女之心血管功能。此外，胰島素被認為與心血管功能和血壓調節有關。因此，本研究探討十二週不同運動訓練後，經胰島素誘導之血管功能的影響與調節機制。**方法：**本實驗採用模擬老化停經之雌性自發性高血壓大鼠(spontaneously hypertensive rats, SHR)和同週齡正常血壓大鼠(normotensive Wistar-Kyoto rats, WKYs)，隨機分成四組：高血壓有氧運動組(SHR-EE)、高血壓阻力運動組(SHR-RE)、高血壓控制組(SHR-CON)和正常血壓對照組(WKY-CON)。為期十二週的運動介入後，於四十八週齡進行胰島素誘導之血管舒張反應及血清胰島素阻抗測試。**結果：**無論在 SHR-EE 組或 SHR-RE 組，皆顯著改善經胰島素誘導之血管舒張反應，亦顯著改善 SHR-RE 組的胰島素阻抗指數。而在空腹血糖及胰島素濃度的部分，四組則未達顯著差異。**結論：**透過十二週不同的運動訓練，皆有助於改善老化停經之自發性高血壓大鼠經胰島素所調控的血管舒張功能。**關鍵詞：**運動訓練、胰島素、血管舒張

# Effects Of Different Exercise Training On Insulin Resistance And Insulin-Induced Vascular Function In Elderly Menopause

Jie-Jun Dong, Hsin-Ching Liu, Ai-Lun Yang

Institute of Sports Sciences, University of Taipei, Taiwan

**Background and purpose:** Nowadays, the proportion of postmenopausal women in the world is rising. Menopause is largely related to cardiovascular diseases. Previous studies for elderly and postmenopausal women have shown that both endurance exercise (EE) and resistance exercise (RE) are able to improve cardiovascular function. In addition, insulin is involved in the regulation of cardiovascular function and blood pressure. Accordingly, this study investigated the effect of twelve-week different exercise training on insulin-induced vascular function and regulatory mechanisms.

**Methods:** This study used the model of elderly menopausal spontaneously hypertensive rats (SHRs) and age-matched normotensive Wistar–Kyoto rats (WKYs) randomly divided into four groups: SHR with endurance exercise (SHR-EE), SHR with resistance exercise (SHR-RE), SHR control (SHR-CON), and WKY control (WKY-CON) groups. After 12-week different exercise training, the insulin-induced vasodilation response and serum insulin resistance index were performed in the 48-week-old rats. **Results:** In the SHR-EE and SHR-RE groups, the insulin-induced vasodilation response was significantly improved. Besides, insulin resistance index was also significantly improved in the SHR-RE group. However, there were no significant differences in fasting blood glucose and insulin concentration among the four groups.

**Conclusion:** The 12-week different exercise training were helpful to ameliorate the vascular function regulated by insulin in the model of elderly menopausal SHR.

**Keywords:** exercise training, insulin, vasodilation

**Correspondence:** Professor Ai-Lun Yang, yangailun@gmail.com, +886-2-2871-8288 ext. 5815

# 身體活動與動作協調能力對於學齡前兒童 注意力不足過動傾向與執行功能關聯性之 調節作用

鄒曉郡<sup>1</sup>，許芳瑜<sup>1</sup>，吳昇光<sup>2</sup>，李曜全<sup>1</sup>

<sup>1</sup> 台灣中國醫藥大學物理治療學系

<sup>2</sup> 台灣體育大學競技運動學系

**目的：**注意力不足過動症(attention deficit hyperactivity disorder, ADHD) 是常見的兒童及青少年神經發展障礙，主要症狀包括注意力不足、過動和衝動，可能影響兒童在家庭或學校的自我照顧或社交技能。許多研究已發現身體活動(physical activity, PA)及動作協調能力(motor coordination, MC)可能影響 ADHD 兒童的執行功能。然而，鮮少有文獻探討 ADHD 學齡前兒童的 PA 與 MC 是否同時對於執行功能具有調節作用，以及對 ADHD 和執行功能之間的關係是否有不同的貢獻。因此，本研究主要探討學齡前兒童之 PA 與 MC 對於 ADHD 問題與執行功能之間的調節作用。**方法：**本研究招募 123 名 4-6 歲學齡前兒童（平均年齡  $61.83 \pm 7.48$  個月，63 名男孩）；使用第二版兒童動作評估測驗檢測 MC，以及經驗證的 iPad 應用程式評估抑制控制、工作記憶和認知彈性。父母填寫中文版兒童行為檢核表與兒童休閒活動研究量表，分別評估 ADHD 問題和 PA。最後使用 PROCESS v3.5 marco for SPSS 22.0 for Windows 進行調節作用之分析。**結果與結論：**結果顯示僅有 MC 對於 ADHD 問題和抑制控制之間有顯著的調節效應（未標準化係數=.0016，SE=.0003， $p < .001$ ），當兒童有中等（平均值）或較高（+1SD）的 ADHD 問題程度時，MC 較好可改善抑制控制的表現；PA 則未有任何顯著的調節效應。結果表明 MC 能夠防止因 ADHD 問題所導致的抑制控制能力下降，因此以 MC 為導向的介入可能是改善 ADHD 兒童抑制控制能力的有效方法。

**關鍵詞：** 注意力不足過動症，身體活動量，認知，運動能力，學齡前

# The Moderating Effects Of Physical Activity And Motor Coordination On The Relationship Between Attention Deficit/Hyperactivity Problems And Executive Function In Preschool Children

Chaw Xiao Jun<sup>1</sup>, Fang-Yu Hsu<sup>1</sup>, Sheng K. Wu<sup>2</sup>, Yao-Chuen Li<sup>1,\*</sup>

<sup>1</sup> Department of Physical Therapy, China Medical University, Taiwan

<sup>2</sup> Department of Sport Performance, National Taiwan University of Sport, Taiwan

**Introduction:** Attention Deficit/Hyperactivity Disorder (ADHD) is one of common neurodevelopmental disorders in children and adolescents. The main symptoms of ADHD include inattention, hyperactivity, and/or impulsivity, which may in turn impact children's self-care or social skills at home or school. In recent years, many studies have found that physical activity (PA) and motor coordination (MC) may be associated with executive functions (EFs), such as inhibitory control or working memory, in children with ADHD. However, there is scarce evidence investigating whether PA and MC have a moderating effect on the performance of executive functions in preschool children with ADHD and whether they may contribute differently to the relationships between ADHD and EFs. Therefore, this study was to investigate the moderating effects of PA and MC on these relationships between ADHD problems and EFs during early childhood. **Methods:** This study recruited one hundred and twenty-three preschool children aged between 4 and 6 years ( $61.83 \pm 7.48$  months), 63 of whom were boys (51.2%). We used the Movement Assessment Battery for Children - Second Edition to assess motor coordination and the validated iPad application to evaluate executive functions, including inhibition control, working memory, and cognitive flexibility. Parents were requested to fill out the Chinese version of the Child Behavior Checklist and The Children's Leisure Activities Study Survey to report children's ADHD problems and physical activity, respectively. The PROCESS v3.5 macro for SPSS 22.0 for Windows was used to examine the moderating effects of physical activity and motor coordination on the relationships between ADHD problems and executive functions. Three models were separately created with each independent variable of inhibition control, working memory, or cognitive flexibility. **Results & Conclusions:** The significant moderating effect of motor coordination was only found on the relationship between ADHD problems and inhibitory control (unstandardized coefficient = .0016, SE = .0003,  $p < .001$ ), whereas physical activity was not found to be a significant moderator. After graphing the result, children with the medium (mean) and higher (+1SD) levels of ADHD problems had better performance on inhibitory control if they

had better motor coordination, indicating that motor coordination would prevent the deterioration of inhibitory control resulted from ADHD problems. Therefore, motor coordination-oriented interventions may be an effective approach in improving the inhibitory control ability in children with ADHD, specifically those with the higher levels of ADHD problems.

**Keywords: Attention Deficit/Hyperactivity Disorder, physical activity, cognition, motor ability, preschool**

**Correspondence: Dr. Yao-Chuen Li, [yaochuenli@mail.cmu.edu.tw](mailto:yaochuenli@mail.cmu.edu.tw), +886-4-22053366 ext 7310**

# HIIT 對身體組成影響之探討

蔡維航 賴子維 楊佳政

國立臺中教育大學體育學系碩士班

**目的：**高強度間歇訓練(High Intensity Interval Training, HIIT)是健身界的一個非常受歡迎的訓練方法。許多人將其視為一種高效的方式來增強身體的健康和體適能，並在短時間內燃燒更多的卡路里。許多健身教練和健身中心都已經開始使用 HIIT 作為其健身課程的一部分，並且越來越多的研究正在進行，以了解 HIIT 對身體組成影響。本文目的是透過文獻搜尋，進行 HIIT 對身體組成影響之探討，了解 HIIT 運動對脂肪與肌肉的變化。**方法：**自 PubMed、airitilibrary 的資料庫中，以 High Intensity Interval Training、Body Composition 為關鍵字搜尋，依相關研究結果及結論找尋 HIIT 對身體組成組成的影響，並彙整相關架構。**結果與討論：**經由文獻統整結果發現 HIIT 運動平均共減去 2.74%的體脂肪，增加 1.49%的骨骼肌對於身體組成肌肉和脂肪的影響是有改善的。從眾多文獻中發現，HIIT 能在短時間內提供高效的訓練效果，縮短訓練時間。運動頻率至少達到 4 週以上，並且每週至少 2 次。在訓練形態方面，HIIT 可結合不同訓練動作元素參入其中。包括徒手訓練、阻力訓練與器械訓練等，但由於安全性的考量，建議需要一名專業教練監督下進行，以避免受傷。**結論：**HIIT 可有效達到增肌減脂的效果並且在每週規律的訓練後促進健康，可以給一般民眾或運動員提供一個合適的運動選擇。

**關鍵詞：**高強度間歇訓練、身體組成

**通訊作者：**蔡維航，m21043924@gmail.com, +886985-850-557.

# A Study on the Effects of HIIT on Body Composition

Wei-Hang Tsai, Zi-Wei Lai, Chia-Cheng Yang

Graduate Institute of Physical Education, National Taichung University of Education, Taiwan.

**Introduction:** High Intensity Interval Training (HIIT) is a very popular training method in the fitness community. Many people consider it as an efficient way to enhance their health and fitness and burn more calories in a short period. Many fitness instructors and fitness centers have begun using HIIT as part of their fitness programs, and more and more research is being conducted to understand the effects of HIIT on body composition. The purpose of this study is to investigate the effects of HIIT on body composition through a literature search to understand the changes in fat and muscle with HIIT exercise. **Methods:** We searched the databases of PubMed and airtilibrary with the keywords of High Intensity Interval Training and Body Composition to find the effects of HIIT on body composition according to the results and conclusions of related studies, and compiled the related framework. **Results & Conclusions:** The results of the literature compiled showed that HIIT exercises on average lost 2.74% of body fat and increased 1.49% of skeletal muscle, which improved the effects of body composition on muscle and fat. From a wide range of literature, it was found that HIIT can provide efficient training results in a short period and shorten the training time. The frequency of exercise should be at least 4 weeks and at least 2 times a week. In terms of training form, HIIT can be combined with different elements of training movements. However, due to safety concerns, it is recommended that a professional trainer be supervised to avoid injury. **Conclusion:** HIIT can effectively achieve the effect of muscle building and fat loss and promote health after regular weekly training, which can provide a suitable exercise option for the general public or athletes.

**Keywords:** high intensity interval training, body composition

**Corresponding:** Wei-Hang Tsai, [m21043924@gmail.com](mailto:m21043924@gmail.com), +886985-850-557.



# 以自我決定理論中simplex-like pattern檢

## 驗臺灣運動心理學研究的成果

張靖 聶喬齡

國立臺灣體育運動大學體育學系碩士班

**目的:**自我決定理論被廣泛的運用在運動當中,在研究運動中的自我決定動機時,動機可分為:內在動機、整合調節、認同調節、內設調節、外在調節及無動機等幾個動機的型態,然而 simplex-like pattern(聶喬齡、徐碧昭、李炳昭, [2023])。以集群分析方式檢驗華人家長式領導在運動員基本心理需求與動機和動機相關變項間差異情形。體育學報, 56(1), 125-142。 10.6222/pej.202303\_56(1).0008) 是自我決定理論中,結合有機體整合理論最重要的一個理論主張。simplex-like pattern 是自我決定的核心,但臺灣的研究中較少被提到,有些人甚至不知道,所以本研究的研究目的希望以自我決定理論中 simplex-like pattern 檢驗臺灣研究的成果。**方法:**以華藝中文電子期刊資料庫出版的體育相關文獻為搜尋對象,針對某些測量工具去測量發表的期刊為標的物去看其中是否有提到,若有提到的話則檢驗是否跟 simplex-like pattern 的理論主張是一致的。**結果:**經過以關鍵字運動動機、自我決定進行搜尋,搜尋出來的結果共 67 篇,有 9 篇有提到 simplex-like pattern,符合的有 4 篇,部分符合的有 5 篇。**討論:**simplex-like pattern 的理論在國內知道的人相對較少,所以很多人在結果當中沒有提供相關的資料去檢查,未來很顯然還有其他的用途,建議大家注意。

**關鍵詞:**運動動機、內在動機、整合調節、外在調節、無動機

**通訊作者:**聶喬齡, [clnien@gm.ntus.edu.tw](mailto:clnien@gm.ntus.edu.tw), 0928094085

# Using Self-Determination Theory to examine the results of Simplex-Like Pattern research in Taiwan.

Ching Chang, Chiao-Lin Nien

Department of Physical Education National Taiwan University of Sport

**Purpose:** The self-determination theory has been widely used in sports, When doing research on the self-determined motivation in sports, the motivation can be classified into several types: intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation, and amotivation, etc. However, the simplex-like pattern (Chiao-Lin Nien、Pi-Chao Hsu、Ping-Chao Lee [2023]。 Examination of relationships between paternalistic leadership behavior and psychological needs satisfaction or thwarting, motivation, and well-being or ill-being of college team sport athletes: A cluster analysis approach。 *Physical Education Journal*， 56 (1)， 125-142。 10.6222/pej.202303\_56(1).0008) is the most important theoretical proposition that combines the organismic integration theory in the self-determination theory. The simplex-like pattern is the core of self-determination, but it has been less mentioned in research conducted in Taiwan, and some people are not even aware of it. Therefore, the purpose of this study is to examine the results of research conducted in Taiwan by using the simplex-like pattern in the self-determination theory. **Methods:** The sports-related literature published in the electronic periodical database of Airiti Library was adopted in this study. Specific measurement tools were used to measure the targeted journals to see if they mentioned the simplex-like pattern and whether it was consistent with the theoretical proposition. **Results:** After searching using keywords such as sports motivation and self-determination, a total of 67 articles were found, of which nine mentioned the simplex-like pattern. Among them, four articles were consistent with the theoretical proposition, and the others partially met the criteria. **Discussion:** The simplex-like pattern theory is relatively unknown in Taiwan, so many research did not provide relevant information to examine the results. It is apparent that the simplex-like pattern theory may have other applications in the future, researchers should pay more attention to it.

**Keywords:** Sports motivation, intrinsic motivation, integrated regulation, external regulation, amotivation

**Corresponding Author:** Chiao-Lin Nien， [clnien@gm.ntus.edu.tw](mailto:clnien@gm.ntus.edu.tw)， 0928094085

# 不同族群學生參與運動社團及體育課 動機研究的結果

吳忠陽 聶喬齡

國立臺灣體育運動大學體育學系碩士班

**目的:**在臺灣社會環境下，促使人們對原住民產生刻板映像，如擁有較強的身體素質、對於競技運動較為拿手等，並間接賦予其種族框架。再者臺灣運動場上，原住民選手的出色表現，使這樣的框架變得更加穩固。換言之，非原住民於運動領域的看法，早已刻劃了相較於原住民有著先天劣勢的想法。因此藉由探討原住民與非原住民學生，對參與運動社團及體育課動機的差異，有助於理解臺灣社會環境框架下，不同族群身分對於體育運動的看法。同時思索隨著時代的變遷，不同族群身分是否對種族優劣的錯誤認知有所改善，並正視臺灣運動領域原住民的過度代表性現象。**方法:**以原住民與非原住民相關文獻為收尋對象，用華藝 CEPS 中文電子期刊資料庫與國家圖書館臺灣碩博士論文系統調查，針對不同族群學生間，因社會支持因素影響，使得參與運動動機產生差異為研究內容之文章進行回顧。**結果:**尋結果符合條件之文獻不多，因此以合併討論的方式，發現共有 41 篇的相關文件，其中完全符合的只有 7 篇。以原住民與非原住民學生，參與運動動機比較之研究數量甚少。相關研究中指出，原住民學生相對非原住民學生有較佳的社會支持，使其參與運動動機較非原住民學生高。**討論:**現今社會環境變遷，不同族群學生參與運動動機及社會支持上，是否已不同於過往，在未來還是個值得探討的議題。

**關鍵詞:**種族、運動參與、社會支持

**通訊作者:**聶喬齡，[clnien@gm.ntus.edu.tw](mailto:clnien@gm.ntus.edu.tw)，0928094085

# **Results Of The Study On The Participation In Sports Clubs And Motivation For Physical Education Classes Among Students Of Different Ethnic Groups**

**Chung-Yang Wu, Chiao-Lin Nien**

**Department of Physical Education National Taiwan University of Sport**

**Purpose:** To explore how stereotypes of indigenous peoples have been perpetuated in Taiwan, including the belief that they possess superior physical attributes and are skilled at sports, which reinforces racial frameworks. The outstanding performance of indigenous athletes in Taiwan's sports arenas further reinforces these frameworks. In other words, non-indigenous people already hold the belief that indigenous people are inherently inferior in the field of sports. Therefore, by examining the differences in participation in sports clubs and motivations for physical education between indigenous and non-indigenous students, this study seeks to gain insight into how different ethnic groups perceive sports in the context of Taiwan's social environment. It also considers whether different ethnic identities have led to a correction of incorrect perceptions of racial superiority over time, and addresses the issue of overrepresentation of indigenous athletes in Taiwan's sports industry. **Method:** There are not many literature that meet the criteria in the search results, so by combining and discussing, a total of 41 relevant documents were found, of which only 7 fully met. Relevant literature on indigenous and non-indigenous populations was collected from Airiti Library and National Digital Library of Theses and Dissertations in Taiwan, and articles that focused on differences in motivations for participating in sports due to social support factors between different ethnic groups were reviewed. **Results:** Few studies have compared the motivations for participating in sports among indigenous and non-indigenous students. Related studies suggest that indigenous students have higher motivation to participate in sports due to greater social support than non-indigenous students. **Discussion:** With the changing social environment, it is worth exploring whether the motivations for sports participation and social support of different ethnic groups have changed over time.

**Keywords:** different ethnic groups, motivation for participating in sports, students

**Correspondence:** Professor Chiao-Lin Nien, [clnien@gm.ntus.edu.tw](mailto:clnien@gm.ntus.edu.tw), 0928094085

# 不利條件下使用自我對話對注意力及運動 表現的影響

林家葳、吳修廷

國立臺灣體育運動大學體育學系

**目的:**運動員因疲勞或外在環境的影響而處於不利條件下，可能造成注意力無法專注而影響表現。過去研究發現使用自我對話可提升注意力，同時避免外在環境造成的分心。透過文獻回顧，關注在不利條件下使用自我對話對注意力以及表現影響的機制，對實務工作提供有效的建議。**方法:**蒐集 6 篇關於不利條件下使用自我對話相關文獻，進行系統性回顧與分析。**結果:**研究顯示不利條件下，使用自我對話可以維持或提高運動表現。但在耐力型任務中，提高原因可能與疲勞感知的降低有關，而在其餘的任務中，注意力被認為是影響的關鍵因素。根據 Baumeister 等人 (2007) 提出的自我控制力量模型，解釋集中注意力需要自我控制，而自我控制是有限的資源，因此運動員在賽場中不斷切換注意力焦點，造成自我控制資源不足造成自我耗竭，無法集中注意力。Gregersen 等人 (2017) 進一步說明在進入自我耗竭後，使用自我對話並量測注意力功能，發現可以提升反應速度以及正確率。且過去研究也發現隨著身體疲勞，注意力表現會降低，失誤率提升。**結論:**自我對話會提升表現的相關研究，多是推測注意力可能是中介變項，很少直接或客觀測量，或進一步檢驗中介效果。未來研究可結合神經心理學的客觀測量方式，提供客觀數據以提升研究的效度。

**關鍵詞:**分心、自我耗竭、自我控制力量模型

**通訊作者:** 吳修廷 電話: 0937271581 傳真: 04-22255374 信箱:  
[wuhsiutin@gmail.com](mailto:wuhsiutin@gmail.com)

# Effects Of Using Self-Talk On Attention And Performance Under Adverse Conditions

Chia-Wei Lin , Hsiu-Tin Wu

Graduate Program, Department of Physical Education, National Taiwan University of Sport.

Introduction: Athletes who are placed in adverse conditions due to fatigue or external environmental influences may not be able to focus and this may affect performance. Previous research has found that using self-talk can improve attention while avoiding distractions caused by the external environment. Through a literature review, this study focuses on the mechanisms by which self-talk can improve attention and performance in unfavorable conditions, providing useful suggestions for practical work. **Methods:** Six papers on the use of self-talk under adverse conditions were collected and systematically reviewed and analyzed. **Results:** Research has shown that using self-talk can maintain or improve performance under adverse conditions. However, in endurance tasks, the improvement may be related to the perception of reduced fatigue, while in other tasks, attention is considered a key factor affecting performance. According to the strength model of self-control (Baumeister et al., 2007), focusing attention requires self-control, which is a limited resource. Therefore, athletes who constantly switch their attention focus during competition may experience self-control resource depletion, leading to ego depletion, and an inability to focus attention. Gregersen et al. (2017) further illustrated that using self-talk and measuring attentional function was found to improve response speed and accuracy when ego depletion occurred. Previous research has also found that as physical fatigue increases, attentional performance decreases and error rates increase. **Conclusions:** Most of the research on the effect of self-talk on performance suggests that attention may be a mediator variable, but few studies directly or objectively measure it or further examine the mediating effect. In future research, combining objective measurement methods from neuropsychology could provide objective data to enhance the validity of the study.

**Key words:** distraction, ego depletion, the strength model of self-control

**Correspondence:** Professor Hsiu-Tin Wu, [wuhsiutin@gmail.com](mailto:wuhsiutin@gmail.com), +886-937-271

# 他人導向的完美主義對運動倦怠的影響

陳沛安 吳修廷

國立臺灣體育運動大學體育學系

**目的：**強調追求卓越的競技運動情境，完美主義的人格特質是影響運動倦怠的重要因素，研究發現運動倦怠會造成動機下降、表現失常或退出競技運動等負面結果。完美主義可區分為三種類型：一、適應及不適應性完美主義；二、完美主義追求及完美主義擔憂；三、自我導向、社會規定、他人導向的完美主義。過去研究較少關注於運動員感知他人導向的完美主義與運動倦怠的關係，然而，教練是影響運動員最重要的他人，因此，探討運動員感知他人的完美主義，不能忽略來自於教練對運動倦怠的影響。**方法：**透過PubMed、華藝等搜索引擎蒐集以完美主義、運動倦怠為關鍵字的實證性研究，共計10篇較相關的文獻，進行系統性回顧與分析。**結果：**過去許多研究顯示不適應性、社會規定的完美主義及完美主義擔憂容易加劇運動倦怠症狀；適應、自我導向的完美主義及完美主義追求，則有部分能減緩運動倦怠症狀；而他人導向的完美主義會導致人際關係不佳，與運動倦怠則無相關；值得注意的是，研究顯示選手感知教練他人導向完美主義會導致運動倦怠。**結論：**感知教練他人導向完美主義造成的運動倦怠的相關研究並不多，期待未來研究探討才能更周延的了解運動倦怠的成因，降低運動倦怠發生的機率。

**關鍵字：**動機、人格特質

通訊作者:吳修廷 電話:0937271581 傳真號碼:04-22255374 信箱:wuhsiutin@gmail.com

# The Impact of Other-Oriented Perfectionism on Athlete Burnout

Pei-An Chen, Hsiu-Tin Wu

Graduate Program, Department of Physical Education, National Taiwan University of sports.

**Introduction:** Emphasizing the context of striving for excellence in competitive sports, the personality of perfectionism is an important factor affecting athlete burnout. Research has found that athlete burnout can lead to negative outcomes such as decreased motivation, impaired performance, or withdrawal from sports. Perfectionism can be classified into three types: adaptive and maladaptive perfectionism, perfectionistic strivings and perfectionistic concern, and self-oriented, socially prescribed, and other-oriented perfectionism. However previous research has to focused less on the relationship between an athlete's perception of other-oriented perfectionism and athlete burnout. It is important to note that coaches have the most influence on athletes, and therefore exploring how an athlete perceives other-oriented perfectionism cannot ignore the impact of coaches on athlete burnout.

**Methods:** The literature search was conducted using two major electronic databases, PubMed and Airiti, and 10 relevant empirical studies on perfectionism and athlete burnout were analyzed.

**Results:** Previous studies have shown that maladaptive, socially prescribed perfectionism, and perfectionistic concerns exacerbate the symptoms of athlete burnout. Adaptive, self-oriented perfectionism and perfectionistic strivings partially alleviate the symptoms of athlete burnout. Other-oriented perfectionism leads to poor interpersonal relationships but is not related to athlete burnout. It is worth noting that research indicates that an athlete's perception of their coach's other-oriented perfectionism can contribute to athlete burnout.

**Discussion:** There is limited research on the relationship between the athlete's perception of their coach's other-oriented perfectionism and athlete burnout. It is hoped that future research can further explore the causes of athlete burnout and reduce the likelihood of its occurrence.

**Key words:** motivation, personality traits

**Correspondence:** Professor Hsiu-Tin Wu, [wuhsiutin@gmail.com](mailto:wuhsiutin@gmail.com), +886-937-271-581



# 心理堅韌性與自律對長跑選手運動 表現之影響

黃慧慈、林姿頻、洪寶蓮\*

中國醫藥大學運動醫學系

運動員的競技心理倍受媒體及研究的關注，影響運動表現的因子不只於天賦、身體素質，或是競技技巧等，從文獻發現，「心理堅韌性」對運動及其他方面有好的影響，「自律」對於運動員能夠長時間維持良好的狀態也有很大的幫助，對於田徑長跑選手更是關鍵。本研究專訪了國內3名參與過全大運的優秀長跑田徑選手，以半結構訪談大綱進行深度訪談，藉由質性研究法了解選手本身的特質、心理堅韌性對跑步的堅持影響，以及運動員心理狀態對運動表現的影響。研究結果歸納如下：1.三位受訪者皆認為自律對於長跑選手及田徑選手都很重要，像是合理安排時間，因為要訓練也要維持課業，受訪者都會對自己有所要求，都會鞭策自己要進步，以突破現有的表現獲得更好的成績。2.對於心理堅韌性，他們都是長期關注及保有興趣，能夠比別人堅持得更久、付出更多，不斷超越自己。3.在競技的高峰經驗中享受比賽當下，在很強的訓練狀態下得到好的成績，在低潮經驗中，受訪者都提到的身邊的人，像是男朋友、心理師、防護員，還有隊友的社會支持力量。4.研究整理中也發現外在環境對於他們也都有很大的影響，像是遇到好教練、隊友的良性競爭。本研究能夠提供年輕的長跑選手及提供未來想挑戰任何競技項目的學生作為參考，只要適當合理的分配時間，是能夠同時兼顧好選手的自我精進及學生的職責本分。

**關鍵詞：**心理堅韌性、自律、長跑選手、質性訪談、運動表現

# **The Effects Of Mental Toughness And Self-Discipline On Athletic Performance Of Long-Distance Runners**

**Hui-Ci Huang, Tzu-Ping Lin, Bao-Lien Hung\***

China Medical University Sports Medicine

The competitive psychology of athletes has received significant attention from the media and researchers. Factors such as talent, physical attributes, and competitive skills are not the only ones that will affect one's sports performance. According to previous studies, "mental toughness" also has a positive impact on sports performance and other aspects. Similarly, "self-discipline" also helps athletes maintain a good state and plays as a crucial factor for long-distance runners. This study conducted in-depth interviews with three outstanding long-distance track and field athletes who participated in the National College Games in Taiwan, using a semi-structured interview outline and qualitative research methods to understand the athletes' personal traits, the impact of psychological resilience on their persistence in running, and the influence of their psychological state on their athletic performance. The results are summarized as follows: 1. All three interviewees believed that self-discipline is essential for long-distance runners and track and field athletes, such as reasonable time management to balance training and academic work. They all set high standards for themselves and motivate themselves to improve and achieve better results. 2. Regarding psychological resilience, they all have a long-term interest and can persist longer and put in more effort than others, constantly surpassing themselves. 3. In the experience of athletic peak moments, they enjoyed the game, achieved good results under intense training, and in the experience of low moments, the social support of people around them, such as boyfriends, psychologists, protectors, and teammates, helped them get through. 4. The study also found that external factors have a significant impact on them, such as having good coaches and teammates with positive competition. This study can provide reference for young long-distance runners and students who want to challenge any athletic event in the future. As long as they allocate time appropriately and reasonably, they can both pursue self-improvement as athletes and fulfill their responsibilities as students.

**Key words: mental toughness 、 self-discipline 、 long-distance runners 、 qualitative research 、 sports performance**

第一作者:黃慧慈

\*通訊作者:洪寶蓮 blhoung@mail.cmu.edu.tw (指導教授)

# 融合式身體識能訓練對發展協調障礙兒童 的介入成效：基礎動作技巧

陳玟卉<sup>1</sup> 鄒曉郡<sup>1</sup> 陳芊歲<sup>1</sup> 高堂恩<sup>2</sup> 戴嶸穎<sup>1</sup> 李曜全<sup>1,\*</sup>

<sup>1</sup> 中國醫藥大學物理治療學系

<sup>2</sup> 中國醫藥大學運動醫學系

**背景與目的：**發展協調障礙(developmental coordination disorder, DCD)兒童動作協調表現明顯較差，執行需要動作技巧的日常生活任務也經常遇到困難。近來，身體識能介入被證實能改善兒童動作技巧，且提升身體活動參與。然而，在 DCD 兒童族群仍缺乏證據，也沒有研究探討融合式課程類型的介入成效。因此，本研究旨在探討融合式身體識能介入對 DCD 兒童基礎動作技巧的介入成效。**研究方法：**6 名 DCD 兒童隨機分配到介入組(n=3)或對照組(n=3)，介入組還包括 3 名被邀請參加的一般發展兒童。介入組兒童進行為期六週的介入計畫，每週進行一次兩小時的訓練，包括了移位能力、球類技巧、以及體育活動(5 分鐘暖身，50 分鐘動作技巧訓練，10 分鐘休息，50 分鐘團體闖關或競賽活動，及 5 分鐘緩和運動)。在介入前、後使用第三版粗大動作發展測驗(TGMD-3)評估基礎動作技巧，並分析兩組 DCD 兒童的數據變化。**結果與結論：**針對 TGMD-3 不同面向量尺分數進行廣義線性模型分析，結果發現移位能力有顯著的時間和組別交互作用(unstandardized coefficient=3.00, SE=0.89, df=1, p=.001)，球類技巧上則呈現接近統計學顯著意義的交互作用(unstandardized coefficient=4.33, SE=2.63, df=1, p=.099)，兩者均顯示介入組的 DCD 兒童，其量尺分數相較於對照組有所改善。儘管本研究樣本數較小，初步結果仍顯示融合式身體識能介入可能是改善 DCD 兒童基礎動作技巧的有效方法之一。

**關鍵詞：**學齡前兒童、發展協調障礙、動作困難、身體活動、身體識能、基礎動作技巧

**通訊作者：**李曜全博士，[yaochuenli@mail.cmu.edu.tw](mailto:yaochuenli@mail.cmu.edu.tw)，+886-4-22053366 ext 7310

# Intervention Effects of inclusive Physical Literacy training in Children with Developmental Coordination Disorder: Fundamental Movement Skills

Wen-Hui Chen<sup>1</sup>, Chaw Xiao Jun<sup>1</sup>, Qian-Wei Chen<sup>1</sup>, Tang-En Kao<sup>2</sup>, Tay Jie Ying<sup>1</sup>, Yao-Chuen Li<sup>1\*</sup>

<sup>1</sup> Department of Physical Therapy, China Medical University, Taiwan

<sup>2</sup> Department of Sports Medicine, China Medical University, Taiwan

**Background and purpose:** Children with Developmental Coordination Disorder show poorer performance in motor coordination and have encounter difficulties in executing daily tasks that require motor skills, compared to typically developing (TD) children. In recent years, the physical literacy (PL) intervention has been shown to improve children's motor skills and been applied to enhance the participation in physical activity. However, evidence is scarce in children with DCD, and no study has developed the inclusive PL intervention to bring children with and without DCD together. Therefore, this study aimed to investigate the effectiveness of inclusive PL intervention on motor skills in children with DCD. **Methods:** Six children with DCD were randomly assigned to either the intervention group (n = 3) or the control group (n = 3). The intervention group also included three TD children who were invited to join the program. Children in the intervention group participated in a six-week intervention. In each week, a two-hour program (5-minute warm-up, 50-minute motor skills training, 10-minute break, 50-minute group competition activity, and 5-minute cool-down) was developed, consisting of locomotion and ball skills and sports activities. The Test of Gross Motor Development-3(TGMD-3) was administered before and after the intervention program to evaluate the change in fundamental motor skills. Only data in children with DCD in both groups were analyzed. **Results and Conclusion:** While the generalized linear model was conducted with the scaled score of locomotion and ball skills as the dependent variables, respectively, there were a significant group by time interaction on locomotion skill (unstandardized coefficient = 3.00, SE = 0.89, df = 1, p = .001) and a marginally, statistically group by time interaction on ball skills (unstandardized coefficient = 4.33, SE = 2.63, df = 1, p = .099), indicating the scaled scores improved after the intervention in children with DCD in the intervention group, compared to those in the control group. Therefore, in spite of a small sample size, our preliminary results demonstrate that the inclusive PL intervention could be one of effective approaches to

improve fundamental movement skills in children with DCD.

**Keywords: Preschool Children, Developmental Coordination Disorder, Dyskinesia, Physical Activity, Physical Literacy, Fundamental Movement Skills**

**Correspondence: Dr. Yao-Chuen Li, [yaochuenli@mail.cmu.edu.tw](mailto:yaochuenli@mail.cmu.edu.tw), +886-4-22053366 ext 7310**

# 教練領導行為與教練選手關係對團隊 凝聚力的影響

黃少伯 陳美華

國立彰化師範大學運動健康研究所

**目的：**目前高中乙級球隊雖有高佔比的籃球參與人口，但在媒體關注、專業資源溢注以及相關研究方面較少。因此，本研究的目的在探討高中乙級籃球選手之教練領導行為與教練選手關係對團隊凝聚力之預測情形。**方法：**研究參與者為 110 學年度參加國內高中乙級籃球聯賽之男子籃球隊選手，採用線上填答的方式進行，共有 25 所學校參與，收得 315 份問卷，有效問卷為 310 份。研究工具包括教練-選手關係、教練領導行為及團隊凝聚力共三個量表。**研究結果發現：**1.「與現任教練相處年數」在工作凝聚力達顯著差異。2.專制行為與教練選手關係三個變項皆顯著負相關；除了專制行為外，所有變項皆與工作與社會凝聚力呈正相關。3.在控制「與教練相處年數」後，訓練與指導行為、關懷行為、親密性與互補性可顯著預測工作凝聚力，其中以互補性的預測力最高；訓練與指導行為和關懷行為可顯著預測社會凝聚力，其中以關懷行為的預測力最高。**結論與建議：**與教練相處的年數對工作凝聚力是有幫助的；適時關懷球員、細心指導與安排適當訓練並且減少專制行為，能有效促進教練選手的關係及團隊凝聚力。

**關鍵詞：**高中乙級、訓練與指導行為、關懷行為

# The Influence Of Coach Leadership Behavior And Coach-Athlete Relationship On Team Cohesion

Shao-Po Huang, Mei-Hua Chen

Graduate Institute of Sports and Health, National Changhua University of Education.

**Introduction:** At present, although the high school second division team has a high proportion of basketball participation population, it has less media attention, professional resource overflow and related research. Therefore, the purpose of this study was to explore the prediction of coach leadership behavior and coach-athlete relationship on team cohesion of high school second-division basketball players.

**Methods:** The participants were men's basketball team players participated from domestic high school second division basketball league in 2022, they completed measurements on internet. There were 315 questionnaires received, and 310 valid questionnaires were obtained. The research tools included three scales: coach-athlete relationship, coach leadership behavior and team cohesion.

**Result:** 1. The “years with the current coach” make a significant difference in task cohesion. 2. Autocratic behavior was significantly negatively correlated with three variables of coach-athlete relationship. Task and social cohesion were positively correlated with other variables except autocratic behavior. 3. After controlling for “years with the coach”, training and instruction, social support, closeness and complementarity can significantly predict the task cohesion. And complementarity is the highest prediction. Training and instruction behavior and social support shows significant prediction in the part of social cohesion, especially in social support. **Conclusions and recommendations:** The years of spent with the coach contribute to task cohesion; Caring for players in a timely manner, carefully guiding and arranging appropriate training program and reducing autocratic behavior can effectively promote the relationship between coaches and athletes and team cohesion.

**Key words:** High School Division II, Training and Instruction, Social support.

**Correspondence:** Shao-Po Huang, [brian77617@gmail.com](mailto:brian77617@gmail.com), 0978123332



# 籃球裁判工作熱情之探析

<sup>1</sup>張若琳 <sup>1</sup>邱文玉

<sup>1</sup>國立臺灣體育運動大學體育學系

**背景：**工作熱情是個人面對工作的一種心理動力，能夠讓人堅持工作崗位，降低工作倦怠，對抗工作壓力，也是近年來一直在探討的議題。**目的：**本研究以工作熱情理論 (Vallerand et al., 2003)，來探討籃球裁判的調和式熱情和強迫式熱情此兩構面與其他構念之間的關聯性，並透過研究結果對籃球裁判的發展提供相關幫助。**方法：**以回顧性文章為主。**結果與結論：**本研究發現不同層級的籃球裁判在工作熱情上則未達顯著水準差異，而執法年資較淺的裁判有較高的強迫式熱情。另外，工作壓力、工作倦怠與工作熱情達相關顯著，從中可發現，調和式熱情與工作壓力呈負相關，與強迫式熱情則呈正相關。當熱情越高，其工作壓力與工作倦怠就會降低，反之亦然。在工作滿意度的部分，調和式熱情和強迫式熱情皆與工作滿意度呈正相關。**結論：**顯示工作熱情對裁判的重要性，若能提高裁判的調和式熱情，降低強迫式熱情，就越能減少與其他層面的衝突。

**關鍵字：**調和式熱情、強迫式熱情、籃球裁判

# The Study Of Work Passion Of Basketball Referees

Jo-Lin, Chang <sup>1</sup>, Wen-Yu, Chiu <sup>1</sup>

<sup>1</sup> Department of Physical Education, National Taiwan University of Sport, Taiwan

**Background:** Work passion is a psychological motivation that individuals face in their work, which can help people persist in their job positions, reduce job Burnout, and resist job stress. It has been a topic of exploration in recent years. **Purpose:** This study uses the Work Passion Theory (Vallerand et al., 2003) to investigate the relationship between the two dimensions of harmonious passion and obsessive passion among basketball referees and other constructs. The study aims to provide relative assistance for the development of basketball referees through the research results. **Method:** This study is mainly based on a retrospective article. **Results & Conclusion:** This study found that basketball referees of different levels did not have significant differences in work passion. However, referees with less experience in officiating have higher levels of obsessive passion. In addition, job stress, job Burnout, and work passion are significantly correlated. It was found that harmonious passion was negatively correlated with job stress while obsessive passion was positively correlated. As work passion increased, job stress, job burnout decreased, and vice versa. Regarding job satisfaction, both harmonious passion and obsessive passion were positively correlated with job satisfaction. In conclusion, the importance of work passion for referees is evident. If referees can increase their harmonious passion and decrease their obsessive passion, they can reduce conflicts with other aspects.

**Key words:** harmonious passion, obsessive passion, basketball referees

**Correspondence:** Wen-Yu, Chiu, [wychiu@gm.ntus.edu.tw](mailto:wychiu@gm.ntus.edu.tw), +886-4-22213108 ext 2210

# 零時體育介入國中體育班注意力及 記憶力之影響

張庭瑜、王紫瑄、柯縈蓁

國立臺中教育大學體育學系

**目的：**本研究目的在探討國中體育班學生介入零時體育其注意力之影響。**方**  
**法：**研究參加者為新竹縣某國中體育班七、八年級田徑隊學生，共 20 名。實驗  
期間每週執行三次零時體育，每次 40 分鐘。主要的運動內容包含熱身、主要活  
動、伸展收操，而主要活動為有氧訓練，運動強度設定為 70%HRmax。將透過  
polar 心率錶檢視受試者心跳率是否達到設定的運動強度。另外，在八週零時體  
育介入的前、後進行褚氏注意力測驗，最後將成績以相依樣本 t 檢定進行資料  
分析，統計考驗的顯著水準訂為  $\alpha=.05$ 。**結果與結論：**20 名受試者在褚氏注意  
力中，答題數及答對題數明顯進步，且達到顯著差異；錯題數及錯誤率則未達  
顯著差異。經過八週零時體育介入，受試者答題速度變快、錯誤率降低的情況  
下，本研究結論為：零時體育能有效提升國中體育班學生的專注力。

**關鍵詞：**零時體育、注意力、記憶力、體育班

通訊作者：張庭瑜

通訊地址：國立臺中教育大學，臺中市西區民生路140號。

電話：0989295617

email：[a0989295617@gmail.com](mailto:a0989295617@gmail.com)

# **The Effects of a Zero Hour Physical Education Intervention on Attention in Junior High School Students Enrolled in an Athletic Class**

**Ting-Yu Chang, Tzu-Hsuan Wang, Yin-Chen Ko**

Department of Physical Education, National Taichung University of Education, Taiwan

**Purpose:** The purpose of this study was to investigate the effect of zero-hour physical education (PE) on the attention in junior high school students who majored in physical education. **Method:** Twenty subjects, majoring on the track and field teams, were recruited in this study to perform 40 minutes of the zero-hour physical education activity three times every week for eight weeks. The zero-hour PE activity included warm-up, main activity, and cool down with stretching exercise. All subjects performed aerobic training with 70% HRmax under polar monitor of heart rate during main activity. Simultaneously, All student, athlete class, measured the test of Chu's Attention Test (CAT) for assessing attention function after the zero-hour physical education intervention. The data of the study analyzed with independent T-test under statistical significant at  $\alpha = .05$  and represented by mean/stand. **Results & Conclusions:** The results of Chu's attention test showed that the zero-hour PE activity significantly increased the answer number and correct answers number. However, no significant changes in wrong answer number and the error rate. The faster answer speed and lower error rate were found after the 8-wk zero-hour PE intervention. Therefore, the author implies the zero-hour PE activity can effectively improve the attention of junior high school students in athletic class.

**Key words:** Zero-hour physical education, aerobic training, attention, athletic class

**Correspondence:** Ting-Yu Chang, [a0989295617@gmail.com](mailto:a0989295617@gmail.com), 0989295617

# 台灣版成人發展協調障礙檢核表之信度與效度：初探研究

黃堃婷、陳郁文、李曜全\*

中國醫藥大學物理治療學系暨復健科學研究所

**目的：**成人發展協調障礙檢核表為用於評估成人動作協調能力障礙的工具，然而，台灣版本尚未經過信度與效度驗證，因此本研究旨在評估其內部一致性和建構效度，以確保該工具在台灣成人族群的適用性。**方法：**本研究以台灣版成人發展協調障礙檢核表收集 114 位學齡前兒童之主要照顧者的資料（16 位男性、98 位女性），採用檢核表評量受試者目前協調困難的部分，共 30 個測驗項目。分析信度方面，使用 Cronbach's  $\alpha$  值來評估檢核表的內部一致性；效度部分則以因素分析驗證其建構效度。**結果與結論：**分析檢核表內部一致性時，納入全部 30 個項目，顯示整體內部一致性 Cronbach's  $\alpha$  值為 0.830，為高度一致性。然而，結果亦發現，當移除兩個項目：[很難自己從頭到尾料理一餐？]和[如果你是駕駛，你會覺得停車很困難嗎？]後，內部一致性將進一步提升(Cronbach's  $\alpha = 0.836$ )。因素分析根據因素特徵值與陡坡圖之結果發現，成人目前動作困難部分可進一步分成 6 個因素數目，驗證台灣版成人發展協調障礙檢核表之建構效度。綜合以上結果，排除兩題內部一致性較差的項目後，台灣版成人發展協調障礙檢核表具有良好的信度與建構效度，適合用來評估成人的動作協調能力障礙。

**關鍵字：**內部一致性、辨別效度、因素分析、發展性協調障礙

**通訊作者：**李曜全博士，[yaochuenli@mail.cmu.edu.tw](mailto:yaochuenli@mail.cmu.edu.tw), +886-4-22053366 ext 7310

# Validation Of The Adult Developmental Coordination Disorder – Taiwanese Version: Pilot Study

**Kai-Ting Huang, Yu-Wen Chen, Yao-Chuen Li\***

Graduate Institute of Rehabilitation Science, China Medical University, Taiwan

**Introduction:** The Adult Developmental Coordination Disorder Checklist (ADC) is a tool which has been used to assess adults' motor difficulties. However, the Taiwanese version of the ADC (ADC-TW) has not been validated for reliability and validity. Therefore, this study aimed to evaluate its internal consistency and construct validity and to ensure the suitability of this tool in the Taiwanese adult population. **Methods:** This study collected data from 114 primary caregivers (16 males, 98 females) of preschool children in Taiwan using the ADC-TW. The second part of the checklist was used to current coordination difficulties in adults, including 30 testing items. For reliability analysis, Cronbach's alpha was used to assess the internal consistency, whereas factor analysis was used to verify construct validity. **Results & Conclusions:** When analyzing internal consistency of the ADC-TW with all 30 items, the overall Cronbach's  $\alpha$  was 0.830, indicating high consistency. However, it was found that internal consistency could be further improved (Cronbach's  $\alpha = 0.836$ ) by removing two items: [Do you have difficulty preparing a meal from scratch?] and [Do you have difficulty preparing a meal from scratch? ]. Based on the results of eigenvalue and scree plot, the second part of the ADC-TW could be further categorized into six factors, indicating the validation of construct validity. In summary, after excluding two items with poorer internal consistency, the ADC-TW is reliable and valid to assess motor coordination in adults.

**Key words: internal consistency, discriminative validity, factor analysis, developmental coordination disorder**

**Correspondence: Dr. Yao-Chuen Li, [yaochuenli@mail.cmu.edu.tw](mailto:yaochuenli@mail.cmu.edu.tw), +886-4-22053366 ext 7310**

# 動故事團體介入對於肢體障礙兒童家庭生活品質之影響：質性研究分析

戴嶸穎<sup>1</sup> 陳芊歲<sup>1</sup> 李曜全<sup>1</sup>

<sup>1</sup> 中國醫藥大學物理治療學系

**目的：**動故事團體介入融合繪本的故事情境以及團體動作遊戲模式，同時提供孩童在各發展面向的刺激，並增進孩童的社會互動、學習與他人合作。然而，過去並無研究針對肢體障礙兒童族群探討介入效益對於家庭生活品質之影響，因此本研究採用質性研究之方式進行家長訪談，以了解此介入模式是否造成生活品質之改善。**方法：**本研究共有四組家庭參加，包含4位4-6歲之肢體障礙兒童，參與為期8周之介入，除了利用標準化評估工具進行各發展面向之前測與後測評估（初步成果先前已發表），另邀請主要照顧者（三位媽媽與一位爸爸）於後測時接受一對一半結構式訪談。訪談結果之逐字稿以Nvivo軟體進行分析，由通訊作者進行初步檢視後，偕同第二作者進行編碼。**結果與結論：**此介入模式可帶來三方面之成效：情境主題、主效益以及附加價值。多數家長認為情境主題為本介入最大的特點，可增加小朋友參與的動機。主效益部分，受訪者均認為此介入模式可協助兒童融入團體、改善適應能力、且變得更樂觀；過程中，可同時提供家長喘息的機會。衍生的附加價值則包括可有效提升手足互動，且未來可發展為商業化之介入模式。整體而言，動故事團體介入可對肢體障礙兒童與其家庭產生正面影響，提升整體生活品質。

**關鍵字：**質性研究、動故事、肢體障礙、介入成效、生活品質

**通訊作者：**李曜全博士，[yaochuenli@mail.cmu.edu.tw](mailto:yaochuenli@mail.cmu.edu.tw), +886-4-22053366 ext 7310

# Group Intervention of Action with Story on Quality of Life in Families with Children with Physical Disabilities: Qualitative Research

Tay Jie Ying<sup>1</sup>, Qian-Wei Chen<sup>1</sup>, Yao-Chuen Li<sup>1</sup>

<sup>1</sup>Department of Physical Therapy, China Medical University, Taiwan

**Introduction:** The group intervention of action with story (AWS), which involves the integration of the stories of picture books and group motor games, facilitate the development in various aspects in children. This intervention would also enhance children's social interaction and learning to cooperate with their peers. However, there is a lack of research that has investigated the effect of AWS group intervention on quality of life in families with children with physical disabilities. Therefore, this study conducted qualitative research to interview with parents to understand whether the AWS group intervention would result in the improvement in their quality of life. **Methods:** Four caregiver-child dyads participated in an eight-week AWS group intervention, including four children with physical disabilities who aged between four and six years old. Several standardized assessment tools were used to conduct pre- and post-intervention assessment in different developmental domains (*preliminary results has been previously presented*), the main caregivers (three mothers and one father) were invited to join one-to-one, semi-structured interview. The transcript of the interview was analyzed using the Nvivo software. The corresponding author (YCL) was responsible for the initial inspection of data patterns and collaborated with the second author (QWC) to complete the coding. **Results & Conclusions:** The main benefits of the AWS group intervention could be divided into three sections: story situational theme, main benefit, and additional value. Most parents believed that story situational theme was the main characteristics of this study as children's engagement in activities could be motivated by the stories of picture books. In terms of the main benefit, all interviewees stated that this intervention helped children adapt themselves into the groups at school, improve their adaptive behaviours, and become more optimistic. Additionally, it provided parents with respite care during the process. The derived additional value included the improvement in the sibling relationship and the potential business model of the AWS group intervention. Overall, the AWS group intervention could bring a positive impact on children with physical disabilities and their families as well as improves their quality of life.

**Keywords:** qualitative research, action with story, physical disabilities,



**intervention effectiveness, quality of life**

**Correspondence: Dr. Yao-Chuen Li, [yaochuenli@mail.cmu.edu.tw](mailto:yaochuenli@mail.cmu.edu.tw), +886-4-22053366 ext 7310**

# 彈翻床運動訓練對國小學童記憶力與體適能成效之研究

王紫瑄、張庭瑜、劉沛蕃

國立臺中教育大學體育學系

**目的：**本研究目的主旨在探討彈翻床運動訓練活動對國小學童的記憶力與體適能之影響，**研究方法：**以實驗研究法進行，以臺中市某國民小學中高年級學生為研究對象，共計26位學生，其中中年級有12位學生，高年級有14位學生。以彈翻床運動介入四週訓練，每週3次，每次30分鐘。以教育部體適能測驗項目「柔軟度測驗」、「肌力測驗」、「肌耐力測驗」、「心肺耐力測驗」與「聽覺語文學習測驗」(Rey Auditory-Verbal Learning Test, RAVLT) 為研究工具，以交叉實驗法進行實驗，分別進行前後測驗，將所得的資料以相依樣本t檢定進行統計分析，**結果與結論：**了解受試者在彈翻床運動後的記憶力、體適能是否有顯著差異。根據研究結果發現，提出以下結論：一、彈翻床運動對國小中高年級學童短期記憶力有顯著提升。二、彈翻床運動對國小中高年級學童長期記憶力有顯著提升。三、彈翻床運動對國小中高年級學童體適能有顯著提升。

**關鍵詞：**彈翻床、交叉實驗法、記憶力、體適能

通訊作者：王紫瑄

通訊地址：國立臺中教育大學，臺中市西區民生路 140 號。

電話：0970080724

email：[candy091001@gmail.com](mailto:candy091001@gmail.com)

# Effect Of Trampoline Bounce On Memory And Physical Fitness In Elementary School Students

Tzu-Hsuan Wang, Ting-Yu Chang, Pei-Chioa Liu

Department of Physical Education, National Taichung University of Education, Taiwan

**Purpose:** The purpose of this research was to demonstrate influence of trampoline bounce on memory and physical fitness of elementary school students. **Method:** Twenty-six elementary school students, 12 middle grades students and 14 senior grades students, were recruited to perform this crossover study design from Taichung elementary school. All subjects perform the 4-wk trampoline bounce training under three times per week with 30 minutes every. Rey Auditory-Verbal Learning Test (RAVLT) and Physical fitness were measured before and after the 4-wk trampoline bounce training. Physical fitness cited from the Ministry of Education including flexibility, muscular fitness and Cardiorespiratory Fitness. All data was presented as mean/standard error with the paired. **Results & Conclusions:** The author conclusions that the 4-wk trampoline bounce training significantly improved the short-term memory, the long-term memory, and physical fitness in middle grades and senior grades students. **Keywords:** trampoline, crossover study design, memory, physical fitness

**Correspondence:** Tzu-Hsuan Wang, [candy091001@gmail.com](mailto:candy091001@gmail.com), 0970080724

# 大專甲組桌球運動員少年時期與教練的關係和管教行為對身心健康與運動表現的影響

江至薇、洪寶蓮\*

中國醫藥大學運動醫學系

## 摘要

越來越多的研究及媒體關注到運動員與教練的關係，與教練的關係和運動員的身心健康及運動表現也息息相關。基於此，本研究旨在了解大專甲組桌球運動員在少年時期與教練的關係和管教行為的主觀感受，對於運動員身體、心理是否造成影響，以及和教練的關係和管教行為對於運動表現所產生的影響為何。整理了與教練的關係和管教行為的相關文獻後，招募 30 名大專甲組桌球運動員作為研究參與對象，以質性研究法，進行半結構開放性自編問卷的填寫。經內容資料的編碼及整理分析，統整出五項結果：1.與教練的關係 2.管教行為 3.訓練方法 4.訓練與體罰 5.教練行為的正負面影響。與教練保持良好的關係，教練也可以更關心運動員，使用適當的訓練和管教行為，透過教練和運動員之間良好的互動，使運動員可以與教練一起達到更好的運動表現為主要的結果統整。本研究除了探討與教練的關係和管教行為對於運動表現的影響之外，本研究也關注運動員的身心健康，企盼藉由這些運動員的真實寶貴經驗作為參考，日後協助年輕桌球選手與教練的關係和訓練可以更好。

**關鍵詞:**桌球運動員、教練關係、管教行為、身心健康、運動表現

# **College Table Tennis Open Tournament - How Players' Relationship and Disciplinary with Coaches in Adolescence Affect their Physical and Mental Health and Sport Performance**

**Chih-Wei Chiang · Bao-Lien Hung\***

China Medical University Sports Medicine

## **Abstract**

More and more researches and media focus on the relationship between coaches and players, it also closely related with their sport performance. This study aimed to understand how College Table Tennis Open Tournament players' relationship with coaches and disciplinary will affect their body, mind and their sport performance. After systematical paper review which related with coaches' discipline, the study recruited 30 college table tennis open tournament players as research participants and used a qualitative research method to conduct a semi-structured open-ended questionnaire. Through coding and analyzing the content of the data, the study identified five main findings: 1. the relationship with coach 2. disciplinary behavior 3. training method 4. training and corporal punishment 5. the positive and negative effects of coaching behavior. Maintain a good relationship with coaches, coaches care more about athletes. Using appropriate training and discipline behaviors, through good interaction between the coaches and the athletes, athletes can work with the coach to achieve better sports performance, which was the main integration of result. In addition to exploring the relationship with coaches and the impact of discipline behavior on sports performance, this research also focuses on the physical and mental health of athletes. It is hoped that by using this real and valuable experiences of these athletes as a reference, it will help young billiard players and coaches having better relationship and training plans in the future.

**Keywords: table tennis athletes, coach-athlete relationship, disciplinary behavior, physical and mental health, sport performance.**

第一作者:江至薇

\*通訊作者:洪寶蓮 [blhung@mail.cmu.edu.tw](mailto:blhung@mail.cmu.edu.tw) (指導教授)

# 運動治療對於帕金森氏症患者 執行功能效益之統合分析

吳思嚴<sup>1,2</sup> 林品妍<sup>1</sup> 林璟育<sup>1</sup> 蔡佳良<sup>2</sup>

<sup>1</sup>中山醫學大學物理治療學系 <sup>2</sup>國立成功大學體育體育健康與休閒研究所

**背景和目的：**執行功能 (executive function) 障礙在帕金森氏症 (Parkinson's disease) 中很常見，不僅會影響患者的日常生活 (activities of daily living)，還會影響身體與社會活動參與。而運動治療作為一有效緩解動作和非動作症狀的非藥物性介入，我們對於其針對執行功能的治療效益之了解仍顯不足，特別是由於執行功能有其複雜的概念架構。因此，本統合分析旨在統整身體運動對於帕金森氏症患者在執行功能面向的治療效益。**方法：**我們在線上資料庫 (包括 Academic Search Complete、AgeLine、CINAHL、SPORTDiscus 和 MEDLINE) 搜尋帕金森氏症的運動治療和執行功能的相關文獻，並在 580 項研究中篩選出 7 篇符合標準之論文，其中共包含 196 名參與者。而後針對不同執行功能子面向進行統合分析，分別是抑制控制 (inhibitory control)、工作記憶 (working memory)、認知靈活性 (cognitive flexibility) 和多面向或高階執行功能 (multi-faceted/higher-order executive function)。**結果：**我們確認目前文獻支持運動治療對整體執行功能的有效性 (standardized mean difference [SMD] = 0.14,  $p = .003$ ;  $I^2 = 0\%$ ,  $p = .988$ )，特別是在認知靈活性 ( $k = 11$ , SMD = 0.21,  $p = .040$ ) 和多面向或高階執行功能 ( $k = 20$ , SMD = 0.21,  $p = .037$ )。**結論：**本統合分析提供了運動治療對於改善認知靈活性及多面向或高階執行功能的支持性證據。

**關鍵詞：**身體活動、抑制控制、工作記憶、認知靈活性

# A Meta-Analysis: The Effect Of Exercise Intervention On Executive Functions In People With Parkinson'S Disease

Sz-Yan Wu <sup>1,2</sup>, Pin-Yen Lin <sup>1</sup>, Ching-Yu Lin <sup>1</sup>, Chia-Liang Tsai <sup>2</sup>

<sup>1</sup> Department of Physical Therapy, Chung Shan Medical University, Taichung, Taiwan

<sup>2</sup> Institute of Physical Education, Health and Leisure Studies, National Cheng Kung University, Taiwan

**Background and objectives:** Executive dysfunctions are common in Parkinson's disease (PD) and affect patients' activities of daily living and participation in physical/societal activities. Exercise intervention as a useful non-pharmacological treatment to relieve motor and non-motor symptoms of PD might also benefit executive functions (EF). Little is known about the treatment effect on the complex EF construct; this meta-analysis, therefore, aims at determining whether the effectiveness of physical exercise in PD might benefit all the EF sub-domains. **Methods:** We searched online databases (including Academic Search Complete, AgeLine, CINAHL, SPORTDiscus, and MEDLINE) for literature concerning exercise intervention and EF in PD. Seven out of 580 studies encompassing 196 participants were included. Meta-analyses were conducted for each EF sub-domain separately, specifically the inhibitory control, working memory, cognitive flexibility, and multi-faceted/higher-order EF. **Results:** We found that current literature laid in favor of the effectiveness of exercise intervention on overall EF (SMD = 0.14,  $p = .003$ ;  $I^2 = 0\%$ ,  $p = .988$ ). A significant effect of exercise intervention was only found in cognitive flexibility ( $k = 11$ , SMD = 0.21,  $p = .040$ ) and multi-faceted/higher-order EF ( $k = 20$ , SMD = 0.21,  $p = .037$ ). **Conclusions:** This review found supportive evidence that exercise intervention improves specific EF in PD.

**Keywords:** physical activity, inhibitory control, working memory, cognitive flexibility

**Correspondence:** Distinguished Professor Chia-Liang Tsai,  
[andytsai@mail.ncku.edu.tw](mailto:andytsai@mail.ncku.edu.tw), +886-933306059

# 融合式身體識能訓練對發展協調障礙兒童 的介入成效：認知執行功能

高堂恩<sup>2</sup> 陳玟卉<sup>1</sup> 鄒曉郡<sup>1</sup> 陳芊歲<sup>1</sup> 戴嶸穎<sup>1</sup> 李曜全<sup>1,\*</sup>

<sup>1</sup> 中國醫藥大學物理治療學系

<sup>2</sup> 中國醫藥大學運動醫學系

**背景與目的：**發展協調障礙 (developmental coordination disorder, DCD) 兒童容易出現執行功能困難，如衝動控制或認知彈性等。然而，儘管身體識能 (physical literacy, PL) 介入對於一般發展兒童的執行功能有正面效益，在 DCD 兒童的證據仍然不足。因此，本研究旨在調查融合性 PL 訓練對於 DCD 學齡兒童執行功能的介入成效。**研究方法：**六名 DCD 兒童 (五男一女，平均年齡：99.75±8.82 個月) 隨機並平均分配至介入組或對照組，且為了執行融合性 PL 介入模式，本研究另邀請了三名一般兒童加入介入組。在介入計畫 (每週一次、每次兩小時，為期六週) 前、後，對所有 DCD 兒童進行執行功能 (即衝動控制和認知彈性) 的評估，分別各進行兩項測試：Early Year Toolbox – Go/Nogo 和 Psytoolkit – Simon task 評估衝動控制，以及 Early Year Toolbox – Card Sort 和 Psytoolkit – Multitasking 評估認知彈性。在控制性別和年齡的影響下，廣義線性模型用以檢定組別、時間、和組別\*時間交互作用對執行功能的效應。**結果和結論：**Card Sort 的 Switch Accuracy Score 有顯著的時間效應 (非標準化係數 = -4.00, SE = 1.94, df = 1,  $p = .04$ )，但其他變數均未發現顯著組別\*時間交互作用，顯示對照組 DCD 兒童之執行功能在進行融合性 PL 介入後並無顯著改善。其原因可能課程活動的認知成分不足以引起執行功能的變化；因此，若未來研究希望藉由 PL 介入同時改善執行功能，課程設計應更強調認知功能的任務。

**關鍵詞：**發展協調障礙、動作困難、身體識能、執行功能

**通訊作者：**李曜全博士，[yaochuenli@mail.cmu.edu.tw](mailto:yaochuenli@mail.cmu.edu.tw)，+886-4-22053366 ext 7310



# Intervention Effects Of Inclusive Physical Literacy Training In Children With Developmental Coordination Disorder: Executive Functions

**Tang-En Kao**<sup>1</sup>, Wen-Hui Chen<sup>2</sup>, Chaw Xiao Jun<sup>2</sup>, Qian-Wei Chen<sup>2</sup>, Tay Jie Ying<sup>2</sup>, Yao-Chuen Li<sup>2\*</sup>

<sup>1</sup> Department of Sports Medicine, China Medical University, Taiwan

<sup>2</sup> Department of Physical Therapy, China Medical University, Taiwan

**Background and purpose:** Prior research has shown that children with Developmental Coordination Disorder (DCD) are at increased risk for poor executive functions, such as inhibitory control or cognitive flexibility. However, in spite of the positive effect of physical literacy (PL) intervention on executive functions in typically developing children, there is a lack of evidence in children with DCD. Therefore, this study was to investigate the intervention effect of inclusive PL program on executive functions in school-aged children with DCD. **Methods:** Six children with DCD (5 boys and 1 girl, mean age:  $99.75 \pm 8.82$  months old) were invited and randomly assigned to either the intervention group ( $n = 3$ ) or the control group ( $n = 3$ ). In order to develop the inclusive mode of the PL intervention, this study additionally invited three typically developing children to join the intervention group. Executive functions (i.e., inhibitory control and cognitive flexibility) were evaluated in all children with DCD before and after the intervention program which was held once a week (2 hours) for six weeks. Two tests were selected for each executive function: Early Year Toolbox – Go/Nogo and Psytoolkit – Simon task for inhibitory control, and Early Year Toolbox – Card Sort and Psytoolkit – Multitasking for cognitive flexibility. Generalized Linear Models were used to examine the main effects of group and time and the group\*time interaction on executive functions, while controlling for sex and age. **Results and Conclusion:** Although there was a significant time effect on Switch Accuracy Score of the Early Year Toolbox – Card Sort (unstandardized coefficient = -4.00, SE = 1.94, df = 1,  $p = .04$ ), no group\*time interaction was found on all variables, indicating that children with DCD in the intervention group did not improve their executive functions after the inclusive PL intervention, compared to their incoordinated peers in the control group. It is speculated that the cognitive component of the programs may be not sufficient to induce the changes in executive functions. Therefore, it is warranted that further research should highlight the engagement in cognitive tasks if the PL intervention would like to simultaneously target the improvement in executive functions.

**Keywords: Developmental Coordination Disorder, motor difficulty, physical literacy, executive functions**

**Correspondence: Dr. Yao-Chuen Li, [yaochuenli@mail.cmu.edu.tw](mailto:yaochuenli@mail.cmu.edu.tw), +886-4-22053366 ext 7310**

# 第二版兒童動作評估測驗檢核表於台灣學

## 齡年兒童族群之適用性：初步研究結果

潘錦和、陳郁文、李曜全\*

中國醫藥大學物理治療學系暨復健科學研究所

**目的：**兒童動作評估測驗(Movement Assessment Battery for Children – Second Edition, MABC-2)是一個用於評估孩童是否有發展協調障礙，且在台灣是常見且廣泛使用的一項工具，其中文版信度與效度已經過驗證，然而其搭配使用的檢核表尚未經過信度與效度的檢驗，因此本研究主旨在評估其內部一致性和建構效度，以驗證在台灣學齡前兒童族群的適用性。**方法：**本研究共徵召123位4-6歲兒童，並邀請其主要照顧者完成MABC-2檢核表之填寫，在排除遺漏值之後，共留下了117筆完整資料進行後續分析。檢核表內容分為6個面向，共30選。隨後使用內部一致性進行信度分析，以及探索性因素分析驗證建構效度。**結果：**針對30個選項進行內部一致性分析，整體Cronbach alpha值為0.939，為高度一致性，但審閱刪除各項目後之內部一致性改變情況，刪除題目B3\_1[不用輔助輪騎腳踏車]後Cronbach alpha值提升為0.945，故刪除此題目後再進行因素分析。根據探索性因素分析之特徵值與陡坡圖建議，MABC-2檢核表中文版可區分為6個因素，然而僅有3個因素之題目與原版量表相近。整體而言，MABC-2檢核表中文版具有高度內部一致性，但建構效度部分與原本量表有所差異，內容結構應用於台灣學齡前兒童族群時應進行些許調整。因此，儘管總分計算影響不大，但若考慮計算孩童於各面向之分數時，應審慎考量此結構上之差異。

**關鍵字：**內部一致性、建構效度、文化差異、學齡前兒童

**通訊作者：**李曜全博士，[yaochuenli@mail.cmu.edu.tw](mailto:yaochuenli@mail.cmu.edu.tw)，+886-4-22053366 ext 7310

# **Suitability Of The Movement Assessment Battery For Children – Second Edition Checklist In Taiwanese Preschool Children: Preliminary Results**

**Jin-He Pan, Yu-Wen Chen, Yao-Chuen Li\***

Graduate Institute of Rehabilitation Science, China Medical University, Taiwan

**Introduction:** Movement Assessment Battery for Children – Second Edition (MABC-2) test is one of commonly used assessments in Taiwan which could be used to assess whether children are at risk for developmental coordination disorder. Reliability and validity of its Chinese version has been previously validated. However, while both the MABC-2 test and checklist are often used, the checklist has not been well examined for its reliability and validity in Taiwanese context. Therefore, the main objective of this study was to evaluate its internal consistency and construct validity to examine the suitability in Taiwanese preschool children. **Methods:** A total of 123 children aged 4-6 years were recruited for this study, and their primary caregivers were invited to complete the Chinese version of the MABC-2 checklist. After excluding missing values, valid data were obtained from 117 caregivers for further analysis. The MABC-2 checklist consists of 6 domains with a total of 30 items. Internal consistency was analyzed for reliability, and exploratory factor analysis was conducted to verify construct validity. **Results & Conclusions:** The overall Cronbach's alpha value was 0.939, indicating high consistency. However, after reviewing and deleting the item B3\_1 [able to ride a bicycle without assistance], internal consistency was improved (Cronbach's alpha = 0.945). Exploratory factor analysis was then conducted. Based on the eigenvalues and scree plot, the Chinese version of the MABC-2 checklist could be divided into six factors (i.e, subtests); nevertheless, only three of them were similar to the original version. Overall, the Chinese version of the MABC-2 checklist shows high internal consistency. In spite of the establishment of construct validity, there is the difference in the structure between the original and Chinese versions. Therefore, although the testing result (i.e., the total score) may be reliable, it needs to be cautious when the subtest scores is calculated and interpreted.

**Keywords:** internal consistency, construct validity, cultural difference, preschool children

**Correspondence:** Dr. Yao-Chuen Li, [yaochuenli@mail.cmu.edu.tw](mailto:yaochuenli@mail.cmu.edu.tw), +886-4-22053366 ext 7310

# Objectively Measured Physical Activity In Children With Developmental Coordination Disorder: A Systematic Review And Meta-Analysis

**Huynh-Truc Tran**<sup>1</sup>, **Yao-Chuen Li**<sup>2</sup>, **Wen-Chao Ho**<sup>1</sup>, and **Li-Wei Chou**<sup>2,3,4</sup>

<sup>1</sup> Department of Public Health, China Medical University, Taiwan

<sup>2</sup> Department of Physical Therapy and Graduate Institute of Rehabilitation Science, China Medical University, Taiwan

<sup>3</sup> Department of Physical Medicine and Rehabilitation, China Medical University Hospital, Taiwan

<sup>4</sup> Department of Physical Medicine and Rehabilitation, Asia University Hospital, Asia University, Taiwan

**Introduction:** Due to significant motor difficulties in performing physical activities (PA), children with developmental coordination disorder (DCD) have been found to be at greater risk of physical inactivity, compare to typically developing (TD) children. A variety of measurements have been used to investigate PA in this special childhood population. However, there is still a lack of synthesised evidence regarding objectively measured PA in children with DCD. Therefore, this study was to conduct a systematic review and meta-analysis to understand the difference in objectively measured PA between children with and without DCD and to identify the correlates which may be associated with PA in children with DCD. **Methods:** A systematic literature search from four databases (PubMed, Science Direct, Web of Science, and Cochrane library) was conducted in November 2022. A total of 12 articles met the inclusion criteria for the systematic review, 10 of which were further entered into the meta-analysis to obtain pooled effect estimates. **Results & Conclusion:** Overall mean difference in moderate to vigorous PA (MVPA) between two groups was -0.17 (95% CI: -0.25 to -0.09,  $I^2 = 48.7\%$ ,  $p = 0.029$ ), indicating that children with DCD significantly had the lower MVPA level. When subgroup analysis of age was further conducted (i.e., school-aged vs. preschool), there was a significant moderation of age ( $p = 0.007$ ) on the relationship between DCD and MVPA. A significant pooled effect size with no heterogeneity was found in school-aged children (i.e., 6–14 years old) (standardized mean difference (SMD) = -0.27, 95% CI: -0.38 to -0.16,  $I^2 = 43.1\%$ ,  $p = 0.08$ ), indicating the significant difference in MVPA between children with DCD and TD only existed in the school-aged population. In addition, evidence synthesized from the included studies

identified some potential PA correlates for children with DCD, including internal factors (e.g., movement impairment, psychological problems, sex, strength, body mass index) and external factors (e.g., activity types and parental factors). In summary, children with DCD spent significantly less time participating in MVPA, specifically those children aging between 6 and 14 years, when compared with TD children. These findings help raise the awareness for the parents and physicians toward insufficient participation in PA in children with DCD and highlight the importance of early identification of these children. Furthermore, the modifiable internal and external risk factors that were identified in this study would provide the practical implications for the development of interventions/ strategies targeting the improvement in PA.

**Keywords: Developmental coordination disorder, motor coordination, moderate-to-vigorous physical activity, accelerometry**

**Correspondence: Professor Li-Wei Chou [chouliwe@mail.cmu.edu.tw](mailto:chouliwe@mail.cmu.edu.tw) or [chouliwe@gmail.com](mailto:chouliwe@gmail.com), +886-4-22053366 ext 7301**

# 學習桌球的動機內涵:以國內 證實研究為例

<sup>1</sup>王琦心 <sup>2</sup>聶喬齡

<sup>1</sup> 國立臺灣體育運動大學球類系 <sup>2</sup> 國立臺灣體育運動大學體育系

## 摘要

**目的:**桌球運動近年來，因為國際賽成績斐然，逐漸成為受歡迎的運動項目之一。由於其特性是入門容易但精進技巧困難，所以往往技術精進背後最重要影響的因素之一，就是學習動機。而不同的動機內涵又造成研究桌球動機時結果難以相互比較的來源之一。因此，本研究目的在於探討學習桌球時的動機何涵為何，國內研究是否有一致的發現。**方法:**本研究以關鍵字為核心，搜尋中文資料庫中已出版之結果，鎖定國內已出版之實徵性研究對象，針對測量工具的內容進行分類與歸納，以獲取相關結果。**結果與討論:**以關鍵字「學習動機」為第一層蒐尋策略，於華藝 CEPS 中文電子期刊資料庫中進行搜尋，得到 1582 篇的結果後，再以關鍵字「桌球」進行檢索結果再查詢，最終得到 19 筆資料後，再逐一以人工方式進行研究結果的檢核，最後與主題相關之研究，共 11 篇實徵研究。進行學習動機的內容歸納與分類後發現：1)以測量學習動機的工具中，發現由國內學者陳偉瑀與沈莉青(2003)發展的動機信念量表出現次數最多，共五篇，其次是 Keller(1999)ARCS 學習動機問卷調查，共 3 篇，而國內學者吳靜吉與程炳林(1993)編修自國外的激勵的學習策略量表，2 篇；2)從事相關研究的學者為陳偉瑀，共計 5 篇；3)研究對象最多的為大學的體育課學生，共計 8 篇，其次是國小學童 2 篇和國中學生 1 篇。由上述的結果可知國內針對桌球學習動機的研究，仍有潛力投入於大學以下的學生族群，以及提供相關研究學習動機時，可供選擇的測量工具之參考。

**關鍵字:**自信心、自我決定、自我效能

**通訊作者:**聶喬齡，[cnien@gm.ntus.edu.tw](mailto:cnien@gm.ntus.edu.tw)，0928094085

# An Empirical Study Approach To Examine Learning Motivation In Table Tennis

Chi-Hsin Wang<sup>1</sup> · Chiao-Lin Nien<sup>2</sup>

<sup>1</sup>National Taiwan University of Sport, Department of Ball Sport

<sup>2</sup>National Taiwan University of Sport, Department of Physical Education

**Purpose:** Table tennis has become one of the most popular sports in recent years due to its success in international tournaments. As it is an easy sport to get into but difficult to improve, one of the most important factors behind the improvement of technique is often the learning of motivation. This is one of the reasons why it is difficult to compare the results of different motivations studies on this subject. Therefore, the aim of this study was to investigate what motivation is in learning table tennis and whether there are consistent findings from domestic studies. **Methodology:** This study focused on keywords, searched for published results in Chinese databases, and targeted on the published empirical studies in China to classify and summarize the content of the measurement tools to obtain relevant results. **Results and Discussion:** The keyword "learning motivation" was used as the first level of search strategy, and 1582 articles were searched in the Chinese e-journal database of Hua Yi CEPS, and then the keyword "table tennis" was used to retrieve the results. After summarising and categorising the motivation content, it was found that: 1) the motivation belief scale developed by Chen Wei Yu and Shen Liqing (2003) appeared most frequently, with five articles, followed by Keller's (1999) ARCS motivation questionnaire, with three articles, and Wu Jingji and Cheng Binglin (1993), who developed a motivational learning strategy scale from overseas, with two articles. 2) Chen Wei Yu (5 articles) was the most frequently studied researcher, with 8 articles; 3) the most frequently studied researcher was university students in physical education, followed by 2 articles for primary school students and 1 article for secondary school students. From these results, there is potential for research on the motivation of learning to play table tennis in China to be applied to students below the university level, as well as to provide a reference for the measurement tools that can be used to study motivation.

**Keywords:** self-confident, self-efficacy, self-determination

**Correspondence:** Associate Professor Chiao-Lin Nien, [clnien@gm.ntus.edu.tw](mailto:clnien@gm.ntus.edu.tw), +886-928094085



# 中信兄弟隊主場行銷與經營之研究

劉昭廷

國立臺灣體育運動大學 運動事業管理學系

## 摘要

中華職棒發展已行之有年，聯盟從「全國主場」的巡迴式比賽演變成各球隊認養球場並執行主場經營。主場行銷和經營是所有運動球隊經營者的重要課題，此課題建立在主客場制度的規則上。藉由主客場制度使球隊必須更加專注於主場經營，屬地經營是球隊長期經營之必要策略，透過這樣的方式讓球隊能建立更多的在地球迷。通過經營和行銷策略，讓其產生歸屬和認同感進而增加進場意願。**研究目的：**探討中信兄弟球團主場行銷與經營之現況，進而以作為日後職業運動球團發展之參考。研究對象為前身是中華職棒聯盟成立時的四支創始球隊之一兄弟象隊之-中信兄弟隊。**研究方法：**本研究使用 SWOT 分析中信兄弟的主場經營和主場行銷之概念，分析內外部優缺點後並提出其球隊屬地經營方式。**研究結果與結論：**中信兄弟有落實主場經營和主場行銷，在台中經營多年的中信兄弟更加證實台灣主場行銷與經營策略在職業聯盟之重要性。本研究透過 SWOT 分析歸納出以下幾項結果並提出建議：(一) 改善球場廁所問題；(二) 更重視爭議性球迷的發洩管道；(三) 更注重球員的表現空間；(四) 增強球迷與洲際棒球場之間的情感。

**關鍵詞：**中信兄弟、屬地經營、主場經營、主場行銷、SWOT 分析

**通訊作者：**劉昭廷 連絡電話：0919832552 E-mail：11005013@gm.ntus.edu.tw

# Research on Marketing and Operation of CTBC Brothers Home Stadium

Chao-Ting Liu

Department of Sport Management, National Taiwan University of Sport

## Abstract

The development of Chinese professional baseball has been going on for many years. The league has evolved from a "national home stadium" touring game to teams adopting stadiums and implementing home stadium management. Home marketing and management is an important topic for all sports team operators, and this topic is based on the rules of the home and away system. With the home and away game system, the team must focus more on home-field management, and territorial management is a necessary strategy for the team's long-term management. Through this method, the team can build more local fans. Through business and marketing strategies, let them have a sense of belonging and identity, thereby increasing their willingness to enter the market.

**Introduction:** To discuss the current situation of CTBC Brothers' home field marketing and operation, and then use it as a reference for the future development of professional sports teams. The research object is the CTBC Brothers team, which was formerly the Brothers Elephant Team, one of the four founding teams of the Chinese Professional Baseball League when it was founded. **Research method:** This study uses SWOT to analyze the concepts of CTBC Brothers' home court management and home court marketing, and after analyzing the internal and external advantages and disadvantages, it proposes the team's territorial management methods. **Research results & conclusions:** CTBC Brothers has implemented home-court management and home marketing. CTBC Brothers, who have been operating in Taichung for many years, further confirmed the importance of Taiwan's home-field marketing and business strategies in professional leagues. Through SWOT analysis, this research summarizes the following results and puts forward suggestions: (1) Improve the toilet problem in the stadium; (2) Pay more attention to the venting ways of controversial fans; (3) Pay more attention to the performance space of players; (4) Strengthen fans Emotions with the Intercontinental Baseball Stadium.

**Keywords:** CTBC Brothers, territorial management, home-court management, home-court marketing, SWOT analysis

**Correspondence:** Chao-Ting Liu Tel: 0919832552 E-mail: 11005013@gm.ntus.edu.tw

# 推廣各級學校八人制拔河運動之阻礙因素

## 研究-以臺中市國民小學為例

王憶慈、王妍菲、陳玟璇

國立臺中教育大學 體育學系

**目的：**我國自 1990 年引進八人制拔河運動，迄今已逾三十餘年。1998 年「教育部 87 學年度全國各級學校拔河比賽」時，多達 1087 隊各級學校拔河隊伍報名參加，然而，近年來國內各項全國級賽事報名總隊伍數卻僅剩不到 50 隊。以臺中市為例，推廣拔河運動已有三十年以上，在全國各級賽事屢獲佳績、成績斐然，但近 10 年臺中市各級學校報名參加全國級賽事的學校卻不到 10 所，原因何在？  
**方法：**本研究採用半結構式訪談方式，訪談了臺中市拔河委員會總幹事、副總幹事及多位帶領國小拔河隊的資深教師，以探討臺中市國小八人制拔河運動推廣之阻礙因素。  
**結果與討論：**一、校內缺少有具拔河運動專長且願意兼任教練之教師，致使無人指導拔河隊；二、家長與級任教師願意支持孩子參加拔河隊及學生參加拔河隊意願低，導致選手來源不足；三、拔河訓練器材、裝備價格昂貴，非校內預算所能支應；四、校內行政是否支持且協助拔河隊組訓，對於拔河隊的經營推廣是影響重大，五、參賽所需膳食、交通及住宿各項經費為一筆龐大開銷，如未能獲的補助及贊助，恐難以參加各項賽事。  
**結論：**從訪談中發現「教練來源」、「選手來源」、「場地設備」、「行政支持」及「經費來源」為目前臺中市國小八人制拔河運動之主要阻礙因素。

**關鍵詞：**八人制拔河、阻礙因素

通訊作者：王憶慈

通訊地址：國立臺中教育大學，臺中市西區民生路 140 號。

電話：0927047166

email：[abombqq@zdes.tc.edu.tw](mailto:abombqq@zdes.tc.edu.tw)

# Research on the obstacles of promoting eight-person tug-of-war in schools: A case study of elementary schools in Taichung City

Yi-Cih Wang, Yan-Fei Wang, Wun-Syuan Chen

Department of Physical Education, National Taichung University of Education, Taiwan

**Purpose:** Eight-person tug-of-war was introduced in Taiwan in 1990, and over the past 30 years, it has become popular among schools. In 1998, a total of 1,087 teams from various schools participated in the “Ministry of Education's 87 Academic Year National Tug-of-War Competition”. Unfortunately, the total number of teams participating in national-level competitions has dropped to less than 50 in recent years. Taking Taichung City as an example, although the promotion of tug-of-war sports has been ongoing for over 30 years and has achieved remarkable results in various national-level competitions, however, in the past ten years, less than 10 schools at all levels in Taichung have registered for the national level competition. What are the reasons for this? **Method:** This study conducted semi-structured interviews with the general secretary, deputy general secretary of the Taichung City Tug-of-War Committee, and experienced teachers who lead elementary school tug-of-war teams to explore the obstacles to the promotion of eight-person tug-of-war in Taichung City elementary schools. **Results and Discussion:** First, the lack of teachers with expertise in tug-of-war sports and willingness to serve as coaches within the school resulted in no one coaching the tug-of-war teams. Second, the low willingness of parents and homeroom teachers to support their children's participation in tug-of-war teams, and the low willingness of students to join the teams resulted in a shortage of players. Third, the expensive prices of tug-of-war training equipment and gear cannot be supported by school budgets. Fourth, whether the school administration supports and assists the establishment and training of tug-of-war teams has a significant impact on the promotion and management of tug-of-war teams. Fifth, the costs of food, transportation, and accommodation required for participation in competitions are enormous, and without subsidies or sponsorship, it may be difficult to participate in various competitions. **Conclusion:** It was found that coach source, player source, facility and equipment, administrative support, and funding sources are the major obstacles to the promotion of eight-person tug-of-war in Taichung City elementary schools.

**Keywords:** eight-person tug-of-war, obstacles

**Correspondence:** Yi-Cih Wang, [abombqq@zdes.tc.edu.tw](mailto:abombqq@zdes.tc.edu.tw), 0927047166

# 職業棒球啦啦隊應援經濟:2023WBC世界 棒球經典賽

吳政穎

臺灣體育運動大學休閒系在職專班學位學程

**目的:**在 2023WBC 經典賽預賽 B 組中，10 場的賽事是核心產品，是消費者主要要看的，行銷公司帶入啦啦隊這個重要的延伸產品，讓 4 場中華隊賽事得到場場爆滿的回饋，最初剛公布此次中華隊票價時怨聲載道，但最終卻是滿場收尾，其中成功吸引消費者的是產品的哪個部分。**方法:**本篇研究採取文獻分析法，蒐集的研究以行銷相關的文獻進行分析，從行銷學角度看啦啦隊對這次賽事造成甚麼樣的幫助。**結論與建議:**消費者進場看球的主要目的是為了棒球本身或是啦啦隊，帶來滿場的效益就是一個成功的行銷，啦啦隊是棒球比賽的延伸產品，但運動產業的核心有著不易變更的特性，延伸產品依賴的核心產品，一旦核心產品消失延伸產品也會連帶消失，無法獨立出來。這次的賽事行銷是一次成功的銷售手法，要能延續到較長期的賽事中，找到每個時期的主流，由主流文化跟產業結合才更能達到高的經濟效益。

**關鍵詞:**應援經濟、延伸產品、世界棒球經典賽

# Professional Baseball Cheerleaders Supports the Economy: The 2023 WBC World Baseball Classic

Cheng-Ying Wu

Department of Recreational Sport, National Taiwan University of Sport

**Introduction:** In Group B of the 2023 WBC Classic Preliminaries, the 10 games are the core products that consumers mainly want to watch. The marketing company brings in the cheerleaders, an important extended product, so that the 4 Chinese Taipei team games can get full feedback. There were many complaints when the ticket price of the Chinese team was first announced, but in the end it ended with a full audience. Among them, which part of the product successfully attracted consumers.

**Method:** This study adopts the literature analysis method, and the collected research is analyzed with marketing-related literature, and from the perspective of marketing, what kind of help the cheerleaders has brought to this event.**Results & Conclusions:** The main purpose of consumers to watch the game is for the baseball itself or for the cheerleaders. It is a successful marketing to bring benefits to the stadium. The cheerleaders is an extended product of the baseball game, but the core of the sports industry has something that is not easy to change. Features, the core product that the extended product depends on, once the core product disappears, the extended product will also disappear and cannot be independent. The event marketing this time is a successful sales method. It must be extended to a longer-term event, find the mainstream of each period, and combine the mainstream culture with the industry to achieve high economic benefits.

**Keywords:** aid economy, extended products, World Baseball Classic

**Correspondence:** Cheng-Ying Wu, [11102105@gm.ntus.edu.tw](mailto:11102105@gm.ntus.edu.tw), +886 988704979

# 足球課程教學設計對學生學習動機之探究

李育嬋<sup>1</sup> 石竹君<sup>1</sup> 劉佳鎮<sup>2</sup>

<sup>1</sup>國立臺中教育大學體育學系碩士在職專班 <sup>2</sup>國立臺中教育大學體育學系

足球是一項風靡全球的運動項目，每當世界盃足球賽開打時，總是讓人熱血沸騰投入賽事中，其討論度居高不下。對萬人為之瘋狂的足球運動，臺灣各地有許多俱樂部、工作室提供足球課程吸引學生報名參加，而在學校體育課程中，林靜萍與陳信亨 (2007) 指出學生因對足球經驗少、覺得累，不會踢、不好玩等接受程度較低，加上體育教師將教學重心著重在運動技能的傳授，花較多的時間在技能的反覆練習上，致使學生降低學習樂趣而缺乏主動練習的動機。**目的：**探討足球課程授課教師其教學設計對學生學習動機之影響。**方法：**以文獻分析探究足球課程教學設計對學生學習動機影響之情形，於「臺灣博碩士論文知識加值系統」與「華藝線上圖書館」以「足球」、「課程」、「足球教學」等關鍵字進行搜尋，符合相關文獻有碩士論文 24 篇、期刊 26 篇，排除不符合探討條件之文獻，共有 10 篇期刊納入分析。**結果：**經由文獻回顧彙整下列重點：一、運用不同器材來設計課程，可促進學生積極主動參與。二、透過遊戲融入課程，增添趣味性，可引發學生學習動機。三、簡化足球規則，視學生能力調整難易度，提升學生對足球的興趣。四、傾聽學生意見並適當給予鼓勵營造良好學習氛圍，增強學生自信心。**結論：**教師的教學方式與課程設計會影響學生參與足球課程的學習動機，教師除具備足球專業知能，教導學生相關知識與技巧外，應善用器材及遊戲化的方式使課程更加豐富有趣，使學生從中習得基本動作技能，並於分組對抗中獲得成就感，享受足球所帶來的樂趣。建議教師可多參與相關教學研習或工作坊，與他人交流教學經驗並觀摩課程實施情形，增進課程創新與應變之能力，提升學生學習動機，使學生樂於參與足球課程，甚至於課餘時間主動積極參與足球活動。

**關鍵詞：**足球教學、樂趣化課程、學習動機

**通訊作者：**李育嬋，[dog864911@hotmail.com](mailto:dog864911@hotmail.com)，02-26806673 分機 865

# Exploring the Effect of Soccer Curriculum Instructional Design on Students' Learning Motivation

Yu-Chan Li<sup>1</sup>, Chu-Chun Shih<sup>1</sup>, Chia-Chen Liu<sup>2</sup>

<sup>1</sup> Department of Physical Education in-service master's program, National Taichung University of Education, Taiwan.

<sup>2</sup> Department of Physical Education, National Taichung University of Education, Taiwan.

Soccer is a popular sport throughout the world. Whenever the World Cup begins, it always ignites people's passion and draws them into the competition, resulting in a high level of discussion and interest. For the wildly popular sport of soccer, many clubs and studios in Taiwan offer soccer classes to attract students to enroll. Lin Jing-ping and Chen Xin-heng (2007) pointed out that students have a lower acceptance of soccer in physical education curriculum due to their lack of experience, feeling tired, not knowing how to play, and finding it not fun. In addition, physical education teachers tend to focus on imparting sports skills and spend more time on repetitive skill practice. This results in a decrease in students' learning enjoyment and a lack of motivation to practice actively. **Purpose:** Exploring the impact of teaching design in soccer curriculum by instructors on students' learning motivation. **Methods:** Using literature analysis to investigate the impact of teaching design in soccer curriculum on students' learning motivation, searching for keywords such as “soccer”, “curriculum”, and “soccer teaching” in National Digital Library of Theses and Dissertations in Taiwan and Airiti Library. There are 24 master's theses and 26 journal articles in accordance with the relevant literature search. After excluding literature that does not meet the investigation criteria, a total of 10 journal articles were included in the analysis. **Results:** After conducting a literature review, the following points were summarized: 1. Designing curriculum using different equipment can encourage students to actively participate. 2. Incorporating games into the curriculum can add fun and increase students' learning motivation. 3. Simplifying soccer rules and adjusting the difficulty level based on students' abilities can increase their interest in soccer. 4. Listening to students' opinions, giving appropriate encouragement, and creating a positive learning atmosphere can enhance students' confidence. **Discussion:** The teaching style and curriculum design of the teacher can affect students' learning motivation to participate in soccer courses. In addition to possessing professional knowledge of soccer, teachers should also use equipment and gamification to make the curriculum more interesting. By doing so, students can learn basic skills and movements, gain a sense of achievement



through group competitions, and enjoy the fun of soccer. It is suggested that teachers can participate in relevant teaching training sessions or workshops, exchange teaching experiences with others, and observe the implementation of courses to enhance their ability to innovate and adapt the curriculum, improve student motivation, and encourage students to actively participate in soccer classes. This may even lead to students participating in soccer activities voluntarily during their free time.

**Key words: soccer teaching, fun-oriented curriculum, learning motivation**

**Correspondence: Yu-Chan Li, [dog864911@hotmail.com](mailto:dog864911@hotmail.com), 02-26806673 ext 865**

# 以文獻回顧探討宗教對運動史發展之影響

陳玟璇、王憶慈、王妍菲

國立臺中教育大學 體育學系

**目的：**溯及既往，綜觀宗教對運動的影響淵源流長，宗教試圖透過不同的運動展現方式達成其發展，運動的發展也透過宗教的力量及組織得以茁壯，兩者之間互相裨益、互助助長，其影響有負面、有正面，基於此，本文旨在探討宗教對運動史發展變遷之影響。**方法：**研究採用文獻分析方法，蒐集的面向，包括：一、不同宗教對運動所抱持的態度；二、宗教對運動員的影響；三、運動與宗教的衝突，從中整理出宗教在運動史上的發展變遷之影響。**結果與討論：**一、隨著社會的變遷，在不同的時空背景下，宗教、運動與社會的關係，三者之間也不斷的互相影響及改變；二、隨著現代社會結構的改變，宗教信仰透過運動文化及科技媒介的傳播，更加地有組織、系統化；三、這股神聖及超自然的無形力量已轉化為運動情境，從神格化的宗教信仰轉化為人格化的運動世界中。**結論：**從文獻回顧中，我們發現宗教與運動之間影響的因素環環相扣，但仍受東西方文化的不同而有所差異。

**關鍵詞：**宗教、運動

通訊作者：陳玟璇

通訊地址：國立臺中教育大學，臺中市西區民生路 140 號。

電話：0973260982

email：l36134582@gmail.com.tw

# A Literature Review Of Exploring The Influence Of Religion On The Development And Change Of Sport History

Wun-Syuan Chen, Yi-Cih Wang, Yan-Fei Wang

Department of Physical Education, National Taichung University of Education, Taiwan.

**Introduction:** Religions have tried to achieve their development through different ways of presenting the sport, and the development of the sport has been strengthened through the power and organization of religions. The two are mutually beneficial and mutually supportive, with both negative and positive effects. In this vein, this study aims to explore the influence of religion on the development and changes of sport history. **Methods:** The research adopted a documentary analysis method to collect the following aspects: first, the attitude of different religions toward sports; second, the influence of religion on athletes; and third, the conflict between sports and religion, from which the influence of religion in the development and changes of sports history can be sorted out. **Results and discussion:** First, with the changes in society, the relationship between religion, sports and society has been constantly influencing and changing in different temporal and spatial contexts; second, with the change of modern social structure, religious beliefs have become more organized and systematic through the spread of sports culture and technological media; third, the invisible power of the sacred and supernatural has been transformed into a sporting context, from a divine religious belief to a personalized sporting world. **Conclusion:** From the literature review, we found that the factors influencing religion and sport are intertwined, but still differed by the differences between Eastern and Western cultures.

**Key words:** religion, exercise

**Correspondence:** Wun-Syuan Chen, [136134582@gmail.com.tw](mailto:136134582@gmail.com.tw), 0973260982

# 運動場上香港人對義勇軍進行曲的態度

<sup>1</sup> 彭俊鋒 <sup>2</sup> 孟峻瑋

<sup>12</sup> 國立臺灣體育運動大學體育學系

**目的:** 2019 年是一個不幸的年份，在新冠肺炎疫情的影響下世界各地發生了不同的事情，而在香港這個地方因為中國的權力的控制下走向另外一面。2014 年 8 月 31 日，中國全國人大常委會北京舉行會議的一個決策改變了香港的走勢，從而發生政治和社會運動。由於香港人對中國產生反感，加上義勇軍進行曲不僅是中國國歌，也是香港運動代表隊的國歌，讓港人在運動場上有特殊的行為和反應。**方法:** 本研究採用幾個著名的個案進行分析，回顧這些運動場的事件所帶來的影響。**結果與結論:** 在香港人地身份認同上，大家部分的香港市民都覺得自己是香港人，但因一連串的政治事件下，港人利用運動項目表達對香港政府的不滿。**結論:** 香港人對義勇軍進行曲的態度可能因個人信仰、價值觀和政治立場而有所不同。有些人可能會支持該曲目，認為它代表著愛國主義和對軍人的尊重；而另一些人則可能反對該曲目，認為它代表著對歷史的歪曲和對暴力鎮壓的支持。港人在運動場上對義勇軍進行曲採取否定的態度，造成香港政府也制訂反制的規定。

**關鍵詞:** 政治運動、義勇軍進行曲、香港、中國

# Attitudes of Hong Kong People towards the March of the Volunteers in Sports Events

<sup>1</sup>ChunFung Pang <sup>2</sup>Junwei Yu

<sup>12</sup>Department of Physical Education, National Taiwan University of Sport

**Purpose:** 2019 was an unfortunate year, with various events happening worldwide due to the impact of the COVID-19 pandemic. China's governance of Hong Kong led to a totally different direction. On August 31, 2014, a Standing Committee of the National People's Congress in Beijing passed legislation that changed the course of Hong Kong, leading to political and social movements where Hong Kong people not only expressed opposing voices in society but also on sports fields. Additionally, the "March of the Volunteers" is Hong Kong's national anthem, which has generated anti-China sentiments among Hong Kong people, resulting in different attitudes towards the song.

**Method:** This study will use several recently occurred incidents that involved China's national anthem as case studies and review the impact of these events on Hong Kong.

**Results and Conclusion:** In terms of Hong Kong people's identity, most Hong Kong citizens feel they are Hong Kong people. During the protests, Hong Kong people had different views from Special Administrative Government, and they expressed dissatisfaction through sports events. The attitude of Hong Kong people towards the "March of the Volunteers" may vary due to personal beliefs, values, and political stance. Some may support the song, seeing it as representing patriotism and respect for the military, while others may oppose it, viewing it as a distortion of history and support for violent repression. Regardless of individual perspectives, we should respect and tolerate different opinions and uphold freedom of speech and a diverse society.

**Keywords:** Political Movement, March of the Volunteers, Hong Kong, China

**Correspondence:** Professor Junwei Yu, [jwyu@ntus.edu.tw](mailto:jwyu@ntus.edu.tw)

# 近十年跆拳道道館經營模式發展

廖惟林<sup>1</sup> 劉佩涵<sup>1</sup> 蔡仁峯<sup>1</sup> 張碧峰<sup>1</sup>

<sup>1</sup> 國立臺中教育大學體育學系碩士班

**研究目的:** 探討全球跆拳道運動普及及其對道館經營方式的變革，包括越來越多人將跆拳道視為健身運動，道館提供教學和鍛練的改進，賽事形式的多樣化，以及社交媒體對跆拳道推廣的影響。**方法:** 使用系統性文獻回顧為主要研究方法，以跆拳道道館經營、跆拳道道館發展為關鍵字進行搜索，收集並分析過去 10 年內關於跆拳道道館經營模式發展的相關研究。研究目的包括關注消費者和選手教練關係，提升道館經營和管理能力，吸引優秀人才參與和推廣跆拳道。**結果與結論:** 透過文獻回顧與分析，發現近十年的跆拳道道館發展的相關研究，仍有許多須提升之處：一、教練團隊的專業化和多樣化；二、賽事和比賽組織的提升；三、行銷和推廣策略的創新；四、學員培養和綜合素質教育；五、與社會和學校合作的加強。上述之改進有助於推動跆拳道道館的發展，除提升教學品質外、提高學員參與度和滿意度，以促使跆拳道在社會中獲得更廣泛的認可和支持。

**關鍵詞:** 跆拳道、文獻分析、道館經營

# The Development Of The Business Model Of Taekwondo Gyms In The Past Ten Years

Wei-Lin Liao<sup>1</sup>, Pei-Ju Liu<sup>1</sup>, Ren-feng Tsai<sup>1</sup>, Bi-Fon Chang<sup>1</sup>

<sup>1</sup>Department of Physical of Education, National Taichung University of Education, Taiwan.

**Instruction:** To explore the global popularity of Taekwondo as a fitness sport and its impact on the business models of Taekwondo gyms, including improvements in teaching and training methods, diversification of competition formats, and the influence of social media on Taekwondo promotion. **Methods:** The main research method used will be a systematic literature review, with keywords such as "Taekwondo gym management" and "development of Taekwondo gyms" used for searching relevant studies published within the past 10 years. The research objectives include examining consumer and athlete coach relationships, enhancing gym management and operational capabilities, and attracting top talent to participate in and promote Taekwondo. **Results & Conclusions:** Based on a literature review and analysis, it was found that there are several areas for improvement in the research on the development of Taekwondo gyms in the past decade. These include: 1. Professionalization and diversification of coaching teams, 2. Improvement of competitions and competition organizations, 3. Innovation of marketing and promotion strategies, 4. Trainee training and comprehensive quality education, 5. Strengthening of cooperation with society and schools. These improvements can help to promote the development of Taekwondo gyms, improve the quality of teaching, and increase student participation and satisfaction, leading to greater recognition and support for Taekwondo in society.

**Key words:** Taekwondo, literature analysis, gymnasium management

**Correspondence:** Wei-Lin Liao, [1058004@ntsu.edu.tw](mailto:1058004@ntsu.edu.tw)

# 體感遊戲應用於體育教學之相關研究探討

劉佩洳<sup>1</sup> 蔡仁峯<sup>1</sup> 廖惟林<sup>1</sup> 張碧峰<sup>1</sup>

<sup>1</sup> 國立臺中教育大學體育學系

**目的：**本研究旨在透過文獻探討，探討體感遊戲運用於體育教學成效的相關研究，並綜合分析體感遊戲在體育教學中的應用、成效及限制等方面的發現，以利作為後疫情時代及教育部推動「生生用平板」之體育課教學參考。**方法：**使用系統性文獻回顧為主要研究方法，以體感遊戲、體育教學為關鍵字搜尋，收集並分析過去 10 年內關於體感遊戲在體育教學中的相關研究。**結果與結論：**透過文獻回顧，發現體感遊戲運用於體育教學中的成效相當顯著，主要表現在以下三個方面：(1) 增強學生學習動機及學習興趣；(2) 提高學生體育技能及身體協調能力；(3) 促進學生身心健康及社交能力發展。另外，本研究也發現，體感遊戲在體育教學中的應用仍存在一些限制，包括技術限制和設備限制等。

未來可進一步探討如何運用體感遊戲設計更有效的教學策略，或是如何結合體感遊戲與傳統體育教學方法以更增進教師教學上的效益。

**關鍵詞：**體感遊戲、體育教學



# A Study On The Effect Of Physical Education Course Based On Motion Sensing Games

Pei-Ju Liu<sup>1</sup>, Ren-Feng Tsai<sup>1</sup>, Wei-Lin Liao<sup>1</sup>, Bi-Fon Chang<sup>1</sup>

<sup>1</sup> Department of Physical of Education, National Taichung University of  
Education, Taiwan.

**Introduction:** This study aims to explore the effectiveness of using motion-sensing games in sports teaching through literature review. It comprehensively analyzes the findings on the application, effectiveness, and limitations of motion-sensing games in sports teaching, and provides references for physical education classes using tablets in the post-pandemic era and the Ministry of Education's promotion of "Tablets for Students" program. **Methods:** The main research method is a systematic literature review, which involves using "motion sensing games" and "sports education" as keywords to search for relevant studies on the use of motion sensing games in sports education over the past 10 years. **Results & Conclusions:** Based on the literature review, it was found that the use of motion sensing games in sports education has significant benefits, particularly in three areas: (1) enhancing student motivation and interest in learning; (2) improving student physical skills and coordination abilities; and (3) promoting student physical and mental health as well as social development. However, this study also identified some limitations in the application of motion sensing games in sports education, such as technical and equipment constraints. Future research could explore how to use motion sensing games to design more effective teaching strategies, or how to combine motion sensing games with traditional sports education methods to further enhance teaching effectiveness for physical education teachers.

**Key words:** motion sensing games, physical education course. **Correspondence:** Pei-Ju Liu, [peadypeady1220@gmail.com](mailto:peadypeady1220@gmail.com)

# 臺灣雙語體育教學實施現況和未來 發展之探討

王妍菲、陳玟璇、王憶慈

國立臺中教育大學 體育學系

**目的：**面對全球化及國際化，為提升國民英語能力以增加國際競爭力，教育部成立「英語推動會」，規劃一系列的雙語課程，以強化學生在生活中應用英語的能力，希冀達成臺灣 2030 年成為雙語國家之目標，本文基於此一趨勢發展，探討雙語體育教學的現況與未來，以此提出相關建議。**方法：**本研究採文獻分析方法，蒐集面向包括：一、雙語教學的政策執行、二、雙語體育教學現況與教材發展、雙語體育師資甄選培訓。**結果與討論：**一、鑑於臺灣將在 2030 年成為雙語國家，我國合格雙語體育教師數量嚴重不足；二、善用多模態 (Multimodality) 的教學手法透過視覺、聽覺等輔助性教材，可加速學生對於課程理解；三、想要達成政策目標，除了透過在職教師專業增能外，師培機構如何針對師資生進行專業培育，提升其雙語教學知能，甚為重要。**結論與建議：**未來發展策略與方向如下：一、提供在職教師雙語培訓課程、研習與研討會，並提供誘因與獎勵；二、須先整備雙語體育師資培育完整體系規劃；三、運用師培大學與國中小教師專業發展學校合作。

**關鍵詞：**雙語體育教學、體育教師

通訊作者：王妍菲

通訊地址：國立臺中教育大學 臺中市西區民生路 140 號

電話：0986-562768

email：[juliajuliajulia1209@gmail.com](mailto:juliajuliajulia1209@gmail.com)

# An Analysis Of Current Status And Future Development Of Bilingual Sports Teaching Implementation In Taiwan

Yan-Fei Wang, Wun-Syuan Chen, Yi-Cih Wang

Department of Physical Education, National Taichung University of Education, Taiwan

**Introduction:** In the face of globalization and internationalization, the Ministry of Education has established the "English Promotion Association" to enhance the English proficiency of the nation and increase international competitiveness. They have planned a series of bilingual courses to strengthen students' ability to apply English in their daily lives, with the goal of making Taiwan a bilingual country by 2030. Based on this trend, this article explores the current and future status of bilingual sports teaching and makes related recommendations. **Methods:** the research adopts a literature analysis method, and the collection includes: First, the implementation of bilingual teaching policies; Second, the current situation and development of bilingual sports teaching materials; Finally, the selection and training of bilingual sports teachers. **Results and discussion:** Firstly, considering that Taiwan will become a bilingual country by 2030, there is a severe shortage of qualified bilingual sports teachers in our country. Secondly, the use of multimodal teaching methods through visual and auditory aids can accelerate students' understanding of the curriculum. Finally, in order to achieve policy goals, in addition to enhancing the professional capabilities of in-service teachers, it is also crucial for teacher training institutions to provide professional education for prospective teachers to improve their bilingual teaching competencies. **Conclusion:** Firstly, providing in-service teachers with bilingual training courses, workshops, and seminars, and offer incentives and rewards. Secondly, a complete system for the cultivation of bilingual sports teachers should be established. Finally, collaborating with teacher training universities and professional development schools for junior high and elementary school teachers.

**Key words:** Bilingual physical education, physical education teacher

**Correspondence:** Yan-Fei Wang, [juliajuliajulia1209@gmail.com](mailto:juliajuliajulia1209@gmail.com), 0986-562768

# 雙語體育教學於雙語政策下成效與 困境之探討

涂昂里<sup>1</sup> 李國維<sup>1</sup> 趙師頤<sup>1</sup>

<sup>1</sup> 國立臺中教育大學體育學系

## 摘要

**緒論：**近年來台灣教師逐漸開始嘗試雙語體育教學，然而仍處於發展中的雙語體育教學在教學現場必然會遭受到困難及挑戰，因此本研究目的於探討近年來雙語體育教學於政策下之困境與成效。**研究方法：**本研究採用文獻回顧法，以關鍵字「雙語體育」於全國碩博士論文網進行搜尋，進而篩選近年來(111-112年)於雙語體育教學之論文，篩選後以四篇論文進行研究分析。**研究結果：**透過文獻回顧歸納出雙語體育教學於學生學習之成效與影響，以及教師於雙語體育教學下所面臨之困難。整體結果顯示雙語體育教學於學生學習方面不論於認知、情意、技能皆有所成效，另外雙語體育教學於學生的體育知識、體育英文單字字彙量、英語聽力皆有正向的影響，學生學習動機於雙語體育教學之下也有所提升。另外在教師雙語體育教學所遭遇的困境包含教師英語能力、課室英語的使用、雙語體育教學的認同、師資的培育。**結論：**目前雙語體育教學在政策的推廣下已逐漸實行於學校教育，期盼未來研究能藉由雙語體育教學之成效及課程設計，解決目前所遭遇之困難，使雙語體育教學能真正落實。

**關鍵字：**雙語體育教學、雙語政策、學習成效。

主要聯絡者：涂昂里

通訊地址：彰化市延平路 470 巷 8 號

聯絡電話：0921-717-871

電子郵件信箱(E-mail)：[yone611@gmail.com](mailto:yone611@gmail.com)

# **An Investigation of Effectiveness and Difficulties on Bilingual Physical Education under Bilingual Policy**

**Ang-Li Tu<sup>1</sup>, Kuo-Wei Lee<sup>1</sup>, Shin-Yi Chao<sup>1</sup>**

<sup>1</sup>Department of Physical Education, National Taichung University of Education, Taiwan

## **Abstract**

**Introduction:** Instructors in Taiwan have been endeavoring to do bilingual physical education due to the promotion of bilingual policy recently. However, there must be difficulties and challenges in the current teaching spots because the bilingual physical education is still under developing. Therefore, the study aimed to investigate the difficulties and effectiveness of bilingual physical education under the bilingual policy.

**Method:** Firstly, the study adopted the document analysis by using the keywords “bilingual physical education” to search in the National Digital Library of Thesis and Dissertation in Taiwan. Next, the study selected master theses of bilingual physical education (from 111 to 112). Finally, four master theses were chosen for analyzing.

**Results:** The study summarized the effectiveness and influences for students on bilingual physical education and the difficulties faced by instructors in bilingual physical education. Overall, the results indicated that bilingual physical education positively affected students in cognition, affection, and psychomotor. Furthermore, bilingual physical education positively influenced students’ physical education knowledge, vocabulary in physical education, and English listening comprehension ability. Last but not least, students’ motivations also raised under bilingual physical education. On the other hand, the difficulties instructors had faced included teachers’ English proficiency, the using of classroom English, the identification of bilingual physical education, and the cultivation of bilingual instructors. **Conclusion:** Bilingual physical education is carrying out in school’s education under the promotion of bilingual policy. Future studies are anticipated to solve the existing difficulties by the effectiveness and curriculum design of bilingual physical education so that it can be implemented indeed.

**Keywords:** Bilingual physical education, bilingual policy, learning effectiveness.

**Correspondence:** Ang-Li Tu, yone611@gmail.com, 0921717871

# 2023世界棒球經典賽新聞報導分析：

## 國族主義的視角

彭琳惠 陳渝苓

國立台灣體育運動大學 休閒運動學系碩士班

### 摘要

**目的：**當今全球化的浪潮下，體育賽事已逐漸成為國家展現形象和凝聚國族主義情感的重要表達途徑，而世界棒球經典賽自 2006 年舉辦以來，已成為全球矚目的重要國際級棒球賽事之一。本研究探討三家台灣主流平面媒體(中國時報、自由時報、聯合報)在報導 2023 年世界棒球經典賽時，如何將國族主義的意識形態傳述在新聞文本中，希望瞭解臺灣媒體如何形塑出國族主義的情感。**方法：**本研究採用內容分析法，以 2023 世界棒球經典賽作為研究主題，於 2023 年 3 月 7 日至 2023 年 3 月 12 日，至三家平面媒體(中國時報、自由時報、聯合報)官方網站，以「經典賽」為關鍵字蒐集中華隊相關之報導資料共計 598 篇。分析方法採用安碧芸、駱碧蓮(2010)針對 2008 年奧運棒球賽事符合國族主義陳述方式之構面進行分析，記錄下新聞標題及文本內容出現與國族意識及意涵相關之報導。**結果與討論：**研究結果顯示，本次 2023 世界棒球經典賽共有 17 篇報導具有國族意識形態。最常被使用的陳述方式是強調球員/球隊為國爭光 (6 篇)，其次是強調國家象徵物(4 篇)，以及強調球場勝利對國家的意義(4 篇)，除此之外，還有應援觀眾以及啦啦隊與國家行銷的連結 (6 篇)。相較於 2008 年奧運棒球賽之不同，媒體常以「打擊/矮化對手」以及「強調勝負對國家榮譽的關聯」之陳述方式呈現強烈的國族意識，於本次經典賽的相關報導中並不明顯。

**關鍵字：**國族主義、內容分析、2023 世界棒球經典賽

# **The Content Analysis Of 2023 WBC News Converge: From The Perspective Of Taiwanese Nationalism**

Lin-Hui Peng , Yu-Ling Chen

Department of Recreational Sport, National Taiwan University of Sport, Taiwan.

**[Background]** Since 2006, the World Baseball Classic (WBC) has become one of the globally acclaimed international baseball tournaments. Under the wave of globalization, sports events have gradually become an important expression avenue for countries to represent the images of nations and to foster nationalistic sentiments. This study investigates how local printed-media in Taiwan (China Times, Liberty Times, and United Daily News) convey Taiwanese nationalism in their news coverage of the 2023 World Baseball Classic, with the aim of understanding how Taiwanese media disclose nationalistic sentiments and consciousness. **[Method]** This study uses content analysis as primary method and focuses on the news coverages during 2023 WBC. From March 7 to March 12., totally 598 news articles were collected from the official websites of three major printed-medias (China Times, Liberty Times, and United Daily News) related to Team Chinese Taipei using the “WBC”, followed by the content analysis. The titles of news, paragraphs and sentences of news related to national consciousness were recorded as primary texts. The construct of data analysis is based on the framework proposed by An & Lu (2010) for analyzing nationalist expressions in news coverage of the 2008 Olympic. **[Results and Discussion]** The findings indicates that there were 17 reports with national consciousness among the news coverage of 2023 WBC. The most frequently used statement was emphasizing on how players/teams bringing glory to the country (6 reports), followed by national symbols (4 reports), and the meaning of winning in “our home field” (4 reports). In addition, there are also links between supporting audiences, cheerleaders, and national marketing (6 articles). Compared with the strong nationalistic sentiments expressed in the 2008 Olympic reports with statements such as “striking down the opponent” and “equal the victory/lose with national pride/disgrace”, such sentiments were not as evident in the news coverage of the 2023 Classic.

**Keyword: Nationalism, Content analysis, 2023 World Baseball Classic.**

**Correspondence: Yu-Ling Chen, ylchen@gm.ntus.edu.tw, 04-22213108\*2183**

# 小學五人制足球運動團隊經營與發展-以 Y小學為例

趙師頤<sup>1</sup> 李國維<sup>2</sup> 涂昂里<sup>3</sup>

<sup>1</sup> 國立臺中教育大學體育學系

**目的：**旨在探究小學五人制足球運動團隊經營與發展。臺中市大里區推展五人制足球活動迄今已逾15年，藉由實務教學者的推動歷程，瞭解目前五人制足球運動的實施方式與未來規劃。**方法：**主要邀請二位具有五人制足球教練背景，且超過15年足球隊帶隊資歷之教練擔任本研究參與者，及一間長期贊助球隊之企業單位，進行半結構式訪談，以瞭解其五人制足球運動發展規劃。**結果與結論：**五人制足球教練除不斷地在教學上調整自己的訓練方法外，從研究發現球隊發展與現況為 一、探討臺中市大里區Y小學五人制足球運動之時代背景：(一) 五人制足球推展政策。(二) 五人制足球成立源起。(三) 學校五人制足球相關課程。二、探討臺中市大里區Y小學五人制足球運動發展之規劃：(一)地方及區域性整合。(二)小學、國中、高中三級足球學校。(三)地方單位長期贊助經費。三、探討臺中市大里區Y小學五人制足球運動學校之發展狀況：(一)教練師資。(二)學生來源。(三)場地設施。(四)訓練狀況。目前臺中市大里區五人制足球之規劃，尚缺地方其他小學五人制足球運動的加入，這是未來需要積極努力的目標。讓臺中市大里區五人制足球運動發展，除各方的支持認同及資源上的協助外，成立區域性五人制足球團隊，將會是地方團隊未來最重要的發展規劃，以使在地特色團隊得以落實推行與發展。

**關鍵詞：**五人制足球、經營與發展、發展規劃

通訊作者：趙師頤

通訊地址：臺中市太平區大源十五街 23 號。

電話：0922-770204

email：aa0922770204@gmail.com



# Management and Development of Futsal in a Primary School

## - A Case Study of an Elementary School

Shih-Yi Chao<sup>1</sup>, Kuo-Wei Lee<sup>1</sup>, Ang-Li Tu<sup>1</sup>

<sup>1</sup> Department of Physical Education, National Taichung University of Education, Taiwan

### Abstract

**Purpose:** The study aimed to explore the management and development of elementary school futsal teams. With more than 15 years of promoting futsal activities in Dali District, Taichung City, the practical instructors utilized the promoting process to understand the current implementation and future plans of futsal. **Methods:** The study primarily invited two coaches with backgrounds in futsal coaching and over 15 years of experience in leading futsal teams, as well as a corporate sponsor that has been supporting a team for a long time, to conduct semi-structured interviews and understand the current implementation and future plans of futsal. **Results & Conclusions:** In addition to constantly adjusting their training methods in teaching, futsal coaches had found that the development and current situation of futsal teams were: 1) discussing the era background of futsal in Y elementary school in Dali District, Taichung City: (a) the promotion policy of futsal, (b) the origin of futsal, and (c) the relevant courses of futsal in schools; 2) discussing the development plan of futsal in Y elementary school in Dali District, Taichung City: (a) local and regional integration, (b) three levels of futsal schools (primary, junior high, and high schools), and (c) long-term sponsorship funds from local units; and 3) discussing the development situation of futsal in Y elementary schools in Dali District, Taichung City: (a) coach qualifications, (b) student sources, (c) field facilities, and (d) training situation. Currently, the plan for futsal in Dali District, Taichung City still lacks the participation of other elementary schools, and this is a goal that needs to be actively pursued in the future. To promote and develop futsal in Dali District, Taichung City, the establishment of regional futsal teams will be the most important development plan for local teams in the future, so that characteristic teams can be implemented and developed.

**Key words:** futsal, management and development, development plan

**Correspondence:** Shih-Yi Chao, aa0922770204@gmail.com, 0922770204

# 運動員品牌形象、一致性對行為意圖的影響-以中華職棒為例

蕭珮羽<sup>1\*</sup>

<sup>1</sup> 國立臺灣體育運動大學運動事業管理學系研究所

**緒論：**本研究旨在探討運動員品牌形象、一致性對行為意圖的影響，以中華職棒(CPBL)為例。**方法：**本研究選取曾觀看中華職棒(CPBL)賽事之球迷作為研究對象。並於棒球社團發放，得有效問卷 94 份。本研究以 SPSS 25.0 進行敘述性統計、獨立樣本 t 檢定、單因子變異數分析及路徑分析。**結果與結論：**本研究樣本以男性、20 歲以下、學生且五專/二技(含)以下居多。獨立樣本 t 檢定結果顯示，性別於運動員品牌形象中之比賽風格( $t=-1.498, p=.028^*$ )達顯著差異，一致性及行為意圖兩變項皆未達顯著差異。職業於運動員品牌形象中之關係力( $t=2.259, p=.005^{**}$ )及態度( $t=1.525, p=.044^*$ )達顯著差異，一致性及行為意圖兩變項則皆未達顯著差異。單因子變異數分析結果顯示，不同年齡層對關係力( $F=5.662, p=.005^{**}$ )及顧客忠誠( $F=3.697, p=.029^*$ )有顯著差異，20 歲以下之球迷比 31 歲以上的球迷更重視與運動員間的互動關係，而 31 歲以上之球迷則具有更高的忠誠度。經由路徑分析結果顯示，運動員品牌形象僅對一致性有顯著影響，一致性對行為意圖亦有顯著影響。研究結果顯示，運動員品牌形象對於行為意圖無顯著影響，但能透過一致性產生間接影響。結果顯示年齡越大的球迷，其顧客忠誠度越高，因此，建議中華職棒大聯盟可從新社群媒體及宣傳活動著手，使觀看賽事更加普及化，進而吸引更多年輕球迷。

**關鍵詞：**運動員形象、職業運動、棒球

通訊作者：蕭珮羽

通訊地址：臺中市沙鹿區鹿寮里福德路 138 巷 34 弄 1 號

電子信箱：11005003@gm.ntus.edu.tw

# The Influence of Athlete Brand Image and Congruency on Behavioral Intention: A Case Study of Chinese Professional Baseball League(CPBL)

Pei-Yu Hsiao<sup>1\*</sup>

<sup>1</sup> Department of Sport Management, National Taiwan University of Sport, Taichung, Taiwan

**Introduction:** This study aims to explore the influence of athletes' brand image and congruency on behavioral intentions, taking Chinese Professional Baseball League (CPBL) as an examples. **Method:** This study adopts purposive sampling to select fans who have watched Chinese Professional Baseball League (CPBL) matches as the research object. A total of 110 questionnaires were collected and distributed to the basketball club on Facebook. After removing 16 invalid questionnaires, 94 valid questionnaires were obtained. The Chinese version of SPSS 25.0 statistical software was used for descriptive statistics, independent sample t-tests, one-way ANOVA and path analysis. **Results & Conclusions:** The majority of the samples in this study are male, under the age of 20, students, and under the fifth or second technical level. The independent sample t-test results showed that there was a significant difference between gender in the competition style ( $t=-1.498$ ,  $p=.028$  \*) of athletes' brand image, while there was no significant difference in both congruency and behavioral intention variables. There was a significant difference in the relationship between profession and athlete brand image ( $t=2.259$   $p=.005$  \* \*) and attitude ( $t=1.525$   $p=.044$  \*), but there was no significant difference in both congruency and behavioral intention variables. The results of one-way ANOVA showed that there were significant differences in relationship effort ( $F=5.662$ ,  $p=.005$  \* \*) and customer loyalty ( $F=3.697$ ,  $p=.029$  \*) among different age groups. Fans under the age of 20 paid more attention to interaction with athletes than fans over the age of 31, while fans over the age of 31 had higher loyalty; There was no significant difference between different levels of education. The results of path analysis show that athlete brand image only has a significant impact on congruency, and congruency also has a significant impact on behavioral intention. The research results show that athlete brand image has no significant impact on behavioral intention, but can have an indirect impact through congruency. Chinese Professional Baseball League is the largest professional tournament in Taiwan today, and the results show that the older the fans are, the higher their customer loyalty is. Therefore, it is recommended that the Chinese Professional Baseball League start with new social media and promotional activities to make watching the game more popular and thereby attract more young fans.

**Key words: Athletic image, professional sports, baseball**

**Corresponding author:Pei-Yu Hsiao**

**E-mail:11005003@gm.ntus.edu.tw**

# 原住民族棒球專任教練領導智慧的 展現初探—個案探討

洪明興 胡暄宜 余建霖 劉佳鎮  
國立臺中教育大學體育學系

## 中文摘要

運動員優良的表現與堅毅的精神足以成為青少年模仿的楷模，進而對社會良好的風氣發揮一定的影響力，其中，運動員的表現往往受到教練的影響。探究競技運動教練透過領導所展現的智慧可以讓我們一窺其處事及帶領選手的精髓。**目的：**初步的了解原住民族棒球專任教練教學現場所遇困境與現況，以及所展現的領導方式與智慧。**方法：**本研究以個案研究的方式，針對兩位帶隊資歷十年以上的原住民族棒球隊教練進行訪談，採用自編的半結構式訪談大綱進行訪談，以探究教練在領導團隊的過程中所展現的領導智慧。**結果：**透過分析訪談逐字稿可以得知，研究參與者皆認為智慧的展現不侷限於球場，更要能運用在選手的日常生活，並能從不同角度協助選手使其學習到未來人生所需能力。**結論：**教練在帶領運動團隊的過程中展現領導智慧，並透過以身作則的方式，將可為運動員帶來正面影響，並提升團隊之績效。後續相關研究可探討更多的教練領導智慧，並進一步探討不同族群與運動項目是否存在差異。

**關鍵字：**原住民、棒球、專任教練、領導智慧

# A Preliminary Study on the Wisdom of Aboriginal Baseball Full-time Coaches—— case studies

Ming-Hsing, Hung Hsuan-Yi, Hu Jian-Lin, Yu Chia-Chen, Liu  
Department of Physical Education, National Taichung University of Education  
Summary

The excellent performance and perseverance of athletes are enough to become a model for young people to imitate, and then exert a certain influence on the good atmosphere of society. Among them, the performance of athletes is often influenced by coaches. Exploring the wisdom that competitive sports coaches display through leadership can give us a glimpse of the essence of how they do things and lead players. **Purpose:** To gain a preliminary understanding of the difficulties and current situation encountered by full-time aboriginal baseball coaches in the teaching field, as well as the leadership methods and wisdom displayed. **Method:** This study conducted interviews with two aboriginal baseball team coaches who had led the team for more than ten years in the form of a case study, and conducted interviews using a self-made semi-structured interview outline to explore the process of coaches leading the team. Demonstrated leadership wisdom. **Results:** Through the analysis of the verbatim transcripts of the interviews, it can be known that the research participants all believe that the display of wisdom is not limited to the court, but should be applied in the daily life of the players, and can help the players to learn what they need in future life from different angles ability. **Conclusion:** Coaches who demonstrate leadership wisdom in the process of leading a sports team and lead by example will have a positive impact on athletes and improve team performance. Follow-up related research can explore more coaching leadership wisdom, and further explore whether there are differences between different ethnic groups and sports.

**Keywords:** Aboriginal people, baseball, full-time coaches, leadership wisdom

主要聯絡者：洪明興  
通訊地址：南投縣仁愛鄉中正村光明路 65 號  
聯絡電話：0937-430-864  
電子郵件信箱(E-mail)：batu681217@gmail.com

# 教學遊戲化概念之理論與實際：以 Kahoot平台為例

王大維

臺灣體育運動大學 休閒運動學系在職學位學程

**目的：**2020-2023 在 Covid-19 疫情的影響下，隔離的政策導致民眾對於 3C 的依賴度更是越來越高。教育領域同時也需面對在教學上運用數位或 E 化學習平台的必要性，並創造有利的學習條件，進而達成教育目標，如引發學生動機或增加學習效能。2021 年教育部啟動「生生用平板」專案計畫，進行數位教學，以偏鄉學校數位優先，縮減城鄉教育落差。基於以上，本研究以目前多人採用的 E 化教學平台 Kahoot 為研究主題，希望藉此教育平台的個案分析來檢視教學遊戲化與 E 化教學的可用性與可能性。**方法：**本研究以 Kahoot 平台為個案研究，使用次級資料分析 Kahoot 教育平台的設計構面、試圖引入之學習邏輯，使用方式及過往研究所提出之學習成效。**結果：**根據個案資料的分析，在平台設計的架構上採搶答模式，學習邏輯為利用問答及搶答方式，競爭分數並排名。教師使用的方式為出題，利用代碼讓學生進來系統搶答，最後結算排名。在學習效能上：相關實證資料指出，Kahoot 融入電子教科書教學後，在各領域的學習成就與學習態度皆有提升，可繼續朝這方面拓展。**建議：**教學和數位遊戲結合的好處為目前教學帶來相當多元的機會，可將數位遊戲試著與其他方面結合，如八大智能，或是應用於偏鄉教育環境並達成公平教育的目標。

**關鍵詞：**遊戲種類、教學遊戲化、Kahoot、E 化教學

# The Practice of Gamification in Education: Using Kahoot Platform as an Example

Da-Wei Wang

Department of Recreational Sports, National Taiwan Sport University

**Purpose:** Under the impact of Covid-19 from 2020 to 2023, the quarantine policy has led to an increasing reliance on 3C products by the public. In the education context, it is urgent to employ digital or E-learning platforms in teaching in order to create favorable learning conditions to achieve educational objectives, such as aspiring students' motivation and learning efficiency. In 2021, the Ministry of Education launched the "Tablets for Students" project to promote digital teaching, prioritizing digitalization in rural schools and reducing the urban-rural education gap. Based on the above, this study focuses on the widely-used E-learning platform, Kahoot, to examine the feasibility and potential of gamification and E-learning in education through a case study of this educational platform. **Method:** This study employs a case study of the Kahoot platform, utilizing secondary data analysis to examine the design aspects of the Kahoot education platform, the learning logic, the ways of how it is used, and the learning outcomes proposed by previous studies. **Results:** Based on the case Kahoot, the platform design adopts a quiz game format, with a learning logic that utilizes question and answer format as well as a competitive scoring and ranking system. The teacher provides questions and allows students to join the system using a code to compete for the top rank. In terms of learning effectiveness, relevant empirical data shows that after integrating Kahoot into teaching, there is an improvement in learning achievements and learning attitudes, indicating the potential for further expansion in this direction. **Discussions:** The combination of teaching and digital games brings significant opportunities to current education. It is suggested to explore the integration of digital games with other aspects, such as the Eight Intelligences, or to apply them to rural education environments to achieve the goal of equality.

**Keywords:** types of games, gamification in education, Kahoot, e-learning.



# 從體育學系師資生參與偏鄉教育

## 活動探究服務學習之意涵

吳佩璇<sup>1</sup> 江孟杰<sup>2</sup> 劉佳鎮<sup>3</sup>

<sup>1</sup> 國立臺中教育大學體育學系碩士班

<sup>2</sup> 國立臺中教育大學體育學系碩士班

<sup>3</sup> 國立臺中教育大學體育學系

「服務學習」(Service-Learning) 是經驗學習的一種型式，使參與的學生在服務過程中達到滿足被服務者的需求，並經由服務學習過程中的反思與回饋，提升學習效果與成長 (教育部，2014)。意即學生將正式課程所學，透過規劃及服務的付出，應用與實務中以實現做中學之意義。爾來各師資培育機構透過服務學習來提升師資生教學知能，服務學習的實施方式分為準備、服務、反思與慶賀分享四階段 (陳國泰，2017)，國內許多研究也發現，將服務學習融入學習經驗，確能助於提升師資生之專業能力。師資生到偏鄉參與服務學習可結合地方特質設計課程，藉由共備、觀課與相互討論增長教學效能，有助於職涯規劃 (何縉琪、黃韻宇，2019)。本研究以 108 及 109 學年度中部某大學之體育學系師資生至蘭嶼辦理服務學習活動為研究範圍。**研究目的：**了解偏鄉教育之服務學習對體育學系師資生之影響。**研究方法：**本研究透過個案研究法蒐集 21 位參與的師資生之背景資料，以訪談與觀察為主，探討相關文獻與資料進為輔，分析省思札記、回饋單及服務學習心得，分析其參與活動的歷程與成效。**研究發現：**一、教學知能方面：提升課程設計及規劃能力、培養班級經營管理之經驗、教學自信及台風更加穩健。二、人際互動方面：能與同儕協調合作、有效提升溝通互動的能力、能以同理心關懷他人。三、自我成長方面：了解偏鄉教學資源現況、能以學生的角度思考問題、促進自我教學省思。**結論：**透過偏鄉教育的服務學習，幫助體育學系師資生將師資培育正式課程所學，應用於實務經驗當中，在實際的付出與投入歷程中更深入學習，在體驗所學的同時培養師資生體育教學知能的發展，並具體呈現出學生投入服務學習的學習成效。

**關鍵詞：**師資生、服務學習、偏鄉教育

**通訊作者：**吳佩璇，[wupenny210@gmail.com](mailto:wupenny210@gmail.com) 0911-950425

# Exploring the Implications of Service-Learning From The Pre-Service Teachers of Department of Physical Education Participating in Rural Education Activities

Wu, Pei-Hsuan<sup>1</sup> Chiang, Meng-Jay<sup>2</sup> Liu, Jia-Zhen<sup>3</sup>

<sup>1</sup>Master's Program, Department of Physical Education, National Taichung University of Education, Taiwan.

<sup>2</sup>Master's Program, Department of Physical Education, National Taichung University of Education, Taiwan.

<sup>3</sup>Department of Physical Education, National Taichung University of Education, Taiwan.

“Service-Learning” is a form of experiential learning that allows participating students to satisfy the needs of those being served, and through reflection and feedback during the service-learning process, enhances learning outcomes and personal growth (Ministry of Education, 2014). This means that students can apply what they have learned in formal courses through planning and service efforts to achieve the meaning of learning by doing. Teacher education institutions use service-learning to enhance the teaching competencies of pre-service teachers. The implementation of service-learning is divided into four stages: preparation, service, reflection, and celebration and sharing (Chen, 2017). Many studies in Taiwan have found that incorporating service-learning into learning experiences can help improve the professional competencies of pre-service teachers. Service-learning in rural areas, where pre-service teachers can participate in curriculum design based on local characteristics, can increase teaching effectiveness through co-preparation, observation, and mutual discussion, as well as facilitate career planning (Ho and Huang, 2019). This study focuses on the service-learning activities of physical education pre-service teachers from a university in central Taiwan who went to Orchid Island during the 2019 and 2020 academic years. **Purpose:** The purpose of the study is to understand the impact of service-learning in rural education on physical education pre-service teachers. **Method:** The research method is a case study approach that collects background information from 21 participating pre-service teachers through interviews and observations, supplemented by relevant literature and data analysis of reflective notes, feedback forms, and service-learning experiences to analyze the process and effects of their participation. **Results:** First, in terms of teaching competencies, service-learning improves the ability to design and plan courses, cultivate experience in classroom management, increase teaching confidence, and strengthen adaptability. Second, in terms of interpersonal interaction,

service-learning enhances the ability to coordinate and collaborate with peers, effectively improve communication skills, and cultivate empathy and care for others. Third, in terms of personal growth, service-learning increases awareness of the status of teaching resources in rural areas, helps pre-service teachers think about problems from the students' perspective, and promotes self-reflection in teaching. **Conclusion:** Service-learning in rural education helps physical education pre-service teachers apply what they have learned in formal coursework to practical experiences, deeply learn through the process of actual service and investment, and develop teaching competencies. The study provides concrete evidence of the learning outcomes of pre-service teachers' participation in service-learning.

**Key words:** pre-service teachers, service-learning, rural education

**Correspondence:** Wu, Pei-Hsuan, [wupenny210@gmail.com](mailto:wupenny210@gmail.com), 0911-950425

# 臺灣潛水產業發展之研究

李冠良<sup>1</sup> 鄭博勻<sup>1</sup> 劉嘉璇<sup>1</sup> 許偉聖<sup>1</sup> 余泳樟<sup>1,2</sup>

<sup>1</sup>天主教輔仁大學運動休閒管理學士學位學程

<sup>2</sup>天主教輔仁大學體育系

## 摘要

**目的:**本研究旨在探討臺灣潛水產業之發展研究,了解臺灣潛水產業之發展現況。**方法:**本研究採用質性研究深度訪談法分析下列問題:臺灣潛水產業發展歷程、阻礙因素、產業現況與未來發展。受訪者為四位長期從事潛水產業之從業人員,皆具有豐富的休閒潛水相關知識。**結果:**台灣潛水活動起源於軍事、打撈用途,隨著解嚴後,相關法律持續鬆綁,潛水人口持續增加。但潛水產業雖具備相對應的人員和產品,但潛水產業極容易受到環境影響。潛水產業相關法規並沒有改善完全,成為阻礙潛水產業發展的因素之一。潛水產業若要永續發展須改善法規與增加民眾對於海洋環境維護相關知識,增加媒體宣傳曝光率及透過教育機構的指導,讓更多人了解海洋環境的重要性。潛水產業不僅需要業者自行提升水準,教育機構需對客戶進行海洋的知識,並且也需要政府政策上的支援,規範潛水運動觀光業同時提高有力的環境保障,未來讓產業能夠蓬勃發展永續經營下去。**結論:**臺灣是潛水產業從軍事開放到民間,經歷不同的時代,演變至今成為重要的水域活動之一,但由於潛水是極容易受到環境影響的產業,希望未來環境保育相關法律能更周全與民間教育機構共同努力推廣海洋知識,臺灣的潛水產業才能永續經營。

**關鍵詞:**潛水產業、推展策略、阻礙因素

# The study on the Development of Taiwan's Diving Industry

Kuan-Liang Lee<sup>1</sup>, Wei-Sheng Hsu<sup>1</sup>, Po-Yun Cheng<sup>1</sup>, Jia-Xuan Liu<sup>1</sup>, Yung-Chang Yu<sup>1,2</sup>

<sup>1</sup>Program of Sport Recreation Management, Fu Jen Catholic University

<sup>2</sup>Department of Physical Education, Fu Jen Catholic University

## abstract

**Purpose:** the purpose of this study was to investigate the development of Taiwanese scuba diving industry, knowing the condition of scuba diving in Taiwan. **Method:** the research used literature review and depth interview with four industry staff, which has amount of diving knowledge, to analysis four topic as below, the development of process, of scuba diving, . **Result:** the origin of diving activities in Taiwan can be traced back to military and salvage purposes. With the lifting of martial law, related laws and regulations have been relaxed, leading to a continuous increase in the number of divers. However, the diving industry is highly susceptible to environmental impacts despite having the necessary personnel and products. The existing regulations related to diving have not been fully improved, becoming one of the obstacles to the industry's development. To achieve sustainable development in the diving industry, regulations must be improved, and public knowledge of marine environmental protection must be increased through increased media exposure and guidance from educational institutions. the industry not only needs to improve its own standards, but educational organization also need to provide customers with knowledge of the ocean environment. Furthermore, government policies need to support the diving tourism industry by regulating it and increasing effective environmental protection to enable the industry to flourish and achieve sustainable management. **Conclusion:** Taiwan's diving industry has undergone different eras from military openness to civilian use and has now become an important water activity. However, diving is an industry that is highly susceptible to environmental impacts, so it is hoped that future environmental conservation laws will be more comprehensive and that civil education institutions will work together to promote ocean knowledge. Only then can Taiwan's diving industry be operated sustainably.

**Key word:** diving industry, promotion strategy, cumber reason

**Correspondence:** Student, Kuan-Liang Lee, [guanl4391@gmail.com](mailto:guanl4391@gmail.com), 0979980315

# 從產權理論列入奧運正式項目之可能性

阮宇軒

國立臺灣體育運動大學運動管理碩士在職學位學程

**目的：**本文旨在探討電子競技作為新興體育項目中的產權問題，電子競技作為一種新興的體育項目，其產權問題與傳統體育項目有所不同，以及研究電子競技的產權問題在保障各方權益、制定相關管理政策和發展其他類型的公共財等方面的重要意義。**方法：**系統性文獻回顧法，收集 2003 年至 2023 年文獻，管道國家圖書館搜尋相關文獻。**結果與結論：**產權問題對於電競能否列入奧運項目確實有重要的影響。在奧運會的申辦和評選過程中，產權問題一直是重要的考慮因素之一。奧運會是全球性的體育盛會，涉及到大量的商業利益和版權問題。如果電競運動不能有效地解決產權問題，就會影響到運動的商業發展和版權經營，進而影響到該運動是否有資格成為奧運項目。產權沒有解決電競不會列入奧運項目。

**關鍵詞：**電子競技、奧運項目、智慧財產權

# **The Possibility of Incorporating Esports as an Official Olympic Event from the Perspective of Property Rights Theory**

**Yu-Shiuan Ruan**

National Taiwan Sport University Master's Program in Sport Management (on-the-job)

**Introduction :** This paper aims to explore the property rights issues of esports as an emerging sports event. As esports differs from traditional sports, the property rights issues it faces are also different. The study of property rights in esports is significant in protecting the interests of all parties, formulating relevant management policies, and developing other types of public goods.**Methods:** This paper uses a systematic literature review method to collect documents from 2003 to 2023. Relevant literature is searched through the National Library system.**Results & Conclusions:** Property rights issues do have a significant impact on whether esports can be included in the Olympic Games. In the bidding and selection process of the Olympic Games, property rights issues have always been one of the important considerations. The Olympic Games is a global sports event involving a large number of commercial interests and copyright issues. If esports cannot effectively solve the property rights issues, it will affect the commercial development and copyright management of the sport, and therefore affect whether the sport is qualified to become an Olympic event. If the property rights issues are not addressed, esports will not be included in the Olympic Games.

**Key words:** Esports, Olympic events, intellectual property rights

# 深度休閒之參與動機、持續涉入因素之探討—以65龍舟隊的成員為例

林欣翰、黃泓鈞、徐子捷

私立天主教輔仁大學運動休閒管理學士學位學程

**目的：**本研究以 65 龍舟隊為例，成員參與深度休閒活動的動機和持續涉入因素；探討龍舟隊成員投入龍舟運動深度休閒的共同特質。**方法：**研究者採用質性研究方法，透過對 10 名受訪者的半結構式訪談、參與觀察法及文件蒐集進行研究。**研究結果與討論：**1.參與動機對於心理需求為最強烈之動機，其次是社會需求及成就需求。2.持續涉入對於龍舟之吸引力為最主要的原因，而後逐漸形成自身生活中心性，最後發掘自我表現。3.本研究歸納出共同特質賽事表現觀點、團隊永續發展觀點。**結論：**1.參與動機：對於龍舟抱有直接的興趣的心理需求為最強烈的動機，其次是對於同儕之邀請的社會需求及看中自身感受的成就需求。一般來說參與者的動機都會夾帶其他動機。2.持續涉入因素：受訪者在參與龍舟訓練及比賽的過程中，感受其逐漸增強其對龍舟及隊伍的喜愛程度為最主要的誘因，在每周固定的訓練時間之中，進入了發現自身的不足而後加以改進的循環，藉此完成自己所期許的目標變成了每周的習慣。3.共同特質：賽事表現觀點、團隊永續發展觀點。參與賽事是一個龍舟團隊對於自身能力是否提升的一個借鑑，從中階者轉變為進階者的過程僅是因為經驗上的不同，自身的能力提升轉變為更看重團隊默契是必經的過程。

**關鍵字：**半結構式訪談、深度休閒、參與動機、持續涉入、龍舟

聯絡者：林欣翰

電話：0903290997

信箱：[hsinham@gmail.com](mailto:hsinham@gmail.com)

地址：新北市三重區重陽里 23 鄰明志街 105 號 4 樓



# Discussion on the Participation Motivation and Continuous Immersion Factors of Serious Leisure— Take the 65 Dragon Boat Team as an example

HUANG,HONG-JUN 、 LIN,HSIN-HAN 、 HSU,TZU-CHIEH

Bachelor's degree program in Sport and Leisure Management at Fu Jen Catholic University

**Purpose:** This study uses the 65 dragon boat team as an example to explore the motivation and factors for sustained involvement of members in deep leisure activities, and to investigate the common characteristics of dragon boat team members who are deeply committed to dragon boating.**Methods:** The researcher used a qualitative research method, including semi-structured interviews with 10 participants, participant observation, and document collection.**Results** and discussion:

1. Motivation for participation: The strongest motivation is psychological needs, followed by social needs and achievement needs. 2. Factors for sustained involvement: The main reason for the attractiveness of dragon boating is the gradually increasing love for the sport and the team, which then becomes a central part of their lives and helps them discover self-expression. 3. Common characteristics: perspectives on competition and team sustainability.**Conclusion:** 1. Motivation for participation: The strongest motivation for dragon boat team members is a direct interest in the sport, followed by social needs from peers and the desire for personal achievement. Generally, participants have multiple motivations.

3.Factors for sustained involvement: Participants feel a gradually increasing love for dragon boating and the team during training and competitions, and they constantly strive to improve themselves during the fixed training time each week, forming a habit of achieving their goals. 3. Common characteristics: perspectives on competition and team sustainability.

Participating in competitions is a way for the dragon boat team to assess their own abilities, and the process of transitioning from intermediate to advanced level is only due to differences in experience, with the emphasis shifting towards team coordination and teamwork.**Keywords:** Semi-structured interview, deep leisure, motivation for participation, factors for sustained involvement, dragon boat.

# 2020年東京奧運會羽球女子單打 冠亞軍決賽之分析

葉宥忻<sup>1</sup>、趙榮瑞<sup>2</sup>

<sup>1</sup> 國立臺灣體育運動大學競技運動學系、<sup>2</sup> 國立臺灣體育運動大學球類運動學系

## 摘要

**目的：**主要探討 2020 年東京奧運羽球女子單打冠亞軍賽得分及失分之分析。**對象：**以 2020 年東京奧運會羽球女子單打冠亞軍決賽，戴資穎對戰中國選手陳羽菲為主。**方法：**自世界奧運會 Youtube 網站取得之影帶，再透過 TV 慢動作，讀取整個比賽過程，經描述性統計之分析。**結果：**一、整場三局比賽的總數之分析，第一局上半場戴資穎對陳羽菲(11:10)、下半場(18:21)。第二局上半場(8:11)、下半場(21:19)。第三局上半場(6:18)、下半場(18:21)。全場總數為 49.7%對 50.3%。戴資穎在三局比賽中只勝第二局輸了一、三局。二、整場得、失分球種之分析，戴資穎在第一局以切球得分最多(4 分)，第二局以殺球得分最多(6 分)，第三局以切球和殺球得分最多(各 5/5 分)，陳羽菲第一局以殺球得分最多(7 分)，第二局以殺球得分最多(5 分)，第三局以防守得分最多(5 分)。三、整場得、失分區域之分布，戴資穎在得分區域得分最多在 C1 佔 33.3%，其次是 A1 佔 14%>A3>B2，以界外球及 B3 佔 1.8%最少。反之，陳羽菲得分區域，以 A1 佔 27.9%最多，其次 C1 佔 21.3%>C3>A3 及 B3 佔 8.2%，最少為界外。則兩位得分數以 A1 與 C1 最多，最少為界外。依以上數據顯示，在整個比賽過程表現的質與量，以陳羽菲整體表現較穩定，反之戴資穎的表現呈現不穩的現象。

**關鍵字:**羽球、奧運會、得失分

**通訊作者:**葉宥忻，Email:ivy123456220@gm.ntus.edu.tw，0975667537

地址:404 臺中市北區雙十路二段 16 號

# Analysis of the Women's Singles Badminton Gold and Silver Medal Match at the 2020 Tokyo Olympics

Youxin Ye<sup>1</sup> and Rong-Ruey Chao<sup>2</sup>

<sup>1</sup> Department of Competitive Sports, National Taiwan Sport University, Taichung, Taiwan

<sup>2</sup> Department of Ball Sports, National Taiwan Sport University, Taichung, Taiwan

## Abstract:

**Purpose:** The main purpose of this study was to analyze the scores and points lost in the women's singles badminton final match at the 2020 Tokyo Olympics. **Object:** The study mainly focused on the final match between Tai Tzu-Ying from Taiwan and Chen Yu-Fei from China. **Methods:** The entire match was reviewed in slow motion through video footage obtained from the International Olympic Committee's official YouTube channel. The data were analyzed using descriptive statistics. **Results:** 1. Analysis of the total points scored in the entire match revealed that Tai Tzu-Ying won only the second set, while losing the first and third sets. 2. Analysis of the types of shots used to score and lose points in the entire match revealed that Tai Tzu-Ying scored the most points in the first set using drop shots, in the second set using smashes, and in the third set using a combination of drop shots and smashes. Chen Yu-Fei scored the most points in the first and second sets using smashes and in the third set using defense. 3. Analysis of the distribution of points scored and lost in different areas of the court showed that Tai Tzu-Ying scored the most points in the C1 area, accounting for 33.3%, followed by the A1 area (14%)>A3>B2, while the least points were scored from out-of-bounds shots and the B3 area (1.8%). On the other hand, Chen Yu-Fei scored the most points in the A1 area (27.9%), followed by the C1 area (21.3%)>C3>A3 and the B3 area (8.2%), and the least points were scored from out-of-bounds shots. The two players scored the most points in the A1 and C1 areas and the least from out-of-bounds shots. Based on the above data, it can be concluded that Chen Yu-Fei's overall performance was more stable than Tai Tzu-Ying's, which showed a lack of consistency.

**Keywords:** Badminton, Olympics, scores and points lost

**Corresponding Author:** Yoxin Ye, Email: [ivy123456220@gm.ntus.edu.tw](mailto:ivy123456220@gm.ntus.edu.tw), Phone: 0975667537 Address: No. 16, Sec. 2, Shuangshi Rd., North District, Taichung City 404, Taiwan

# 身體活動課程對學齡前幼兒動作能力 影響之探討

胡暄宜 余建霖 洪明興 劉佳鎮

國立臺中教育大學體育學系

## 摘要

**目的：**旨在探討身體活動課程對學齡前幼兒動作能力的影響。**方法：**研究對象設立為三至六歲的學齡前幼兒，本研究採文獻分析法進行文獻資料的收集，以「幼兒身體活動」為主題，從「華藝線上圖書館」與「臺灣博碩士論文知識加值系統」中搜尋相關文獻，進一步搜尋「大肌肉活動」、「體能遊戲」、「動作能力」等關鍵字，篩選出共 7 篇文獻，再以表格彙整資料並統整分析。**結果：**透過文獻回顧得知，近幾年幼兒身體活動對於幼兒動作發展之研究，都有提升的效果。主要因素為：一、有系統且有目標地進行身體活動，對幼兒動作發展皆有正向的幫助。二、執行不同的身體活動，提昇的技能亦有所差異。三、規律、提升身體活動課程的頻率會提升幼兒的動作能力。四、不同性別的幼兒受到相同的身体活動課程與指導機會，動作能力表現不受到性別的影響。**結論：**綜合以上結果，統整出與幼兒身體活動相關文獻可以得知，實施的身體活動課程，內容凡經過有效設計、有目的性，並會請專家修改後再執行，皆有明顯地提升幼兒動作能力，表示幼兒身體活動課程對幼兒大肌肉發展是有意義的課程，而非無結構性的、自由自在地跑跳、追逐玩耍。教保服務人員在投入身體活動時的態度以及備課的內容更顯重要，課程的師資可能亦是影響幼兒動作能力的隱性關鍵，是教師、行政端與政府都需要重視的課題，期盼國家未來的主人翁們能在安全的環境下，身心都能穩定地正向成長。

**關鍵詞：**幼兒身體活動、大肌肉活動、體能遊戲、動作能力

主要聯絡者：胡暄宜

通訊地址：臺中市北屯區東山路一段 140 巷 30 號

聯絡電話：0936-980-971

電子郵件信箱(E-mail)：AEC101110@gm.ntcu.edu.tw

# **The Effect of Physical Activity Programs on the Motor Skills of Preschool Children**

**Hsuan-Yi Hu, Jian-Lin Yu, Ming-Hsing Hong, Chia-Chen Liu.**

Department of Physical Education, National Taichung University of Education, Taiwan.

**Introduction:** This study focus on investigate the effect of physical activity programs on the motor skills of preschool children. **Method:** Our research subjects were preschool children which aged three to six years old. The main topics "Preschool Children's Physical Activity". We had searched the "Airiti Library" and "National Digital Library of Theses and Dissertations in Taiwan" for the reference of this study.

Using keywords such as "large muscle activities," "physical fitness games," and "motor skills", after reviewing lots of papers, seven articles were selected to use, and we summarized and analyzed these information by forms. **Results:** These studies demonstrated physical activity for preschool children is beneficial for their motor development. The determinants are:(1) Systematic and goal-oriented physical activity programs have positive effects to the development of preschool children's motor skills. (2)Different physical activity programs can enhance different skills. (3) Regular and frequent physical activity programs can improve preschool children's motor skills. (4)The performance of motor skills of preschool children of different genders is not affected by the same physical activity program and instruction. **Conclusion:** According to the analysis, it shows that those programs which are effectively designed with good intension, and also supervised by experts can improve children's motor skills.It can also prove that Physical activity programs for preschool children are meaningful courses for the development of their body and large muscles. It's totally different form daily running, jumping and playing around. Being an educator, as a teacher, we should be more serious and cautious while preparing lesson and setting programs. Those lessons we deliver to kids might be the key point of their transformation. How to provide a better and safer environment to children and let them grow both mentally and physically in a positive way should be our priority concern. That's the duty of being a teacher, a politician, and also a part of this nation.

**Keywords:** preschool physical activity, large muscle activities, physical fitness games, and motor skills.

# 學齡階段智能障礙兒童身體活動 現況及其影響因素

王瀚妮<sup>1</sup>、成戎珠<sup>1</sup>

<sup>1</sup> 國立成功大學物理治療學系碩士班

**目的：**超過 40% 智能障礙兒童有過重的情形，將增加成人時罹患高血壓、心臟病、與糖尿病之風險。身體活動度不足為過重主因之一。本研究目的為檢視臺灣學齡階段智能障礙兒童身體活動現況與可能的影響因素。**方法：**採橫斷式研究，對象為 6~12 歲智能障礙學童。以加速規(Actigraph GT3x+)及 PAQ-C 問卷測量兒童客觀與主觀的身體活動。並以問卷調查兒童對自身身體活動的自我效能、享受的程度，以及家庭、教師、同儕對智能障礙兒童身體活動社會支持程度。**結果：**初步有 12 名智能障礙兒童(年齡 119±12.1 月)參與，平均身體質量指數 BMI 為 17.0±3.7，平均每日有 56.1±39.1 分鐘屬於中等以上程度的身體活動量，低於 WHO 建議的每日至少 60 分鐘中等到劇烈程度的活動；PAQ-C 分數為 2.3±0.5，表示主觀感覺身體活動偏低。客觀身體活動與 BMI ( $r=0.781$ ,  $p<0.01$ )、家長本身對身體活動喜好程度( $r=0.607$ ,  $p<0.05$ )、家長陪伴孩子身體活動動機( $r=0.776$ ,  $p<0.01$ )，與同儕支持( $r=0.607$ ,  $p<0.05$ )顯著正相關；與障礙程度( $r=-0.691$ ,  $p<0.05$ )、家庭收入( $r=-0.773$ ,  $p<0.01$ )、家長最高學歷( $r=-0.658$ ,  $p<0.05$ )、教師支持( $r=-0.680$ ,  $p<0.05$ )顯著負相關。主觀身體活動與身體活動自我效能( $r=0.852$ ,  $p<0.01$ )和享受度( $r=0.73$ ,  $p<0.01$ )皆顯著正相關。**結論：**初步資料顯示臺灣學齡階段智能障礙兒童的身體活度量偏低，未達 WHO 的建議標準；生理因素與環境因素對身體活動有強烈的顯著相關，而心理因素則與兒童對自己身體活動的看法有關。

**關鍵字：**身體活動、智能障礙兒童、主觀評量、客觀評量

# The Physical Activity in School-Age Children with Intellectual Disability and Its Influencing Factors

Han-Ni Wang<sup>1</sup>、Rong-Ju Cherng<sup>1</sup>

<sup>1</sup> Department of Physical Therapy, National Cheng Kung University, Tainan, Taiwan

**Introduction:** 40% of children with intellectual disability (ID) are overweight or obese. Children with overweight and obesity tend to have hypertension, cardiovascular, and diabetes diseases in later adulthood. Insufficient physical activity (PA) plays an important role in this issue. The purposes of the study were to examine the level of PA in school-age children with ID, and to examine the intrapersonal and interpersonal influencing factors of the PA in children with ID. **Method:** This was a cross-sectional study. Children aged 6~12 with ID were recruited from the elementary school. PA was objectively measured with triaxial accelerometers, Actigraph GT3x+, and subjectively assessed with the Physical Activity Questionnaire for Older Children (PAQ-C) Chinese edition. Motor development was measured with Test of Gross Motor Development-Second Edition (TGMD-2); self-efficacy and enjoyment of PA, family support, teacher support, and peers support were measured by questionnaire. **Result:** The preliminary result of 12 children with ID (mean age 119±12.1 months) showed that the average BMI was 17.0 ±3.7. Objective PA showed that they had 56.14±39.11 minutes per day activity reaching moderate intensity level. Subjective PA score was 2.3±0.51 which indicated that children had lower PA. Objective PA showed significant positive correlation with BMI ( $r=0.781$ ,  $p<0.01$ ), parent favor of PA ( $r=0.607$ ,  $p<0.05$ ), parents' motivation accompanying their children in PA ( $r=0.776$ ,  $p<0.01$ ), and peers support ( $r=0.607$ ,  $p<0.05$ ); and had significant negative correlation with the level of ID ( $r=-0.691$ ,  $p<0.05$ ), family income ( $r=-0.773$ ,  $p<0.01$ ), parent educational attainment ( $r=-0.658$ ,  $p<0.05$ ) and teacher support ( $r=-0.680$ ,  $p<0.05$ ). Subjective PA had significant positive correlation with PA self-efficacy ( $r=0.852$ ,  $p<0.01$ ) and enjoyment ( $r=0.73$ ,  $p<0.01$ ).

**Conclusion:** The preliminary study showed that PA in school-age children with ID in Taiwan was low and did not reach the recommendation amount by WHO. Physical factors and environmental factors were strongly correlated with PA of children with ID, and psychological factors were correlated with children's subjective feeling about PA.

**Key words:** Physical Activity, Children with Intellectual Disability, Subjective evaluation, Objective evaluation

# 新冠疫情對視覺障礙學生參與運動賽事 之影響—以全國中等學校身心障礙者 會長盃田徑錦標賽為例

羅偉碩

國立臺灣體育運動大學 休閒運動研究所

**目的：**研究指出嚴重特殊傳染性肺炎影響視覺障礙者參與全國中等學校身心障礙者會長盃田徑錦標賽之參賽人次，本研究分析過去 6 年參賽人次，以統計方法介入分析疫情是否影響視覺障礙者參與大型運動賽事。**方法：**本研究使用 T 檢定分析 106 學年度至 111 學年度參與全國中等學校身心障礙者會長盃田徑錦標賽之視覺障礙學生參賽人次，分析在疫情時(108 及 109 學年度)，視覺障礙學生參賽人次是否較疫情前(106 及 107 學年度)有顯著差異，並進一步分析疫情各階段視覺障礙者參與賽事之人次變化。**結果與結論：**疫情前(106 及 107 學年度)參賽人次達 186 人次，疫情時(108 及 109 學年度)驟降為 79 人次，以 t 檢定考驗統計量為 1.94 大於臨界值(.05)的 1.89 達顯著水準，**結論：**疫情爆發後參賽人次確實有顯著的減少，疫情終結後第一年參賽人次仍未能有所顯著提升，視覺障礙者的運動賽事參與程度仍應持續投入關注。

**關鍵詞：**身心障礙運動、視覺障礙、新冠疫情



# **The Impact of the New Crown Epidemic on the Participation of Visually Impaired students in Sports Events**

**Introduction:** The study pointed out that the COVID-19 affected the number of participants in the National President Athletics Championships for the Disabled. This study analyzed the number of participants in the past 6 years, and used statistical methods to intervene to analyze whether the epidemic affected the participation of the visually impaired in large-scale competitions sports event. **Method:** This study uses the T-test to analyze the number of visually impaired students who participated in the National President Athletics Championships for the Disabled from the 2018 to 2023 school year, and analyzed the number of visually impaired students participating in the epidemic (2020 and 2021). Whether there is a significant difference from before the epidemic (106 and 107 academic years), and further analyze the changes in the number of people with visual impairments participating in the competition at each stage of the COVID-19 affected. **Results & Conclusions:** Before the epidemic (2018 and 2019), the number of participants reached 186, and during the epidemic (2020 and 2021), the number of participants dropped to 79. The t-test test statistic was 1.94 which was greater than the critical value (.05). 1.89 reached a significant level. **Conclusion:** The number of participants has indeed decreased significantly after the outbreak, and the number of participants has not increased significantly in the first year after the end of the epidemic. The participation of visually impaired people in sports events should continue to be paid attention to.

**Keywords:** physical and mental disability movement, visual impairment, new crown epidemic

# 疫情下的馬來西亞勞勿縣基層 籃球運動之發展

李學宇<sup>1</sup>，蔣任翔<sup>2</sup>

國立臺灣體育運動大學體育學系碩士班

**背景：**自新冠疫情爆發以來，馬來西亞經歷了兩年的行動管制。從 MCO（行動管制令）到 CMCO（有條件行動管制令）再到 RMCO（復甦期行動管制令），在行動管制時期下，人民外出的機會僅限於採購生活用品，一般的休閒活動遭到了全面的禁止，籃球運動也因此停滯。馬來西亞基層籃球運動也因為政策反復更改造成在疫情期間的停賽停訓。**目的：**本研究旨在探討 Covid-19 對馬來西亞基層籃球隊訓練、管理、發展所帶來的影響。**方法：**採用質性研究調查法以及文獻分析法。透過馬來西亞政府發布的政策公告以及官方媒體發布的相關資料進行文獻蒐集；透過半結構性訪談，蒐集馬來西亞基層籃球運動員，教練，管理層的經歷，探討身處疫情中對馬來西亞基層籃球運動所帶來的影響。**結果：**訓練層面：運動員在將近一年停賽停訓，甚至不得踏入球場的情況下，對球技以及打籃球的熱情卻有著正面的影響。管理層面：教練費並不是教練主要收入來源，因此在疫情期間管理層的生活仍得到保障。發展層面：地方分屬會在政府頒布的防疫 SOP 指示下應對疫情。政府並沒有相關的政策給予基層運動員以及相關人士補助，而是透過地方仕紳的私人贊助來獲得發展資金。

**關鍵詞：**Covid-19、馬來西亞、基層籃球、籃球發展

# Development of grassroots basketball in Raub district, Malaysia during the Covid-19 pandemic.

Lee Xue Yu<sup>1</sup> · Ren-Shiang Jiang<sup>2</sup>

Department of Physical Education · National Taiwan University of sports

**Background:** Since the outbreak of the Covid-19 pandemic, Malaysia has experienced two years of movement control. From MCO (Movement Control Order) to CMCO (Conditional Movement Control Order) and then to RMCO (Recovery Movement Control Order), people's opportunities to go out were limited to purchasing daily necessities, and normal leisure activities were completely prohibited, resulting in the suspension of basketball activities. The grassroots basketball in Malaysia has also been suspended during the pandemic due to the changing policies.

**Objective:** This study aims to explore the impact of Covid-19 on the training, management, and development of grassroots basketball teams in Malaysia.

**Method:** Qualitative research and literature analysis methods were employed. Literature collection was done through government policy announcements and relevant information released by official media in Malaysia. Semi-structured interview was conducted to collect experiences from Malaysian grassroots basketball players, coaches, and management to explore the impact of the pandemic on grassroots basketball.

**Results:** Training: Despite being unable to train or enter the court for almost a year, the suspension of basketball activities had a positive impact on players' skills and passion for playing basketball. Management: Coaches' income mainly comes from sources other than coaching fees, so the livelihood of management was still secure during the pandemic. Development: Local basketball associations responded to the pandemic under the government's issued standard operating procedures (SOP). However, the government did not have specific policies to provide financial assistance to grassroots basketball players and related personnel. Instead, they relied on private sponsorships from local elites to obtain development funds.

**Keywords:** Covid-19, Malaysia, grassroots basketball, basketball development

**Correspondence:** Lee Xue Yu, [11101023@gm.ntus.edu.tw](mailto:11101023@gm.ntus.edu.tw), +886-9-73606405

# 後疫情時代青少年對社群 網路之分析

邱紹恩

國立臺灣體育運動大學 休閒運動學系碩士班

**目的：**疫情爆發至今已有一年之久，儘管政策逐漸鬆綁，確診數仍然持續增加，在無法踏出門的期間，電視、網路媒體成為學子們獲取資訊的唯一管道，從人與人實體的互動，轉變成以網路為媒介的線上虛擬互動。本研究將分析青少年疫情後對社群網路的依存程度，研究青少年是否更容易吸取網路上的資訊，並提出相關建議。**方法：**本研究採文獻分析法，以「資訊信賴」為關鍵字搜尋相關論文、期刊之文獻。(樣本期間為 2020-2022。) **結果與結論：**比起傳統媒體，如電視、收音機，民眾更容易相信網路媒體接收到的資訊。在疫情尚未解封期間，青少年的課程皆為線上上課，使得手機、電腦、網路的使用頻率大幅增加，而許多家長白天需出門工作，青少年使用網路並未受到約束，因此在瀏覽資訊時不一定能分辨其真偽，網路的需求明顯增高，對網路的依存度愈加深入，科技帶給人們便利，也需要加強宣導分辨網路訊息真偽的方法。

**關鍵詞：**社群媒體、網路依存度、資訊信賴

# Analysis Of Teenagers' Dependency On Social Networking In The Post-epidemic Era

**En-Shao Chiu**

Department of Recreational Sport, National Taiwan University of Sport, Taiwan.

**Introduction:** Compared with traditional media, such as TV and radio, people are more likely to trust the information received by Internet media. **Methods:** This study adopts the method of literature analysis, using "information trust" as the keyword to search for relevant papers and periodical literature. (The sample period is 2020-2022.) **Results & Conclusions:** Compared to traditional media such as television and radio, people are more likely to believe the information they receive from online media. During the period when the pandemic was still not under control, teenagers had to attend classes online. This led to a significant increase in the frequency of usage of mobile phones, computers, and the internet. As many parents had to go out to work during the day, teenagers were not restricted in their use of the internet, and therefore may not necessarily be able to distinguish between true and false information when browsing. The demand for the internet has clearly increased, and dependence on it has become even more profound. While technology brings convenience, it is also necessary to strengthen the promotion of methods to discern the authenticity of online information.

**Key words:** social media, Internet dependence, information trust

**Correspondence:** En-Shao Chiu, [weier02121313@gmail.com](mailto:weier02121313@gmail.com), 0983491102

# 青少年休閒參與型態與網路成癮現象

宿慧萱<sup>1</sup> 張家昌<sup>2</sup>

<sup>1</sup> 國立彰化師範大學運動學系運動與健康休閒碩士在職專班

<sup>2</sup> 國立彰化師範大學運動健康研究所

## 摘要

**目的：**身心發展巨變的青少年，情緒容易起伏波動。休閒能紓發情緒，增加與人互動機會，相對比較健康滿足（王梅香，2003）。近年網路崛起，它是生活、是教育、更是休閒型態。青少年對新奇浩瀚的網路世界尤其難抗拒，易產生心理依賴，衍生許多問題（黎士鳴；林宜美，2014）。多元休閒型態及正確的休閒觀，可讓青少年重拾對周遭事物的熱情，對沉迷網路的問題或許能獲得改善，因此本研究旨在探討青少年在休閒型態與網路成癮之間是否有關聯性及預測力。**方法：**使用問卷調查法，採分層隨機抽樣方式，選取 426 名臺中市市區一所國中學生施測。以「休閒量表」及「網路成癮量表」為工具，採五點及四點量表計分，用斯皮爾曼相關進行分析兩者的關聯性；再以多元逐步回歸考驗休閒對網路成癮的預測力。**結果：**「網路類」、「體能類」、「社交類」休閒與網路成癮有顯著相關；「網路類」的影響力最大，「體能類」為負項影響，聯合預測網路成癮有 10.8% 的解釋力。**結論：**網路已是近幾年青少年休閒參與頻率最高的一項活動，長時間靜態久坐，影響其他類型休閒的參與，成癮風險也將會提高。藉不同休閒參與讓身體活動起來，遠離網路沉迷更有助紓壓及提升學習力。

**關鍵詞：**網路成癮、休閒型態、預測力、靜態久坐

**通訊作者：**宿慧萱，[t600726@nmail.hsijh.tc.edu.tw](mailto:t600726@nmail.hsijh.tc.edu.tw), +886-981911675

# Adolescent Leisure Participation Patterns and Internet Addiction Phenomenon

SU Huixuan<sup>1</sup>, ZHANG Jiachang<sup>2</sup>

<sup>1</sup> Master Program of Sports, Health & Leisure (In-Service Program), Department of Sports,  
National Changhua University of Education

<sup>2</sup> Graduate institute of Sports and Health, National Changhua University of Education

## Abstract

**Purpose:** Adolescents with great changes in physical and mental development, emotional fluctuations are prone to ups and downs. Leisure can relieve emotions, increase the opportunity to interact with people, and be relatively healthy and satisfying (Wang , 2003). In recent years, the rise of the Internet is a form of life, education, and leisure. Adolescents are particularly difficult to resist the novel and vast online world, prone to psychological dependence and many problems (Li ; Lin , 2014). The purpose of this study was to explore whether there is a correlation and predictive power between leisure patterns and Internet addiction among adolescents by regaining their enthusiasm for the things around them and improving the problem of Internet addiction. **Methods:** A total of 426 middle school students in Taichung City were selected by stratified random sampling method. Using the "Leisure Scale" and the "Internet Addiction Scale" as tools, the five-point and four-point scales were used to score the scores, and the Spearman correlation was used to analyze the correlation between the two; then use multiple stepwise regression to test the predictive power of leisure on Internet addiction. **Results:** "Internet", "physical fitness", "social" leisure and Internet addiction are significantly correlated. "Internet" has the greatest influence, and "physical fitness" has a negative impact, with a combined predictive power of 10.8% of Internet addiction. **Conclusion:** The Internet has become one of the most frequent leisure activities of adolescents in recent years, and long-term static sitting will affect the participation of other types of leisure, and the risk of addiction will also increase. Through different leisure participation, physical activity and staying away from online addiction can help relieve stress and enhance learning ability.

**Keywords:** Internet addiction, leisure mode, predictive power, static sedentary

**Corresponding author:** Su Huixuan, t600726@nmail.hsjh.tc.edu.tw, +886-981911675

# 銀髮健身俱樂部行銷策略-以西川社區 發展協會為例

莫羽如<sup>1</sup> 盧佳瑩<sup>2</sup> 林明宏<sup>1</sup>

國立中興大學運動與健康管理研究所

**目的：**為了增強長者的肌肉量而增設銀髮俱樂部，對於銀髮俱樂部的服務內容和管理模式通過實地觀察和深入訪談，了解其提供的健身服務內容、社交活動和管理模式，從而洞察其商業模式和藍海策略。**方法：**本研究鎖定在銀髮健身俱樂部產業，以PEST與藍海策略分析訪談內容，了解在經營上與轉變市場過程如何有效提供未來在這個產業上的運用，採用文獻資料來收集相關銀髮俱樂部的資料，並利用藍海策略進行分析、與探討，接著使用深度訪談法，在質性研究中是很常見的研究方法，深度問題可以從不同角度深入探討銀髮族的體驗和感受。廣度問題則可以從不同層面瞭解銀髮族對俱樂部的看法和體驗。**結果與建議：**銀髮健身俱樂部可以加強員工培訓，提升服務品質和專業度，並利用技術手段，如互聯網、移動應用等，為老年人提供更多的健康和社交資訊，以及方便的服務。並配合當地醫療資源引進復健師，讓銀髮健身俱樂部服務更多元化。通過提供多樣化的運動課程、專業的教練和醫療支持，避免運動傷害和過度疲勞。因此，銀髮健身俱樂部應該聘請經驗豐富且具有相關專業證照的教練，以確保老年人在運動中得到有效指導和支持。

**關鍵詞：**銀髮健身俱樂部、PEST、藍海策略



# Marketing Strategy for fitness club in older adults - A Case Study of Xichuan Community Development Association

Ming-Hong Lin<sup>1</sup>, YU-RU MO<sup>1</sup>, JIA-YING LU<sup>2</sup>

Graduate Institute of Sport and Health Management, National Chung Hsing University, Taiwan.

**Purpose:** To enhance the muscle mass of the elderly, Fitness club in older adults is established. Through on-site observation and in-depth interviews on the service content and management mode of the silver hair club, the study aims to understand the fitness services, social activities, and management mode provided by the club, and to gain insight into its business model and blue ocean strategy. **Method:** This study focuses on the silver hair fitness club industry, using PEST and blue ocean strategy analysis to understand how to effectively provide future applications in this industry in terms of management and market transformation. Literature data is collected to gather relevant information on silver hair clubs, and blue ocean strategy is used for analysis and discussion. Then, in-depth interviews are conducted, which is a common qualitative research method, to explore the experiences and feelings of the elderly from different perspectives. Broad issues can be understood from different levels to understand the views and experiences of the elderly towards the club. **Results and suggestions:** The silver hair fitness club can strengthen employee training, improve service quality and professionalism, and use technological means such as the internet and mobile applications to provide more health and social information, as well as convenient services for the elderly. In addition, the club can introduce rehabilitation therapists in cooperation with local medical resources to make the services more diversified. By providing diversified exercise courses, professional coaches, and medical support, the club can avoid sports injuries and excessive fatigue. Therefore, the silver hair fitness club should hire experienced coaches with relevant professional qualifications to ensure that the elderly receive effective guidance and support during exercise.

**Key words:** fitness club in older adults, PEST, blue ocean strategy

# 新冠肺炎疫情下教保服務人員實施大 肌肉活動之影響

石竹君<sup>1</sup> 李育嬋<sup>1</sup>

<sup>1</sup>國立臺中教育大學體育學系碩士在職專班

因應國內疫情警戒時間延長，為避免學童受到感染之風險，教育部部長潘文忠宣布全國各級學校及公私立幼兒園於5月19日至6月14日停止到校實體上課，採居家線上學習，後因疫情不見好轉，全國三級警戒延長至7月2日止（學校休業式），採取停課不停學的政策。**目的：**本研究將探討教保服務人員在新冠肺炎疫情下實施大肌肉活動之影響。**方法：**本研究使用研究者自編之訪談大綱「疫情下線上大肌肉活動之現況」以半結構式訪談法針對北部（台北、新北、桃園）地區公立國民小學附設幼兒園，年資5-10年的10名教保服務人員進行資料蒐集。訪談大綱為線上實施大肌肉課程活動內容、居家線上學習對出汗性大肌肉活動進行的困難與限制以及實體大肌肉活動和線上大肌肉活動之差異等。訪談以錄音方式紀錄，再將訪談內容謄錄成逐字稿，為提升訪談之信度及效度，資料依據訪談大綱進行主軸編碼，再針對訪談的內容依據訪談主題進行整理，最後請一位熟悉此研究且曾遇疫情之教保服務人員來擔任此研究之分析師，做最後之分析確認，藉以了解因新冠肺炎疫情，教保服務人員進行出汗性大肌肉活動之影響。**結果：**一、線上大肌肉活動的類型以幼兒律動占大多數。二、線上進行大肌肉活動多數以影片方式呈現，少數教保服務人員會一同參與。三、教保服務人員對線上大肌肉活動的教學困境，以幼兒無適當環境、家長無法陪同、設備器材問題等。**結論：**疫情來得突然，許多幼兒園改變以前的教學模式去應對，但是大多數的教保服務人員對於線上教學的經驗幾近於零，因此容易產生慌張或是害怕的心情，導致影響到線上教學之品質。本研究發現在停課期間教保服務人員對線上教學的成效，未來相關研究可透過蒐集問卷調查的方式，以進一步了解實際實施線上大肌肉活動的困境，並釐清線上實施大肌肉活動之優點與限制，避免再次停課，造成恐慌或準備不周等問題出現。

**關鍵字：**教保服務人員、幼兒、身體活動、新冠肺炎

# The Impact Of The Implementation Of Gross Motor Muscle Activities By Preschool Educators During The Covid-19 Pandemic

Chu-Chun Shih<sup>1</sup>, Yu-Chan Li<sup>1</sup>

<sup>1</sup>Department of Physical Education in-service master's program, National Taichung University of Education, Taiwan.

Due to the extension of the domestic epidemic alert period, in order to avoid the risk of students being infected, the Minister of Education, Pan Wen-Chung, announced that all levels of schools and public and private kindergartens in Taiwan would stop physical classes and switch to online learning from May 19th to June 14th. Later, as the epidemic did not improve, the nationwide level 3 alert was extended until July 2nd (the end of the school year), and a policy of suspending classes but not learning was adopted.

**Purpose:** This study aims to explore the impact of implementing large muscle activities by preschool educators during the COVID-19 epidemic. **Methods:** In this study, the researcher used a self-designed interview outline, "The Current Status of Online Gross motor activities during the Epidemic," and conducted semi-structured interviews with 10 preschool educators with 5-10 years of experience in public elementary schools and affiliated kindergartens in the northern region (Taipei, New Taipei, and Taoyuan) to collect data. The interview outline included the content of online large muscle activity courses, the difficulties and limitations of performing sweating gross motor activities during online learning, and the differences between physical and online gross motor activities. The interviews were recorded and transcribed verbatim. To enhance the reliability and validity of the interviews, the data were coded based on the interview outline and organized according to the interview topics. Finally, a preschool educator who was familiar with this study and had experienced an epidemic was invited to serve as the analyst for the study to confirm the final analysis and understand the impact of preschool educators performing sweating gross motor activities during the COVID-19 epidemic. **Results:** 1. The majority of online gross motor activities were toddler movements. 2. Most online gross motor activities were presented in the form of videos, and a few preschool educators would participate together. 3. The teaching difficulties of online gross motor activities for preschool educators included the lack of suitable environment for toddlers, parents' inability to accompany, equipment and instrument problems, etc. **Conclusion:** The epidemic came suddenly, and many kindergartens changed their teaching methods to cope with it. However, most preschool educators

had little experience in online teaching, which easily led to panic or fear, affecting the quality of online teaching. This study found that during the suspension of classes, the effectiveness of online teaching by preschool educators needs further investigation through a questionnaire survey to understand the actual difficulties of implementing online gross motor activities and clarify the advantages and limitations of online implementation of gross motor activities, to avoid panic or lack of preparation and other issues arising from the suspension of classes.

**Keywords:** preschool educator, Toddlers, Physical Activities, COVID-19.

**Correspondence:** Professor Chu-Chun Shih, [aec101141@gm.ntcu.edu.tw](mailto:aec101141@gm.ntcu.edu.tw), +886-929-967855

# 成人平日及假日靜態行為時間之比較分析

徐郁茹<sup>1</sup> 古博文<sup>2</sup>

<sup>1</sup>國立彰化師範大學運動學系運動與健康休閒碩士在職專班 <sup>2</sup>國立中興大學運動與健康管理研究所

**目的：**本研究目的在探討成人於平日、假日每日靜態時間是否有差異，及分析平日、假日每日靜態時間的相關因素。**方法：**本研究為橫斷性研究，以彰化地區成人為研究參與者，有效樣本 110 人(年齡 29.18±10.79 歲，女性 53.2%)。參與者除填寫問卷並配戴三軸加速規(ActiGraph GTX3+)為期五天(期間含平日、假日)，以記錄其每日靜態時間。本研究以 IBM SPSS 26.0 版進行成對樣本 t 檢定、單因子變異數分析、及多元線性迴歸(forward selection)分析； $\alpha=0.05$ 。**結果：**成人平均每日靜態時間為 272.61(SD=75.81)分鐘。平日平均每日靜態時間為 251.79(SD=71.79)分鐘，假日平均每日靜態時間為 331.06(SD=130.27)分鐘，二者達顯著差異( $p<0.001$ )。透過單因子變異數分析篩選( $p<0.25$ )與平日每日靜態時間可能有關的因素包含：性別、年齡、教育程度、婚姻狀態、是否抽菸及睡覺是否關燈；與假日每日靜態時間可能相關者則包含：是否抽菸、是否喝酒、睡覺是否關燈及是否服藥等。最後，經由多元線性迴歸分析顯示：平日每日靜態時間的顯著相關因素為：抽菸( $B=68.24, p=0.002$ )；假日則為：睡覺不關燈( $B=133.66, p=0.002$ )、有服藥( $B=90.86, p=0.025$ )。**討論：**本研究發現：成人假日每日靜態時間顯著高於平日，且二者的相關因素亦不相同。這代表靜態行為在平日、假日的型態，影響因素等可能都有差異，這對未來研擬降低靜態行為的相關健康促進策略具有參考價值。

**關鍵詞：**久坐時間、三軸加速規、身體活動

# Comparative Analysis of Sedentary Time in Adults between Weekdays and Weekends

Yu-Ru Syu<sup>1</sup>, Po-Wen Ku<sup>2</sup>

<sup>1</sup>Department of Sports, National Changhua University of Education, Taiwan

<sup>2</sup>Graduate Institute of Sports and Health Management, National Chung Hsing University, Taiwan

**Objective:** This study aimed to investigate differences in daily sedentary time in adults on weekdays and weekends and explore the correlates of daily sedentary time on both weekdays and weekends. **Methods:** A cross-sectional study was conducted with a valid sample of 110 adults (age 29.18±10.79 years, 53.2% female) in the Changhua area. Participants completed a questionnaire and wore a triaxial accelerometer (ActiGraph GTX3+) for five days (including weekdays and weekends) to record sedentary time. Paired sample t-tests, one-way analysis of variance, and multivariable linear regression with forward selection were performed using IBM SPSS version 26.0;  $\alpha = 0.05$ . **Results:** The mean daily sedentary time for adults was 272.61 (SD = 75.81) minutes, with significantly higher sedentary time on weekends (331.06±130.27 minutes) compared to weekdays (251.79±71.79 minutes) ( $p < 0.001$ ). One-way analysis of variance ( $p < 0.25$ ) identified factors potentially correlated with daily sedentary time on weekdays (including gender, age, education, marital status, smoking status, and sleeping with lights off) and weekends (including smoking status, drinking status, sleeping with lights off, and medication use). Multivariable linear regression revealed that a significant correlate of daily sedentary time on weekdays was smoking ( $B = 68.24$ ,  $p = 0.002$ ). As for weekends, the significant correlates were not turning off lights at bedtime ( $B = 133.66$ ,  $p = 0.002$ ), and taking medication ( $B = 90.86$ ,  $p = 0.025$ ). **Conclusions:** This study found significant differences in daily sedentary time between weekdays and weekends, with different factors associated with sedentary behavior on each. These findings suggest that patterns and correlates of sedentary behavior may differ between weekdays and weekends, which could be useful for future research on health promotion strategies to reduce sedentary behavior.

**Key words:** Sitting time, Tri-axial accelerometer, Physical activity

**Correspondence:** Yu-Ru Syu, [s89a17@gmail.com](mailto:s89a17@gmail.com), 0911-607-136

# 核心肌群訓練對運動及體能表現 相關研究探討

許茗齡<sup>1</sup> 劉子榕<sup>2</sup> 楊佳政<sup>1</sup>

<sup>1</sup> 國立臺中教育大學體育學系碩士班

<sup>2</sup> 國立臺中教育大學體育學系

**目的：**本研究旨在探討核心肌群訓練對運動及體能表現的影響，以進一步了解核心肌群訓練的重要性。**研究方法：**採用文獻回顧的方式，收集近年來針對核心肌群訓練對運動及體能表現影響的相關研究，並進行了彙整和分析。**結果與結論：**經文獻統整可知，核心肌群的訓練方式主要可分為：(1)徒手訓練，例如：橋式、卷腹、超人式等；以及(2)運用輔助工具如：平衡板、抗力球、藥球、與 TRX 懸吊系統等。多篇研究證實，核心肌群的訓練可有效改善軀幹穩定性、提升神經對肌肉的徵召以及對肌肉的控制能力，進而提升運動中的爆發力、平衡表現、準確性、敏捷性乃至降低傷害風險，是運動員想提升表現時不可或缺的重要訓練。

**關鍵詞：**核心肌群、核心穩定性、核心訓練、運動表現、體能表現

**通訊作者：**助理教授楊佳政，[muchyang@mail.ntcu.edu.tw](mailto:muchyang@mail.ntcu.edu.tw), +886-4-2218-3016, +886-0921-353-806

# The Effects of Core Muscle Training on Sports and Physical Performance

Ming-Ling Hsu<sup>1</sup>, Zi-Rong Liu<sup>2</sup>, Chia-Cheng Yang<sup>1</sup>

<sup>1</sup>Graduate Institute of Physical Education, National Taichung University of Education, Taiwan.

<sup>2</sup>Department of Physical Education, National Taichung University of Education, Taiwan.

**Introduction:** This study aims to investigate the effects of core muscle training on sport and physical performance, in order to further understand the importance of core muscle training. **Methods:** We adopted a literature review approach to collect and analyze recent studies related to the effects of core muscle training on athletic and physical performance. **Results & Conclusions:** Based on the literature review, the training methods for core muscles can be classified into two categories: (1) bodyweight exercises such as planks, crunches, and superman exercises, and (2) using tools such as balance boards, resistance balls, medicine balls, and TRX suspension systems. Several studies have confirmed that core training can effectively improve trunk stability, enhance neural recruitment and control of muscles, and thus enhance explosive power, balance performance, accuracy, agility, and even reduce the risk of injury during sports. Core training is an essential training method for athletes who want to improve their performance.

**Key words:** core muscle, core stability, core training, sports performance, physical performance

**Correspondence:** Assistant Professor Chia-Cheng Yang,  
[muchyang@mail.ntcu.edu.tw](mailto:muchyang@mail.ntcu.edu.tw), +886-4-2218-3016



# 雄性激素受體(AR)在運動引起肌肉 肥大中的生理重要性及其與肌肉質量 增加的相關性-限縮型回顧文章

陳韋廷<sup>1</sup> 吳家瑜<sup>1</sup> 巫錦霖<sup>2</sup>

國立中興大學運動與健康管理研究所

**目的：**在過去的幾十年裡，研究主要圍繞在同化型賀爾蒙濃度，尤其是睪固酮，來了解運動引起的肌肉肥大背後的機制。與肌肉肥大有關的增加的睪固酮濃度會通過雄性激素受體(AR)一種載體蛋白，進入細胞核，增加細胞核中的 DNA 複製和 RNA 轉錄和翻譯。因此，AR 在調節肌肉生長中有著至關重要的作用。此回顧型文章的目的是要找出目前有探討 AR 和肌肉質量之間相關性的文獻。**方法：**通過使用 Web of Science 和 PubMed 文獻資料庫以關鍵詞“AR”、“骨骼肌”和“肥大”進行文獻查找，納入 10 篇最相關的文章，包括 1993 年至 2022 年的 4 篇動物研究和 6 篇人類研究。**結果：**這些研究主要在探究 AR 與肌肉質量之間的關係，並了解 AR 在肌肉合成中的調節機制方面的作用。結果顯示，無論同化型賀爾蒙的濃度為何，AR 濃度的增加與肌肉質量的增加呈顯著正相關。AR 在不同肌肉類型上的分佈會受耐力和阻力訓練計劃的影響。抑制 AR 會導致肌肉質量增加的幅度減少。**結論：**綜合這些研究，我們認為增加肌肉質量需要先提高 AR 的濃度。未來還需要更多的研究來探討運動和營養素誘導 AR 產生的細胞機制。**關鍵字：**睪固酮、雄性激素受體、肌肉質量、肌肉肥大、阻力訓練、耐力訓練

# **The Physiological Importance of Androgen Receptor(AR) in Exercise-induced Muscle Hypertrophy and Its Correlation with Muscle Mass**

## **Accretion – A Narrow Review**

**Wei-Ting Chen<sup>1</sup>, Chia-Yu Wu<sup>1</sup>, Ching-Lin Wu<sup>2</sup>**

Graduate Institute of Sport and Health Management, National Chung Hsing University, Taiwan.

**Introduction:** In the past decades, researches have been predominantly centering around anabolic hormones level, especially testosterone, to understand the mechanism behind exercise-induced muscle hypertrophy. The increased testosterone concentration involved with muscle hypertrophy was proposed to regulate through the androgen receptors (AR), a carrier protein that facilitates androgens entering nucleus, increasing DNA replication and RNA transcription and translation in the cell nucleus. Therefore, AR may play a crucial role in mediating muscle growth. The goal of this review is to identify current literature surrounding the correlation between AR and muscle mass.

**Methods:** By a literature review using the Web of Science and PubMed databases with the keywords "AR", "skeletal muscle" and "hypertrophy", 10 most relevant articles, including 4 animal studies and 6 human studies from 1993 to 2022 were included.

**Results:** These studies mainly focused on the relationship between AR and muscle mass and explored the role in terms of regulatory mechanism of AR in muscle synthesis. The results showed that, regardless of the concentration of anabolic hormones, the increase of AR level demonstrated significant positive correlation with the increment of muscle mass. The distribution of ARs on different muscle types was shown to be influenced by endurance and resistant training programs. Suppression of AR resulted in attenuation of the accretion of muscle mass. **Conclusion:** The present review provides a comprehensive view on muscle hypertrophy in terms of muscle mass accretion elevated by the increased concentration of ARs in precedence. More research is much in need to investigate the cellular mechanism on exercise and nutrients induced AR production.

**Key words :** testosterone, androgen receptor, muscle mass, muscle hypertrophy, resistant training, endurance training

**Correspondence:** Wei-Ting Chen, jemery0932050254@gmail.com, +886-984301372

# 馬克操訓練應用於學生體適能表現

## 相關研究探討

蔡仁峯<sup>1</sup> 廖惟林<sup>1</sup> 劉佩淑<sup>1</sup> 張碧峰<sup>1</sup>

<sup>1</sup> 國立臺中教育大學體育學系碩士在職專班

**研究目的：**本研究旨在透過文獻探討，探討馬克操訓練運用於學生體適能表現成效的相關研究，並綜合分析馬克操動作的應用、實施及操作，作為提升學生體適能基本體能及各項表現之依據。**方法：**使用系統性文獻回顧為主要研究方法，以馬克操訓練、體適能為關鍵字進行搜索，收集並分析過去10年內關於馬克操訓練應用於學生體適能表現的相關研究。**結果與結論：**透過文獻回顧，發現馬克操訓練應用於學生體適能，確實有效提高學生運動之表現。主要表現在以下三個方面：(1) 有效提升體適能運動表現；(2) 提高學生基礎體能之發展；(3) 促進學生瞭解自己身體運動能力。然而，本研究也發現，馬克操訓練的應用對學生體適能仍有其表現限制，影響顯示學生能力發展須在青春之前，甚至須提前到從國小就開始介入與培養。未來可進一步探討透過適當的課程設計可有效提升學生體適能表現，並在合適的身體發展期予以建構運動的基礎，以利提升運動表現。

**關鍵詞：**馬克操訓練、體適能

# **A Review of Relevant Studies on the Application of Mark's Movement Training in Students' Physical Fitness Performance**

**Ren-Feng Tsai<sup>1</sup>, Wei-Lin Liao<sup>1</sup>, Pei-Ju Liu<sup>1</sup>, Bi-Feng Chang<sup>1</sup>**

<sup>1</sup>Department of Physical of Education, National Taichung University of Education, Taiwan.

**Instruction:** The purpose of this study is to investigate the effectiveness of Mark's Movement Training (MMT) on students' physical fitness performance through literature review, and to comprehensively analyze the application, implementation, and operation of MMT as a basis for improving students' basic physical fitness and performance. **Methods:** A systematic literature review will be conducted, with keywords such as "Mark's Movement Training" and "physical fitness" used for searching relevant studies published in the past 10 years. The collected data will be analyzed to examine the application of MMT in improving students' physical fitness performance. **Results & Conclusions:** Through literature review, it was found that the application of MMT in students' physical fitness has been shown to effectively improve their performance in three main aspects: (1) enhancing physical fitness performance; (2) promoting the development of students' basic physical fitness; and (3) facilitating students' understanding of their own physical abilities. However, this study also revealed that there are limitations to the application of MMT on students' physical fitness, as the effects are more significant when introduced before adolescence, even as early as elementary school. Future research could further investigate how appropriate curriculum design can effectively improve students' physical fitness performance and build a foundation for physical development during the appropriate developmental period, aiming to enhance their performance.

**Key words:** Mark's Movement Training, physical fitness.

**Correspondence:** Ren-Feng Tsai, [kn910217@gmail.com](mailto:kn910217@gmail.com), +886-912017639

# 探討專業排球運動員和一般排球員在上下肢本體感覺與動作能力之差異性

陳韋杉<sup>1</sup> 劉彥辰<sup>1</sup> 曾鈺婷<sup>1,2,\*</sup>

<sup>1</sup>國立清華大學運動科學系 <sup>2</sup>國立清華大學教育心智科學研究中心

**目的：**研究指出經過專業訓練的排球運動員在姿勢控制能力優於非運動員，代表排球運動員在功能性動作表現以及整合前庭、視覺及本體感覺的能力都有較佳的表現，然而針對專業排球員與一般排球員的差異仍為未知。因此本研究將探討專業排球運動員與一般排球員其上肢腕關節、下肢踝關節本體感覺和上、下肢動作能力之差異性。**方法：**受測對象為 8 名訓練年齡超過九年的台灣大專排球聯賽公開一級男性排球運動員和 8 名訓練年齡五年以下的一般男性排球員。16 位實驗參與者皆進行 1)腕關節位置覺閾值 2)上肢 Y 字平衡 3)坐式藥球擲遠 4)踝關節位置覺閾值 5)下肢 Y 字平衡 6)立定跳遠共六項上下肢本體感覺、爆發力及穩定性的測驗。實驗數據以獨立樣本 t 檢定進行分析。**結果：**經 SPSS 統計軟體分析顯示兩組在坐式藥球擲遠的表現呈顯著差異( $t = 2.219, p = 0.044$ )，專業組(平均數 = 446.113, 標準差 = 29.470, 單位：公分)上肢爆發力顯著的較一般組佳(平均數 = 404.175, 標準差 = 44.608, 單位：公分)。其餘測驗項目在兩組間皆無顯著差異。**結論：**排球運動涉及大量過頂揮臂與向上跳躍的動作，不僅有腕關節與踝關節的作用，上肢肩關節與下肢膝關節在動作過程中扮演主要發力的角色。而立定跳遠主要測量下肢水平向前的爆發力，可能無法表現出專業與一般排球員在垂直向上的爆發力差異。本研究建議未來可蒐集更大量的樣本數針對專業與一般排球員的身體素質(例如：競技體適能)及運動能力進行更全面的差異比較。

**關鍵字：**本體感覺、動作能力、排球運動員、腕關節、踝關節

# Upper And Lower Limb Proprioception And Motor Performance In Professional And Amateur Male Volleyball Players

Wei-Shan Chen<sup>1</sup>, Yan-Chen Liu<sup>1</sup>, Yu-Ting Tseng<sup>1,2\*</sup>

<sup>1</sup>Department of Kinesiology, National Tsing Hua University, Hsinchu, Taiwan

<sup>2</sup>Research Center for Education and Mind Sciences, National Tsing Hua University, Hsinchu, Taiwan

**Purpose:** Previous studies have indicated that professional volleyball players demonstrate better postural control ability than non-athletes, indicating higher level lower limb functional motor performance and enhanced sensorimotor integration between the vestibular, visual, and somatosensory systems in those players. However, less is known about the differences in sensory and motor function between professional and amateur volleyball players. To bridge this gap, the present study aimed to compare upper limb (wrist) and lower limb (ankle) proprioception and motor ability in both professional and amateur volleyball players. **Methods:** Eight male volleyball players in the Taiwan University Volleyball League with over 9 years of training experience, and 8 male amateur volleyball players with less than 5 years of training experience participated in the present study. All participants underwent six tests measuring proprioception, power, and stability in both the upper and lower limb, which include 1) wrist position just noticeable difference (JND) threshold, 2) upper limb Y- balance test, 3) seated medicine ball throw, 4) ankle position just noticeable difference (JND) threshold, 5) lower limb Y-balance test, 6) standing long jump. Independent t-test was performed for all proprioceptive and motor variables for two groups. **Results:** The results showed a significant difference ( $t = 2.219$ ,  $p = 0.044$ ) in seated medicine ball throw between professional and normal groups. No significant differences were found for the rest of variables. **Conclusion:** Volleyball involves a significant amount of overhead attacks and jumping, making the shoulder and knee joints crucial to every movement. We used the standing long jump test to measure lower limb power, which may not fully capture the differences between professional and amateur players in the vertical direction. Future studies should increase the sample size and include a more comprehensive comparative analysis of physical fitness and athletic abilities between professional and amateur volleyball players.

**Key words:** proprioception, motor ability, volleyball players, wrist joint, ankle joint.

**Correspondence:** Professor Yu-Ting Tseng, [yutingtseng@mx.nthu.edu.tw](mailto:yutingtseng@mx.nthu.edu.tw), +886-3-5715131 ext71527

# 桌球溫蓋特多階段無氧動力測驗與溫蓋特 無氧動力測驗之相關

楊沛苙<sup>1</sup> 張慈純<sup>1</sup> 張立羣<sup>1</sup> 郭智翔<sup>2</sup> 吳昇光<sup>1</sup>

<sup>1</sup>國立臺灣體育運動大學競技運動學系 <sup>2</sup>國立臺灣體育運動大學球類運動學系

**目的：**桌球為一種短時間擊球與較長時間休息的間歇性運動，傳統的溫蓋特無氧動力測驗，受測者在腳踏車上連續 30 秒測試模式與桌球運動屬性有所差異，本研究探討新開發之桌球溫蓋特多階段無氧動力測驗與溫蓋特無氧動力測驗是否具有相關性。**方法：**以 6 名大專公開組男子桌球選手為研究對象，分別進行溫蓋特無氧動力測驗(連續踩車 30 秒)和桌球溫蓋特多階段無氧動力測驗(踩車 5 秒，休息 15 秒，進行六個週期)，兩項測驗間隔兩天，受測者配戴心率錶測量測試時心跳，測驗結束進行運動自覺量表記錄，獲得受測者的最大動力、最小動力、平均動力、動力遞減率、測驗結束心跳數與運動自覺強度，以皮爾遜積差相關分析兩種測驗結果之相關性。**結果與結論：**桌球溫蓋特多階段無氧動力測驗結果僅有第一週期的最大動力和平均動力與溫蓋特無氧動力測驗的最大動力達顯著相關( $r=.854, p<.030$ ;  $r=.945, p<.004$ )，其餘各項結果均無顯著相關。結論：桌球溫蓋特多階段無氧動力測驗與溫蓋特無氧動力測驗結果的相關性較低，未來將評估桌球溫蓋特多階段無氧動力測驗之信度與效度，以確認可作為測量桌球選手下肢動力的專項測驗方法。

**關鍵詞：**運動表現、專項體能、體能測驗

**通訊作者：**張立羣，lichun@ntus.edu.tw, +886-4-22213108 ext 6411

# Table tennis Wingate Anaerobic Test and Wingate Anaerobic Power Test in multiple stages.

Yang Pei-Yi<sup>1</sup>, Chang Tzu-Chun<sup>1</sup>, Chang Li-Chun<sup>1</sup>, Kuo Chih-Hsiang<sup>2</sup>, Wu Sheng-Guang<sup>1</sup>

<sup>1</sup>National Taiwan University of Sport Department of Sport Performance,

<sup>2</sup>ational Taiwan University of Department of Ball Sport

**Introduction:** Table tennis is an intermittent sport that involves short bouts of activity and longer periods of rest. The traditional Wingate anaerobic power test, which involves a 30-second continuous cycling mode, differs from the attributes of table tennis. This study aimed to investigate the correlation between a newly developed table tennis-specific multi-stage anaerobic power test and the Wingate anaerobic power test. **Methods:** Six male college-level table tennis players were recruited as participants. They performed the Wingate anaerobic power test (30-second continuous cycling) and the table tennis-specific multi-stage anaerobic power test (5-second cycling, 15-second rest, for six cycles) on separate days with a two-day interval. Heart rate was monitored during the tests using a heart rate monitor, and a self-perceived exertion scale was recorded at the end of the tests. Maximum power, minimum power, mean power, power decrement rate, final heart rate, and perceived exertion were collected and analyzed using Pearson correlation analysis to examine the correlation between the two tests. **Results & Conclusions:** The results showed that only the maximum power and mean power of the first cycle of the table tennis-specific multi-stage anaerobic power test were significantly correlated with the maximum power of the Wingate anaerobic power test ( $r = .854, p < .030$ ;  $r = .945, p < .004$ ). The other parameters did not show significant correlations. Therefore, the correlation between the table tennis-specific multi-stage anaerobic power test and the Wingate anaerobic power test was found to be low. Future studies should evaluate the reliability and validity of the table tennis-specific multi-stage anaerobic power test to confirm its usefulness as a specialized test for measuring the lower limb power of table tennis players.

**Keywords:** athletic performance, specific physical fitness, fitness test

**Correspondence:** Li-Chun Chang, [lichun@ntus.edu.tw](mailto:lichun@ntus.edu.tw), +886-4-22213108 ext 6411.



# HIIT對肌力與體能的運動表現之探討

劉子榕<sup>1</sup> 許茗齡<sup>2</sup> 楊佳政<sup>1</sup>

<sup>1</sup> 國立臺中教育大學體育學系

<sup>2</sup> 國立臺中教育大學體育學系碩士班

**目的：**根據 ACSM 全球健身趨勢調查顯示 HIIT 都位在前十名，在今年 2023 年的排名為第七名。各年齡層對 HIIT 的瞭解日益漸增，HIIT 對人體的益處也受到各學界的認同及推廣，相關研究也針對 HIIT 對人體的潛在影響加以研究。本文目的透過文獻搜尋探討高強度間歇訓練對運動表現的影響。**方法：**自 PubMed 的資料庫中，以 HIIT(高強度間歇訓練)、exercise performance(運動表現)為關鍵字搜尋，依相關研究結果及結論中找尋高強度間歇訓練對運動表現的影響，並彙整相關機制。**結果與討論：**文獻分析結果發現反向跳躍 CMJ 表現平均提升 7.38 cm，立定跳表現平均提升 5 cm，最大攝氧量提升約 5 ml/min/kg，臥推表現平均提升 17.17 kg，經由文獻分析結果顯示 HIIT 對下肢爆發力、上肢肌力與有氧能力都有顯著的提升。**結論：**HIIT 有助於運動表現的提升，能夠提供運動選手一個有效的訓練方法。

**關鍵詞：**高強度間歇、運動表現

**通訊作者：**劉子榕，[ape109122@gm.ntcu.edu.tw](mailto:ape109122@gm.ntcu.edu.tw), +886922362529

# A Discussion of HIIT on Athletic Performance of Muscle Strength and Physical Fitness

Zi-Rong Liu<sup>1</sup>, Ming-Ling Hsu<sup>2</sup>, Chia-Cheng Yang<sup>1</sup>

<sup>1</sup> Department of Physical Education, National Taichung University of Education, Taiwan.

<sup>2</sup> Graduate Institute of Physical Education, National Taichung University of Education, Taiwan.

**Objective:** According to the ACSM Global Fitness Trends Survey, HIIT is mostly in the top ten, ranking seventh in 2023. The understanding of HIIT at all ages increasing, and the benefits of HIIT on the human body have also been recognized and promoted by various academic circles, and relevant personnel have studies have investigated the potential impact of HIIT on the human body. The objective of this paper is to explore the effect of high-intensity interval training on athletic performance through literature search. **Method:** From PubMed's database, HIIT (high-intensity interval training) and exercise performance were used as keyword searches, and the impact of high-intensity interval training on sports performance was found according to the relevant research results and conclusions, and the relevant mechanisms were summarized. **Results & Discussion:** The results of literature analysis showed that the counter-movement jump (CMJ) performance was improved by an average of 7.38 cm, the standing jump performance was improved by an average of 5 cm, the maximum oxygen uptake was increased by approximately 5 ml/min/kg, and the bench press performance was improved by an average of 17.17 kg. The results of the literature analysis showed that HIIT significantly improved lower limb explosive strength, upper limb muscle strength and aerobic capacity. **Conclusion:** HIIT helps to improve sports performance and can provide an effective training method for athletes.

**Key words:** HIIT (high-intensity interval training), exercise performance

**Correspondence:** Zi-Rong Liu, [ape109122@gm.ntcu.edu.tw](mailto:ape109122@gm.ntcu.edu.tw), +886922362529

# 慣性離心超負荷熱身與一般熱身對跆拳道 選手下肢肌肉僵硬度及運動表現之影響

沈于婷<sup>1</sup> 許芳瑜<sup>1</sup> 李祐丞<sup>1</sup> 趙泰禎<sup>2</sup> 陳哲修<sup>1,2</sup>

<sup>1</sup>國立臺灣體育運動大學競技運動學系 <sup>2</sup>國立臺灣體育運動大學運動科學研究中心

目的：相較於傳統熱身，慣性飛輪離心超負荷運動模式，能誘發更大肌肉動作電位及徵召更多快縮肌纖維。因此，本研究探討慣性離心超負荷熱身與一般專項熱身對下肢肌肉僵硬度及運動表現之影響。方法：招募大專 15 位跆拳道男生選手，年齡  $20.3 \pm 0.8$  歲、身高  $179 \pm 5.6$  公分、體重  $68.8 \pm 8.2$  公斤。以平衡次序進行一般專項熱身（10 分鐘跆拳道熱身，熱身後靜坐休息 5 分鐘）及飛輪慣性離心超負荷（以弓箭步進行熱身，共二組，每組反覆三下，組間休息 1 分鐘）熱身。每種熱身前、後進行肌肉僵硬度 5-10-5 敏捷跑與連續 7 次垂直跳測驗。數據則以前、後測變化程度百分比，進行 t-test 統計分析，顯著水準  $p < .05$ 。結果：肌肉僵硬度方面：股四頭肌左腳一般熱身 [  $(-5.82 \pm 8.02\%)$  顯著低於慣性飛輪  $(4.98 \pm 11.39\%)$  ( $t = -3.7, p < .05$ ) ]。右腳一般熱身 [  $(-7.27 \pm 11.99\%)$  顯著低於慣性飛輪  $(4.25 \pm 5.88\%)$  ( $t = -3.3, p < .05$ ) ]。而腿後腓肌及腓腸肌僵硬度、5-10-5 衝刺跑與連續 7 次垂直跳，兩組之間皆無顯著差異 ( $p > .05$ )。結論：相較於一般熱身，本研究慣性飛輪離心超負荷熱身顯著提升股四頭肌僵硬度，但對運動表現無差異，推測可能增加下肢膝關節穩定性及預防損傷效益，此議題未來仍須持續探討。

**關鍵詞：**熱身、跆拳道、飛輪慣性運動

**主要聯絡者：**沈于婷，[tina87060663@gmail.com](mailto:tina87060663@gmail.com)，0908860606

# Effects of inertial eccentric overload warm-up and general warm-up on lower limb muscle stiffness and sports performance of Taekwondo athletes

Yu-Ting Shen<sup>1</sup>, Fang-Yu HSU<sup>1</sup>, You-Cheng Li<sup>1</sup>, Tai-Chen Chao<sup>2</sup>, Che-Hsiu Chen<sup>2</sup>

<sup>1</sup>Department of Sport Performance, National Taiwan University of Sport

<sup>2</sup>Sport Science Research Center, National Taiwan University of Sport

**Introduction:** Compared with the traditional warm-up, the inertia flywheel eccentric overload exercise mode can induce greater muscle activation and recruit more fast-twitch muscle fibers. Therefore, this study explores the effects of inertial eccentric overload warm-up and general specific warm-up on lower limb muscle stiffness and sports performance. **Methods:** Fifteen male taekwondo athletes, ( age  $20.3 \pm 0.8$  years, height  $179 \pm 5.6$  cm, and weight  $68.8 \pm 8.2$  kg) were divided into the general specialized warm-up and flywheel inertia overload in a counterbalanced design. Before and after warm-up the muscle stiffness 5-10-5 runs and 7 consecutive vertical jump were measured. **Results:** The quadriceps muscle stiffness: the general warm-up of the left foot [  $-5.82 \pm 8.02\%$  ] was significantly lower than the inertial flywheel ( $4.98 \pm 11.39\%$ ) ( $t = -3.7, p < .05$  ). The general warm-up of the right foot [  $-7.27 \pm 11.99\%$  ] was significantly lower than the inertial flywheel ( $4.25 \pm 5.88\%$ ) ( $t = -3.3, p < .05$  ). The hamstring and gastrocnemius stiffness, 5-10-5 agility and 7 consecutive vertical jumps were no significantly different between the two conditions ( $p > .05$ ). **Conclusions:** Compared with the general warm-up, the inertial flywheel eccentric overload warm-up in this study significantly improves the quadriceps femoris stiffness, but no effect on sport performances. It may enhanced knee ability and reduce the risk of injury in the lower extremities.

**Keyword:** Warm-up 、 Muscle Stiffness 、 Inertia flywheel eccentric overload exercise

**Correspondence:** Student Yu-Ting Shen, [tina87060663@gmail.com](mailto:tina87060663@gmail.com), 0908860606

# 有氧和阻力運動對老年高血壓合併停經之 認知功能和抗氧化的影響

陳虹汝、劉馨璟、楊艾倫

臺北市立大學運動科學研究所

**背景與目的:** 老化與更年期會造成認知功能的衰退，而高血壓亦是導致認知功能下降的原因之一，其中又與老年高血壓所伴隨的氧化壓力增加相關。過去研究指出運動能改善老化所造成的高血壓及認知功能，此類研究多針對老年或認知功能受損者，然而針對不同運動介入對於停經高血壓婦女之認知功能相關的影響仍有待釐清。本研究以高血壓動物為模型，探討介入 12 週有氧和阻力運動對老年高血壓合併停經之認知功能和抗氧化的影響。**方法:** 本研究共分為四組：正常血壓卵巢切除組 (WKY-C)、高血壓卵巢切除組 (SHR-C)、高血壓卵巢切除合併有氧運動組 (SHR-AT) 及高血壓卵巢切除合併阻力運動組 (SHR-RT)。為期 12 週的運動介入，並於四十八週大時，採用莫氏水迷宮測量各組之認知功能，及測量血清總和抗氧化能力(TAC)。**結果:** 研究發現認知功能測驗中，相較於 SHR-C 和 WKY-C 組，SHR-AT 和 SHR-RT 組均顯示有顯著較短的逃脫潛伏期、停留在正確的象限有較高的時間比例、及更高的頻率通過平台位置。此外，SHR-AT 與 SHR-RT 組之總和抗氧化能力顯著高於 SHR-C 組，並與 WKY-C 組無顯著差異。**結論:** 本研究證實介入 12 週有氧或阻力運動後，皆可顯著改善老年高血壓合併停經之認知功能及總和抗氧化能力。

**關鍵詞:** 停經、高血壓、抗氧化、水迷宮

# Effects Of Aerobic And Resistance Exercise On Cognitive Function And Anti-Oxidation In Elderly Hypertension With Menopause

Hong-Ru Chen, Hsin-Ching Liu, Ai-Lun Yang

Institute of Sports Sciences, University of Taipei, Taiwan

**Introduction:** Aging and menopause can cause cognitive decline, and hypertension is also one of the causes of cognitive decline, which is related to the increase of oxidative stress accompanying hypertension in the elderly. Previous studies have pointed out that exercise can improve hypertension and cognitive function caused by aging. Most of these studies focus on the elderly or those with impaired cognitive function. However, the impact of different exercise interventions on the cognitive function of postmenopausal hypertensive women remains to be clarified. This study used hypertensive animals as a model to explore the effects of 12 weeks of aerobic and resistance exercise intervention on cognitive function and antioxidant activity in elderly hypertension with menopause. **Methods:** Our experiments were divided into four groups: normotensive Wistar Kyoto rat with ovariectomy (WKY-C), spontaneously hypertensive rat with ovariectomy (SHR-C), ovariectomized spontaneously hypertensive rat combined with aerobic training (SHR-AT), and ovariectomized spontaneously hypertensive rat combined with resistance training (SHR-RT) groups. After a 12-week exercise intervention, the Morris water maze was used to measure the cognitive function of each group, and serum total antioxidant capacity (TAC) of each group was measured at 48 weeks old. **Results:** Results showed that in cognitive function tests, compared with the SHR-C and WKY-C groups, both the SHR-AT and SHR-RT groups showed a higher proportion of time staying in the correct quadrant, a higher frequency of passing the platform position, and significantly shorter escape latencies. In addition, the TAC concentration of the SHR-AT and SHR-RT groups was significantly higher than the SHR-C group, and there was no significant difference with the WKY-C group. **Conclusion:** This study confirmed that after 12 weeks of aerobic or resistance training, the cognitive function and TAC could be significantly improved in elderly hypertension with menopause.

**Keywords:** menopause, hypertension, anti-oxidation, water maze

**Correspondence:** Professor Ai-Lun Yang, [yangailun@gmail.com](mailto:yangailun@gmail.com) +886-2-2871-8288 ext.5815

# 韻律體操常見傷害成因之探討

台中教育大學體育學系

趙彥茹 柯柏任

韻律體操是世界上最美的運動項目之一，也是體操中重要的項目，需要高度複雜和完美的技術手具(繩、環、球、棍棒及彩帶)與發達的肢體技巧及靈活的表現力結合，因此韻律體操運動員從很小的時候就要承受高負荷的訓練內容，而國際體操協會亦認定韻律體操的基本難度動作(平衡、跳躍、旋轉)可能是造成受傷的原因之一，這些過度訓練造成運動員受傷、睡眠不足以及表現受損的主要原因。**本研究目的:**是減少國內韻律體操運動員傷害的發生和建立正確動作姿勢。**方法:**本文使用文獻探討的方式，因國內較少韻律體操相關之文獻，因此本篇以國外相關文獻為主，並透過:Google Scholar、NCBI 網站查詢，設定時間範圍為 2012-2023 年，依關鍵字: rhythmic gymnastics、rhythmic gymnastics overuse injuries 搜尋，排除回顧性文獻，共 13 篇英文學術文獻，以此了解韻律體操常見運動傷害的種類及成因。**結果與討論:**發現腰椎及下肢關節(髖、膝、踝)都是韻律體操常見的傷害，原因可能為體重過輕、超負荷訓練以及在訓練的過程中有許多超過關節角度的動作，透過文獻同時也發現，體重過輕導致身體無法承受訓練內容而造成超負荷訓練，並引發急性傷害，如果沒有適當的治療及休息可能會引發慢性損傷，如:髖腱炎、下背痛、旋轉肌腱炎等，而下背痛會加深下肢關節受傷的風險，至於超過關節角度的動作是不可避免的，在訓練結束後要適當的伸展及收操，可有效降低受傷風險。**結論:**綜合所有文獻，韻律體操發生受傷的機率比其他運動項目高，其原因是過度使用、超過關節角度及心理因素等，因此訓練的過程中選手與教練的溝通是非常重要的，而教練也需要注意選手心理素質，並在訓練結束後伸展與放鬆，可以降低運動傷害的發生，比起其他運動項目目前在韻律體操所知的運動傷害和預防技術還有很大的差距，未來可以往此方面做相關的研究及探討。

**關鍵詞:**韻律體操、超負荷訓練、預防傷害

# Discussion On Causes Of Common Injuries In Rhythmic Gymnastics

Rhythmic gymnastics is one of the most beautiful sports in the world and an important event in gymnastics. It requires a highly complex and perfect combination of technical equipment (rope, hoop, ball, clubs, and ribbon) with developed physical skills and flexible expressive ability. Therefore, rhythmic gymnastics athletes need to undergo high-load training from a young age. The International Gymnastics Federation also recognizes that the basic difficulty movements of rhythmic gymnastics (balance, jump, and rotation) may be one of the reasons for injuries. The excessive training causes injuries, sleep deprivation, and performance damage to athletes. **Purpose:** The purpose of this study was to reduce the occurrence of injuries in domestic rhythmic gymnasts and establish correct posture. **Methods:** This paper uses literature review to explore the types and causes of common sports injuries in rhythmic gymnastics. As there were fewer related domestic literature on rhythmic gymnastics, this study mainly focuses on foreign literature. Google Scholar and NCBI website were searched from 2012 to 2023 with keywords such as "rhythmic gymnastics" and "rhythmic gymnastics overuse injuries". A total of 13 English academic articles were obtained by excluding retrospective studies. **Results and discussion:** It was found that the lumbar spine and lower limb joints (hip, knee, and ankle) were common injuries in rhythmic gymnastics, possibly due to being underweight, excessive training, and many movements exceeding joint angles during training. Through the literature, it was also found that being underweight causes the body to be unable to withstand the training content, resulting in overload training and acute injuries. Without proper treatment and rest, it may cause chronic injuries, such as patellar tendinitis, low back pain, and rotator cuff tendinitis. Low back pain can also deepen the risk of lower limb joint injuries. As for movements exceeding joint angles, it was unavoidable. However, proper stretching and cool down after training can effectively reduce the risk of injury. **Conclusion:** In summary, the probability of injuries in rhythmic gymnastics was higher than other sports due to overuse, exceeding joint angles, and psychological factors. Therefore, communication between athletes and coaches was essential during training. Coaches also need to pay attention to the psychological quality of athletes and perform stretching and relaxation after training to reduce the occurrence of sports injuries. Compared with other sports, there was still a significant gap in the known sports injuries and prevention techniques in rhythmic gymnastics. Future research can focus on this aspect.

**Key words:** rhythmic gymnastics, overload training, injury prevention.



# 不同群聚組配置阻力訓練對最大肌力的影響

林育慧<sup>1</sup> 李金為<sup>2</sup> 陳品蓉<sup>3</sup> 楊明達<sup>4</sup>

<sup>1</sup>臺北醫學大學保健營養學系 <sup>2</sup>臺北市立大學球類運動學系 <sup>3</sup>臺北醫學大學通識教育中心

**目的：**本研究旨在探討不同群聚配置的阻力訓練對最大肌力的影響。**方法：**研究以 18 位健康大學男性大學生為對象，分成群聚組配置-2 組 (cluster-set configuration of 2 group, CSC-2) 與群聚組-4 組 (cluster set configuration of 4 group, CSC-4) (各 9 人)，實驗期間所有實驗參與者皆接受每週 3 次、持續 8 週的群聚組配置阻力訓練；CSC-2 為每組間休息 120 秒與每群聚組休息 15 秒，CSC-4 為每組間休息 120 秒與每群聚組休息 45 秒，使二組的總休息時間均相同。在訓練前、後均測量實驗參與者之仰臥推舉、過頭肩上推舉、俯臥划船、半蹲舉與硬舉的最大肌力，所得數值以混和設計二因子變異數分析進行考驗。**結果與結論：**訓練前二組之各依變項間均無顯著差異，訓練後 CSC-2 與 CSC-4 之仰臥推舉、過頭肩上推舉、半蹲舉與硬舉的最大肌力分別顯著高於訓練前 ( $p < .05$ )，但二組之間並無顯著差異。本研究證實：八週的 CSC-2 與 CSC-4 訓練皆能有效提升最大肌力，為提升訓練的可行性，建議教練能以 CSC-4 作為提升最大肌力的群聚組配置阻力訓練方式。

**關鍵詞：**仰臥推舉、過頭肩上推舉、俯臥划船、半蹲舉與硬舉

# The Effects Of Different Cluster-Set Configuration Resistance Training On Maximal Muscle Strength

Yu-Hui Lin<sup>1</sup>, Chi-Wei Lee<sup>2</sup>, Pin-Rong Chen<sup>3</sup>, Main-Ta, Yang<sup>3</sup>

<sup>1</sup> Department of Nutrition and Health Sciences, Taipei Medical University, Taiwan

<sup>2</sup> Department of Ball Sports, University of Taipei, Taiwan

<sup>3</sup> Center for General Education, Taipei Medical University, Taiwan

**Purpose:** To investigate the effects of different cluster-set configurations resistance training on maximal muscle strengths. **Methods:** Eighteen healthy male college students were divided into cluster-set configuration of 2 group (CSC-2, n=9) and cluster-set configuration of 4 group (CSC-4, n=9). All participant performed cluster-set configurations resistance training 3 times per week for 8 weeks. CSC-2 group had 15 s of intra-set rest and 120 s of inter-set rest, while CSC-4 group had 45 s of intra-set rest and 120 s of inter-set rest. The CSC-2 and CSC-4 groups had an equal total rest time. The maximal muscle strengths of bench press, overhead press, row, squat, and deadlift of participants were tested before and after training. Data was analyzed by two-way mixed design ANOVA. **Results & Conclusions:** All variables were no significant differences between two groups before training. After training, the maximal muscle strengths of bench press, overhead press, squat, and deadlift in CSC-2 and CSC-4 groups were significantly higher than before training ( $p < .05$ ). However, there were no differences between CSC-2 and CSC-4 groups after training. It is concluded that 8 weeks of CSC-2 and CSC-4 resistance training can effectively enhance maximal muscle strength. In order to increase training feasibility, we suggest the coach use the cluster-set configurations resistance training for CSC-4 to enhance the maximal muscle strength.

**Keywords:** bench press, overhead press, row, squat, deadlift

**Correspondence:** Associate Professor Ming-Ta Yang, yangrugby@tmu.edu.tw, +886-2-27361771 ext 2275

# 高中男女生挺舉最佳成績與前深蹲最大 肌力之探討

張育華<sup>1</sup>、趙榮瑞<sup>2</sup>

<sup>1</sup> 國立臺灣體育運動大學競技運動學系、<sup>2</sup> 國立臺灣體育運動大學球類運動學系

## 摘要

**目的：**探討高中男女生挺舉最佳成績及前深蹲最大肌力的比例數據之分析。**受試者：**以台中市大里高中舉重選手，男生 16 名，女生 9 名，共計 25 位選手為主。**方法：**受試者進行挺舉及前深蹲檢測，從空槓開始暖身，然後逐漸增加重量至 1RM 之重量，若成功後休息兩分鐘後再加重，失敗則休息兩分鐘後再減重，進而記錄選手在最佳狀態檢測出最大肌力。**結果與討論：**發現高中男生平均挺舉最佳成績為 126 公斤，前深蹲最大肌力為 152 公斤，進而得到挺舉與前深蹲的比例平均為 1:1.2075。高中女生部分平均挺舉最佳成績為 73 公斤，前深蹲最大肌力為 94 公斤，進而得到挺舉與前深蹲的比例為 1:1.2944。資料顯示高中女生之比例高於男生。因此在實際訓練中，經過此檢測結果，發現本研究受試者之高中女生技術有待提升，同時所得結果可供擬訂舉重訓練計畫之借鏡。

**關鍵詞：**挺舉、前深蹲、最大肌力

**通訊作者：**張育華，Email：[b0936049393@yahoo.com.tw](mailto:b0936049393@yahoo.com.tw)，0909722025

**通訊住址：**404 臺中市北區雙十路二段 16 號

# **Discussion on the Best Clean and Jerk Performance and Front squat Maximum Muscle Strength of High School Boys and Girls**

**Yu-Hua Chang<sup>1</sup>、Rong-Ruey Chao<sup>2</sup>**

1National Taiwan Sport University Department of Athletic Performance、2 National Taiwan Sport University Department of Ball Game Sports.

## **Abstract**

**Purpose:** This study was to explore the ratio data of the best bench press performance and maximum front squat strength of high school male and female students. **Subjects:** Were 25 weightlifting athletes from Dali High School in Taichung City, including 16 males and 9 females. **Methods:** The subjects performed bench press and front squat tests, starting with an empty barbell for warm-up and gradually increasing the weight to the 1RM weight. If successful, they rested for two minutes and then increased the weight again. If failed, they rested for two minutes and then decreased the weight until they achieved the maximum strength in the best condition. **Results and discussion:** It is found that the average best bench press performance of high school male students was 126 kg, and the maximum front squat strength was 152 kg, resulting in an average ratio of bench press to front squat of 1:1.2075. For high school female students, the average best bench press performance was 73 kg, and the maximum front squat strength was 94 kg, resulting in a bench press to front squat ratio of 1:1.2944. The data indicated that the ratio for high school female students was higher than that for male students. Therefore, based on the results of this study, it was found that the technical skills of the female subjects need improvement, and the results can be used as a reference for designing weightlifting training programs.

**Keywords:** bench press, front squat, maximum strength

**Corresponding author:** Yu-Hua Chang, Email: b0936049393@yahoo.com.tw, 0909722025

**Correspondence address:** No. 16, Section 2, Shuangshi Road, North District, Taichung City, 404 Taiwan.

# 世界級羽球女子雙打防守能力之技術分析

黃柏睿<sup>1</sup> 黃明祥<sup>2</sup> 林勁宏<sup>3</sup>

<sup>1</sup> 國立臺灣體育運動大學競技運動學系碩士班 <sup>2</sup> 國立臺灣體育運動大學球類運動學系

<sup>3</sup> 元智大學體育室

**目的：**羽球雙打是該競賽種類項目中，需要較快的速度與較多的力量，過去的研究大多針對具得分優勢之攻擊性技術與策略進行分析，而乎略比賽中選手不可能一直處於進攻狀態，也需要有防守能力，但防守技術與策略如何被使用，目前的資訊仍很缺乏，因此本研究目的在探討世界級羽球雙打防守能力之技術分析。**方法：**研究對象為 2023 年世界羽球錦標賽女子雙打準決賽與決賽之三場比賽，經由分析比賽影像，記錄使用之比賽技術、落點與相關資訊後，分析比較每局勝負兩方，使用之防守技術、連續多拍防守成功與失敗次數之差異。**結果與結論：**羽球女子雙打每局平均來回拍數  $558.3 \pm 55.2$  次，每分平均來回拍數  $14.6 \pm 1.5$  次。在防守使用的技術種類，勝方明顯在每局中使用接殺平推與挑球次數少於敗方 ( $17.1 \pm 5.6$  vs  $24.0 \pm 5.7$ ;  $15.0 \pm 4.0$  vs  $21.0 \pm 3.2$  次,  $p < .05$ )，雖然勝方在每局防守失敗率、連續防守失敗率及末球防守失敗率方面未達顯著差異，但皆其值勝方皆有低於敗方的趨勢，且勝方在連續防守失敗次數上明顯低於敗方 ( $4.0 \pm 1.2$  vs  $6.1 \pm 0.9$  次,  $p < .05$ )。本研究初步主要發現女子雙打比賽過程中，勝方使用防守技術相對較少，且能在對手受壓迫時，處於連續防守情況下，減少失誤次數是主要贏球的關鍵。

**關鍵詞：**接殺平推、挑球、連續防守失敗

**通訊作者：**林勁宏，lch0325@saturn.yzu.edu.tw, +886-3-4638800 ext 2348

# Analysis the ability of defensive skills in world-class Women doubles badminton Players

Po-Jui Huang<sup>1</sup>, Ming-Shaing Huang<sup>2</sup>, Ching-Hung Lin<sup>3</sup>

<sup>1</sup>Master Program, Department of Sport Performance, National Taiwan University of Sport.

<sup>2</sup>National Taiwan University of Sport, Department of Ball Sports, Taiwan.

<sup>3</sup>Physical Education office, Yuan Ze University.

**Introduction:** Doubles events in badminton require faster speed and more strength. Previous studies have mainly focused on analyzing offensive techniques and strategies that lead to scoring advantages. However, in a real game, players cannot always be in an attacking state and need defensive skills as well. The information on how defensive techniques and strategies are used is still lacking. Therefore, the purpose of this study is to explore the technical analysis of world-class women's badminton doubles defensive ability. **Methods:** The research scope were three matches of the semi-finals and finals of the women's doubles at the 2023 World Badminton Championships. After analyzing the video information of the game, comparing the defensive techniques and the number of successful and unsuccessful consecutive defensive shots between the winning and losing sides in each set. **Results & conclusions:** The average number of shots per set is  $558.3 \pm 55.2$  times, and the average number of shots per rally is  $14.6 \pm 1.5$  times. The winning side used fewer push shots and lob shots than the losing side significantly at the defensive techniques ( $17.1 \pm 5.6$  vs.  $24.0 \pm 5.7$ ;  $15.0 \pm 4.0$  vs.  $21.0 \pm 3.2$  times,  $p < .05$ ). The percentage of the defensive failure, consecutive defensive failure and defensive failure at the last shot were trend to be lower in winning than losing side. The number of consecutive defensive failures were significantly lower in winning than losing side ( $4.0 \pm 1.2$  vs  $6.1 \pm 0.9$  times,  $p < .05$ ). The preliminary findings of this study suggest that in women's doubles badminton games, the winning side uses lower defensive techniques and reducing the number of defensive mistakes while being under the opponent attacks is the key to winning.

**Key world: push shot, lob shot, consecutive defensive failures**

**Correspondence: Ching-Hung Lin, [lch0325@saturn.vzu.edu.tw](mailto:lch0325@saturn.vzu.edu.tw), +886-3-4638800 ext 2348**

# 2020東京奧運田徑項目男子110公尺

## 跨欄分段配速之分析

溫麒翔<sup>1</sup>、趙榮瑞<sup>2</sup>

<sup>1</sup>國立臺灣體育運動大學競技運動學院、<sup>2</sup>國立臺灣體育運動大學競技學系

**目的:**針對 2020 東京奧運田徑項目男子 110 公尺跨欄之欄架間及前後段之配速分析。以進入決賽前八名選手為對象。**方法:**則取自世界田徑總會(World Athletics)官方網站之統計資料及影片，再利用錄製之影片，透過 TV 及電腦，以慢動作讀取，最後採雙項數據量化，進行分析。**結果與結論:**男子組起跨攻欄、騰空過欄、下欄著地後啟動加速快是對運動員是非常有利的，以及起跑到第一欄架能夠將高速度保持至第九個欄架，保持絕對速度是決定男子 110 跨欄勝負的重要因素。因此，在 110 公尺跨欄賽事中分段配速及戰術的運用，往往是造成比賽勝負的關鍵。需具備強大的有氧能力、速度及無氧能量系統的配合。

**關鍵詞:**奧運會、110 公尺跨欄、攻欄。

**通訊作者:**溫麒翔 0987-883768 **E-mail:**a076811280@tyes.tc.edu.tw

**通訊地址:**427011 臺中市潭子區潭陽路 19 號

# Analysis of Segmental Pacing for Men's 110-Meter Hurdles Event at the 2020 Tokyo Olympics

Wen Chi Hsiang<sup>1</sup>      Jung-jui Chao<sup>2</sup>

<sup>1</sup>Department of Competitive Sports, National Taiwan Sport University

<sup>2</sup>Department of Competitive Sports, National Taiwan Sport University

**Objective:** Analysis of the pacing and tactics for the men's 110-meter hurdles event at the 2020 Tokyo Olympics, focusing on the spacing between hurdles and the speed of athletes during the pre-race and race segments, specifically for the top eight athletes entering the finals. **Methods:** Statistical data and videos were collected from the official website of the World Athletics, and further analyzed through slow-motion playback using TV and computer recordings. Dual data quantification was employed for analysis. **Results and Conclusion:** It was found that the technique of clearing the hurdles, generating speed during flight, and accelerating after landing was highly advantageous for athletes in the men's event. Maintaining high speed from the start to the first hurdle and throughout the race, especially up to the ninth hurdle, was crucial for success in the men's 110-meter hurdles. Therefore, segmental pacing and tactical strategies in the 110-meter hurdles race are key determinants of the outcome. Athletes need to possess strong aerobic capacity, speed, and coordination of anaerobic energy systems.

**Keywords:** Olympics, 110-meter hurdles, hurdle clearance. **Author:** Wen Chi Hsiang, [a076811280@tves.tc.edu.tw](mailto:a076811280@tves.tc.edu.tw) 0987-883-768



# 探討臺灣企業甲級足球聯賽攻守數據之分析-以2020年冠軍南市台鋼隊、亞軍高市台電隊為例

何主偉<sup>1</sup>、簡如君<sup>2</sup>、陳諺霆<sup>3</sup>、梁建偉<sup>4,\*</sup>

<sup>1</sup> 國立嘉義大學體育與健康休閒學系暨研究所

<sup>2</sup>、<sup>4</sup> 國立中興大學體育室

<sup>3</sup> 國立臺灣體育運動大學競技運動學系碩士在職專班

## 摘要

**目的：**本研究為 2020 臺灣企業甲級足球聯賽，冠軍球隊南市台鋼及亞軍球隊高市台電於第三循環賽之各七場為研究對象，並針對每場各項攻守數據進行分析與比賽結果的相關性進行討論。**方法：**研究者以直播觀看及利用網路平台回放取得研究數據記錄，並統一彙整資料處理。**結果：**經勝負與各項攻守數據發生的相關係數矩陣之分析顯示，射正與射門、傳中與射門、穿越球與射門、穿越球與傳球、黃牌與犯規都達顯著高度相關，另外，傳中與傳球和黃牌與自由球及紅牌與自由球、紅牌與黃牌都達顯著正相關，這意味著黃紅牌的犯規將有產生自由球的風險，而在研究也觀察出，又以穿越球與射門顯著達  $r=.75$ ，兩隊擅長傳球組織與滲透進攻模式，穿越球的精準度確實造成後防線上的壓力，在攻擊端接獲穿越球後的射門把握也是獲勝的關鍵。**結論：**一、兩隊在射門質量上皆有穩定表現，又以冠軍南市台鋼隊的射正較為優異。二、在穿越球與傳球間都有很好的品質亦達高度顯著，但數據顯示以亞軍高市台電隊略高於冠軍南市台鋼隊。三、兩支球隊球風相似，競賽場上能把握進球方得以帶走最終勝利；探討本土聯賽亦可讓國內更加瞭解各隊當年趨勢或實力水平。

**關鍵字：**臺灣企業足球甲聯賽、傳球組織、射門質量

**通訊作者：**梁建偉 402 台中市南區國光路 250 號 國立中興大學體育室

**電話：**04-22840230\*205 **E-mail：**lichwe10302@nchu.edu.tw

# Statistical Analysis of Attack and Defense of Taiwan Football Premier League: Taking the First and Second Place in 2020 as Example (Taiwan Steel Group Football Club from Tainan City and Taipower Football Club from Kaohsiung City)

Chu-Wei HO<sup>1</sup>, Ju-Chun Chien<sup>2</sup>, Yen-Ting Chen<sup>3</sup>, and Chien-Wei Liang<sup>4\*</sup>

<sup>1</sup> Department of Physical Education, Health & Recreation with Graduate Institute, National Chiayi University

<sup>2,4</sup> Office of Physical Education and Sport, National Chung Hsing University

<sup>3</sup> Department of Sport Performance, National Taiwan University of Sport

## Abstract

**Objectives:** This study aimed to analyze the correlation between the data of attack and defense and game results from the top two winners in 2020 Taiwan Football Premier League. The researcher determined the research objects by observing seven games in the third round of the 2020 Taiwan Football Premier League played by TSG FC from Tainan City and Taipower FC from Kaohsiung City. **Methods:** The researcher collected and processed the data by watching live broadcast and replaying videos from online platforms. **Result:** The correlation matrix analysis of the game results and various attacking and defensive statistics showed that shots on goal and shots, crosses and shots, through pass and shots, through pass and pass, yellow cards and fouls were highly correlated. In addition, crosses and pass, yellow cards and free kicks, and red cards and free kicks, as well as red cards and yellow cards were positively correlated, which means that the risk of free kicks is associated with yellow and red card fouls. Moreover, the study observed that through pass and shots had a significant correlation coefficient of  $r = .75$ , indicating that both teams had a strong ability in organizing passes and penetrating attacks, and the accuracy of through pass created pressure on the defense, making shots after receiving through pass a key factor in winning. **Conclusion:** 1. Both teams have stable performance in shot quality, with Taiwan Steel Group Football Club having a slightly better accuracy rate. 2. Both teams demonstrate good quality in through pass and passing, with Taipower Football Club from Kaohsiung City having slightly better statistics. 3. Both teams have a similar playing style, and the ability to score goals is the key to winning. Analyzing the domestic league can help to better understand the trends and strength of each team in the country.

**Keywords:** Taiwan Football Premier League, passing organization, shot quality.

**Correspondence:** Chien-Wei Liang, [lichwe10302@nchu.edu.tw](mailto:lichwe10302@nchu.edu.tw), +886-4-22840230

**ext 205**

# 應用代理人模擬探索足球隊的進攻模式

倪煒傑<sup>1</sup>

<sup>1</sup> 國立台灣大學地理環境資源學系研究所

**目的：**在一場足球比賽中唯一的勝利條件就是己方隊伍的進球數要比敵方隊伍還要來得多，同時不同的隊伍會採取不同的戰術已取得更多的進球。過往的研究使用了資料探勘、機器學習、社會網路分析的方法來嘗試探討不同足球隊伍的進攻模式，然而過往研究並沒有聚焦回應球隊在組織進攻時，不同球員之間傳球的相互作用。本研究以球員(Player)作為代理人(Agent)進行模擬，足球比賽作為一個複雜系統，探索進攻過程中不同球員的相互作用下形成的進攻模式。**方法：**建立進攻隊伍 A 對壘防守隊伍 B，11 人對壘 11 人的足球模擬環境，將英格蘭超級足球聯賽 2017/18 賽季的足球軌跡資料進行擬合參數化作為隊伍 A 球員踢球的決策，回顧過往文獻對於最成功的防守特點的整合進行擬合參數化作為隊伍 B 球員防守的決策。**結果與討論：**本研究將進攻隊伍 A 成功進球的足球軌跡資料進行軌跡分群和視覺化，討論球員在組織進攻時的持球過程是如何轉換為有效的進攻和入球。

**關鍵詞：**體育分析、事件流數據、代理人模擬、資料樣式探勘

# USING AN AGENT-BASED SIMULATION FOR DISCOVERING OFFENSIVE PLAYING PATTERNS OF FOOTBALL TEAMS

Wei-Jye Goy<sup>1</sup>

<sup>1</sup> Department of Geography, National Taiwan University, Taiwan.

**Introduction:** The only winning condition in a football game is for one's team to score more goals than the opposing team, and different teams adopt different tactics to score more goals. Previous studies have used data mining, machine learning, and social network analysis methods to discover the offensive playing patterns of different football teams, but these studies did not focus on the interaction between different players during the team's offensive organization. This study uses players as agents to simulate, use football game as a complex system, discovering the attacking patterns formed by the interaction of different players during the attacking process. **Method:** A simulation environment of 11 players against 11 players is established for team A to attack team B. The trajectory data of the English Premier League 2017/18 season is fitted and parameterized as the decision-making for team A players to play the ball. The integration of the characteristics of the most successful defense in previous literature is parameterized as the decision-making for team B players to defend. **Results and discussion:** This study clustered and visualized the trajectory data of successful goals scored by team A, and discussed how the ball possession process of players during the attacking organization can be transformed into effective attacks and goals.

**Key words:** Sports analytics, Eventstream data, Agent-based simulation, Pattern Mining

**Correspondence:** Wei-Jye Goy, [R10228025@ntu.edu.tw](mailto:R10228025@ntu.edu.tw), +886-905-757-720

# 2023 肇喜登峰巡迴賽(開幕戰) 長華公開

## 賽前5名擊球技術之分析

張彥翔<sup>1</sup>、林怡瀨<sup>1</sup>、趙榮瑞<sup>2</sup>

<sup>1</sup>國立臺灣體育運動大學競技運動學系、<sup>2</sup>國立臺灣體育運動大學球類運動學系

### 摘要

**目的：**本研究以探討肇喜登峰巡迴賽(開幕戰) 長華公開賽前 5 名之選手標準桿上果嶺率、每輪推桿及總桿等平均數之分析。**對象：**以肇喜登峰巡迴賽(開幕戰) 長華公開賽，共五十一位進入決賽，並取較優秀前 5 名選手為主。**方法：**一、資料取自於台灣職業高爾夫協會之官方網站，公開之相關資訊，並自中取得前五名選手技術表現數據。二、為求資料正確性，並透過 youtube 取得比賽過程之錄影帶，經由慢動作分析反覆觀看比賽過程，以確立觀察記錄內容一致性，並將比賽相關數據加以記錄，再將兩者合一比對，進而取得正確值進行分析，以達本研究信效度。**結果與討論：**高爾夫球比賽後有多項數據，本研究將針對標準桿上果嶺率、每輪推桿數、總桿平均數三項擊球技術進行分析。前五名選手都有超過 7 成標準桿上果嶺率，冠軍選手每輪推桿都少其他選手 2 桿之多，推桿把握度好，將有助於降低總桿數。**結論：**高爾夫球運動中各項擊球技巧都相當重要，但推桿技術，乃是極為重要之課題，整個推桿技術如動作正確、穩定及草紋判斷能力等，將有助於比賽中降低桿數。期待將各項擊球技術作更深入之探討，未來將結果提供教練及指導者，在教學、訓練上之借鏡。

**關鍵字：**推桿、總桿、上果嶺率、肇喜登峰巡迴賽。

**通訊作者：**張彥翔，E-mail : a88715ndy@gmail.com , 0932-601-797

# 2023 Zhaoxi Dengfeng Tournament (Opening Game) Analysis of the Top 5 Hitting Techniques of the Changhua Open

Zhang Yanxiang 1, Lin Yilu 1, Zhao Rongrui 2

1 Department of Athletics, National Taiwan Sports University,

2 Department of Ball Sports, National Taiwan Sports University

**Purpose:** This research is to explore the analysis of the average number of greens in par, putts per round and total strokes of the top 5 players in the Changhua Open of the Zhaoxi Dengfeng Tour (opening match). **Objects:** A total of 51 contestants entered the finals of the Zhaoxi Dengfeng Tour (opening match) Changhua Open, and the top 5 contestants were selected. **Methods:** 1. The information is obtained from the official website of the Taiwan Professional Golf Association, and relevant information is released, and the technical performance data of the top five players are obtained from it. 2. In order to ensure the accuracy of the data, obtain the video tape of the game process through youtube, and watch the game process repeatedly through slow motion analysis to establish the consistency of the observation and record content, record the relevant data of the game, and then compare the two Yes, and then obtain the correct value for analysis to achieve the reliability and validity of this study. **Results and conclusion:** There are many data after the golf game. This study will analyze the three hitting techniques of the rate of greens in par, the number of putts per round, and the average number of total strokes. The top five players all have more than 70% of the greens on par. The champion putts less than the other players by 2 strokes in each round. Good putt control will help reduce the total number of strokes. **Conclusion:** All hitting skills are very important in golf, but putting technology is an extremely important subject. The whole putting technology, such as correct movement, stability and grass grain judgment ability, will help reduce the score. Looking forward to discussing various batting techniques in depth, and providing coaches and instructors with the results in the future, as a reference for teaching and training.

**Keywords:** putting, total strokes, percentage of greens hit, Zhaoxi Dengfeng Tour.

**Corresponding author:** Zhang Yanxiang, E-mail: a88715ndy@gmail.com , 0932-601-797

# 2022卡達世界盃冠亞軍比賽 之各項表現技術分析

陳諺霆<sup>1</sup> 林根<sup>1</sup> 趙榮瑞<sup>2</sup>

<sup>1</sup> 國立臺灣體育運動大學競技運動學系

<sup>2</sup> 國立臺灣體育運動大學球類運動學系

**目的：**本研究旨在分析 2022 卡達世足冠亞軍賽之各項表現技術，含控球率、射門、傳球、搶斷等分析，透過多項量化指標進行探討。**對象：**針對 2022 卡達世足賽冠亞軍阿根廷對戰法國場為主。**方法：**透過華視及愛爾達 TV 等轉播，並錄製影帶再透過電腦影片播放慢動作，進行整場賽況讀取、觀察和紀錄，並從中探究各項表現不同數據量化，採用描述性統計，加以深入分析。**結果與討論：**阿根廷和法國之比賽分析顯示：阿根廷在射門方面表現出色，射門(6 次：0 次)，其中射正(3 次：0 次)而法國則沒有一次射門，阿根廷也在傳球(290 次：202 次)和搶斷(10 次：8 次)方面表現優異，依數據顯示：阿根廷在上半場的攻擊能力較佳。然而，在下半場，法國攻入兩分，但阿根廷在射門、傳球和解圍方面的表現仍然較好。法國在成功搶斷(13 次：19 次)、長傳(38 次：50 次)、傳中(10 次：21 次)優於阿根廷。正規比賽兩隊各進兩球平局告終，進入延長加時賽。整體而言，阿根廷在上半場表現更具侵略性，而法國在下半場的防守和侵略性攻擊表現較為出色。

**關鍵詞：** 2022 卡達世足賽、控球率、搶斷、傳球

**通訊作者：**陳諺霆，11004106@gm.ntus.edu.tw, +886-956-775369



# Technical Performance Analysis of the 2022 Qatar World Cup Final and Runner-Up Match

Yen-Ting Chen<sup>1</sup> Ken Lin<sup>1</sup> Jung-jui Chao<sup>2</sup>

<sup>1</sup>Department of Athletic Kinesiology, National Taiwan Sports University

<sup>2</sup>Department of Ball Kinematics, National Taiwan Sports University

**Objective:** The purpose of this study is to analyze the technical performance in the 2022 Qatar World Cup final and runner-up match, including metrics such as possession rate, shots, passes, tackles, etc., using various quantitative indicators for investigation.

**Participants:** Mainly focusing on the 2022 Qatar World Cup final and runner-up match between Argentina and France. **Method:** The match was analyzed through broadcasts from TV channels such as CTS (Chinese Television System) and Elta TV. Video recordings were made and then played back in slow motion using computer software to closely observe and record the entire game situation. Various performance data were quantified, and descriptive statistics were used for in-depth analysis. **Results and Discussion:**

Analysis of the Argentina vs. France match showed that Argentina performed well in shots (6:0) and on-target shots (3:0), as well as passes (290:202) and tackles (10:8). The data indicated that Argentina had better attacking capabilities in the first half of the match. However, in the second half, France scored two goals, but Argentina still performed well in shots, passes, and clearances. France had better success in tackles (13:19), long passes (38:50), and crosses (10:21) compared to Argentina. The regular time of the match ended in a 2-2 draw, leading to an extra time. Overall, Argentina demonstrated more aggression in the first half, while France showed better defensive and aggressive attacking performances in the second half.

**Keywords:** 2022 FIFA World Cup, possession rate, interceptions, passing

**Corresponding author:** Yen-Ting Chen, 11004106@gm.ntus.edu.tw, +886-956-775369

# 女性足球教練角色衝突與調適

李靜雯

國立臺灣體育運動大學體育學系碩士班

**目的:**如今運動與性別的關係雖已不同，但大眾對教練角色有所規範與期待，期待其為男性。運動範疇中亦不難發現，層級越高則女教練越少，其中女性足球教練的存在更猶如沙漠中的花朵。當女性進入運動場域，因固有傳統價值、性別刻板印象等，易產生角色衝突，致使女性教練需要找尋合宜的調適機制。本研究旨了解女性足球教練的角色衝突與調適，分為教練與家庭、教練與性別兩部分。**方法:**以 8 名曾領隊獲全國性賽事冠軍之女性足球教練為對象，運用質性訪談法，半結構式訪談蒐集資料，訪談進行期間為 2022 年 7 月 1 日至 2023 年 4 月 12 日。**結果與討論:**一、教練與家庭角色衝突:因素有生涯發展、性別期待、結婚生子、家人生病、離鄉背井;調適:事先預防、家人支持、配偶協助、暫別教練職位。二、教練與性別角色衝突:來源有球員或家長質疑能力、同儕男教練無視其話語權、被邊緣化、月經污名化;調適:實力證明、隱蔽月經、轉化女性特質為優勢、迴避。三、當產生角色衝突時，女性教練提升認同，接受挑戰且坦承自己的缺失，以持續教練生涯。女性教練產生角色衝突對其不完全為負面的影響，其解決困境過程時亦會獲得成長、更了解自身狀態及困境排除的能力。

**關鍵字:**女性足球教練、角色衝突、調適

主要聯絡者通訊地址:高雄市鳳山區新富路 422 巷 17 號 8 樓

電話:0972115139

傳真號碼: 07-6772215

E-mail:flyingcat68@yahoo.com.tw

# Study of the Role Conflicts and Adaption of Female Football Coaches

Ching-Wen Li

Department of Physical Education, National Taiwan University of Sport, Taiwan

**Introduction:** When it comes to coaching for any sports, people usually have a general idea of males being coaches instead of females. The cause of this phenomenon is the public norms and expectations on gender. For example, football coaches are strongly male-dominated occupation. The percentage of football coaches being female on the higher level of football competition tends to be less. With that being stated, the current women football coaches are the pioneers. When women involve in sport fields, they have more chances to be easily falling into role conflicts, because of gender stereotypes, traditional values and cultures. Thus, female coaches seek approaches to adapt the situation. **Method:** The participants, 8 female football coaches who had lead teams and won the national title, employed in the dual roles of coaching and teaching physical education at schools. By using in-depth interviews and semi-structured interviews which started from Jun. 1, 2022 to Apr. 12, 2023. On the average, each interview was conducted for 60 - 90 min. **Results & Conclusion:** First, Family-Work conflict: these conflicts can be derived from career plans, gender expectations, whether to get married or to have a child, caring for the sick person, move to difference place for better possibilities. Because of the influence of traditional value, a female coach will have a higher chance to get role conflict easily when she has to cope with the stress from job and responsibilities from her family, especially after giving birth to her child. Second, Gender-Work conflict: sources of conflict between work and gender roles such us lack of discursive or discursive power, feel sidelined and excluded from positions of power, menstruation stigma. However, discursive practice in sport, that women coaches are associated with/identified by gender while men coaches are not marked as being gendered. Third, Strategies to accommodation including communication, ignoring problems temporarily, get support from your family, help from their partner, used technologies of the self to prove, hide their menstrual period and removing pluralistic jobs temporarily etc. Female coaches enjoy challenges and admit their defects, so as to continue their coach lives. Role conflicts would be good for female coaches such as self-development, increasing ability and overcoming difficulties.

**Keywords:** female football coaches, role conflict, adaption

# 企業女子壘球聯賽投手配球技術之分析

賴怡璇<sup>1</sup>、趙榮瑞<sup>2</sup>

<sup>1</sup>國立臺灣體育運動大學競技學系 <sup>2</sup>國立臺灣體育運動大學球類系

**目的：**針對企業女子壘球聯賽，投手投球內容配球與控球情況之探討。**方法：**利用電視實況轉播錄影及研究者現場拍攝錄像，透過 TV 及電腦放慢影帶，記錄過程之數據經描述統計，進行量化分析。針對企業女子壘球聯賽福添福嘉南鷹對戰新世紀黃蜂冠軍之戰，柯夏愛投手投球過程為主。**結果與討論：**在冠亞軍賽，全場七局總投球數 100 球中，進行分析：一、投出第一球，依九宮格區域，在 27 打擊個數中，21 個打擊數，第一球為好球，並集中在第五區域及第六區域，即左打外角居多。二、投出好球帶中，以好球優於壞球。好球帶比率集中左打者及右打者較不好攻擊的角度，位置於第四、六區域佔 58%，仍是該投手最大優點。三、在全場投出不同球種 100 球中，以直球 61 次，佔 61% 最多，其次為上飄球，變速球。四、在配球模式中，以外角直球 36 球，佔 36% 最多，其次上飄球、內角球、變速球。**結論：**其投球特質，以外角直球，搭配上飄球為主，在九宮格好球區域以右下角區域為其優勢，另外，好壞球中以好球優於壞球。期待研究結果能提供各級教練，在訓練教學上之借鏡。

**關鍵詞：**企業女子壘球聯賽、配球方式、九宮格區域

**通訊作者：**賴怡璇 E-mail:11004022@gm.ntus.edu.tw 0980788768

404 臺中市北區雙十路一段 16 號

國立臺灣體育運動大學

# Analysis of Pitcher's Pitching Technique in Enterprise Women's Softball League

Lai Yi-hsuan<sup>1</sup>, zhao rongrui<sup>2</sup>

<sup>1</sup>National Taiwan Sports University Department of Athletics

<sup>2</sup>National Taiwan Sports University Ball Department

**Purpose:** To discuss the distribution and possession of pitchers in corporate women's softball leagues. **Method:** Using live TV broadcast video and on-site video taken by researchers, the video tape was slowed down through TV and computer, and the data of the recording process were quantitatively analyzed through descriptive statistics. **Aiming at the corporate women's softball league match between Fujia Fujia Southern Hawks and New Century Hornets, Ke Xiaai focused on the pitching process of the pitcher. Results and Discussion:** In the championship and runner-up match, among the 100 balls pitched in the seven innings of the game, the analysis was carried out: 1. The first ball was thrown, according to the nine-square grid area, among the 27 hits, 21 hits, the first ball For strikes, and concentrated in the fifth area and the sixth area, that is, most of the outside corners are hit from the left. 2. When throwing the strike zone, the strike is better than the strike. The strike zone ratio concentrates on the angles that left hitters and right hitters are not easy to attack, and the position in the fourth and sixth areas accounts for 58%, which is still the biggest advantage of this pitcher. 3. Among the 100 different types of balls thrown in the audience, straight balls were used 61 times, accounting for 61%, followed by floaters and changeups. 4. In the ball distribution mode, 36 balls are straight balls from outside corners, accounting for 36%, followed by float balls, inside corner kicks, and change-up balls. **Conclusion:** Its pitching characteristics are mainly straight balls from the outside corner and top floaters. In the strike area of Jiugongge, the lower right corner area is its advantage. In addition, strike balls are better than bad balls. It is hoped that the research results can provide coaches at all levels with reference to training and teaching.

**Key words:** Corporate Women's Softball League, Ball Distribution Method, Jiugongge Area

**Corresponding Author:** Lai Yi hsuan

**E-mail:** 11004022@gm.ntus.edu.tw 0980788768

**404 National Taiwan Sports University, No. 16, Section 1, Shuangshi Road, North District, Taichung City**

# 台灣男子桌球名將林昀儒2022 WTT新加

## 坡大滿貫賽分析

### 以林昀儒對戰馬龍為例

吳德成<sup>1</sup> 施家淇<sup>2</sup>

<sup>1</sup>國立清華大學體育室 <sup>2</sup>國立清華大學統計學研究所

E-mail: <sup>1</sup>[tcwu@mx.nthu.edu.tw](mailto:tcwu@mx.nthu.edu.tw) <sup>2</sup>[qaz199959@gmail.com](mailto:qaz199959@gmail.com)

**目的：**林昀儒與馬龍皆是近年來桌壇能夠衝擊大賽冠軍的好手。截至新鄉冠軍賽前，雙方一共對決6次，而林昀儒取得2勝4負。若希望能贏得更多的比賽，則林昀儒的主要課題為比賽中技戰術穩定發揮的能力以及在關鍵時刻能具備強大的心理素質。本研究想找出林昀儒此場比賽輸球的原因，探討開局領先次數與該局獲勝的關係，找出決勝局輸球的主要原因和環節。**方法：**2022WTT新加坡大滿貫賽，林昀儒 vs 馬龍，透過 Python 標註工具與 R 語言分析工具，獲取該場比賽的分析結果。**結果與結論：**我們分析該場比賽的比分統計即當局是否存在一些特性，包括兩位選手在每一局中的分別得分（其中，比分為紅字者為當局獲勝的選手）、當局是否為關鍵球局以及當局開局領先的選手是誰，得到以下表格：

	得分		關鍵球局	開局領先
	林昀儒	馬龍		
第一局	11	5		林昀儒
第二局	6	11		馬龍
第三局	4	11		馬龍
第四局	11	9	□	林昀儒
第五局	7	11		馬龍
總計	39	47	1	2:3

林昀儒需要提升開局領先、決勝局取勝及決勝局心理素質抗壓的能力，尤其是在進入相持球之後的環節。再從分析結果中細究，林昀儒開局領先的次數較少，第五局時接發球搶攻的比例從第四局 90% 大幅下降僅剩 70%，由此可推得林昀儒在決勝局時，搶攻的環節受到心理素質上的抗壓能力影響。因此，每一局的技戰術發揮及決勝局的心態相當重要，在關鍵時刻能具備強大的心理素質，穩定發揮技戰術，為在未來重要大賽中戰勝對手奪取獎牌的參考。

**關鍵詞：** R 語言分析工具、決勝局、開局領先

# Video scouting of men's singles table tennis event in 2022 WTT Singapore Smash

## – lessons learned from competition: Lin Yun-Ju vs. Ma Long

Te-Cheng Wu<sup>1</sup>, Chia-Chi Shih<sup>2</sup>

<sup>1</sup> physical Education Office, National Tsing Hua University, Hsinchu, Taiwan

<sup>2</sup> Physical Education Office, National Tsing Hua University, Hsinchu, Taiwan

**Introduction:** Lin Yun-Ju and Ma Long are both top table tennis players. Prior to the 2023 WTT Champions Xinxiang, they have played against each other six times, with Lin Yun-Ju winning two matches and losing four. However, Lin Yun-Ju won their match at the Xinxiang Championships. To win more matches in the future, Lin Yun-Ju needs to improve his ability to execute techniques and tactics consistently and develop strong mental fortitude during critical moments. In the championships, Lin Yun-Ju lost the final game. This study aims to identify the reasons for his loss, examine the relationship between leading at the start of a game and winning, and identify the main factors and moments leading to his defeat in the final game. **Methods:** The 2022 WTT Singapore match between Lin Yun-Ju and Ma Long was analyzed using labeled tools by Python and analysis tools by R. **Results & Conclusions:** We analyzed the score of the match to identify any specific characteristics of each game, including the scores of both players in each game (where the player with the red numbers won the game), whether the game was a deciding game, and which player led at the beginning. The following table shows the results of our analysis:

	Points			
	Yun-Ju	Ma Long	9:9	lead at the beginning
First game	11	5		Yun-Ju
Second game	6	11		Ma Long
Third game	4	11		Ma Long
Fourth game	11	9	□	Yun-Ju
Fifth game	7	11		Ma Long
total	39	47	1	2:3

Lin Yun-Ju needs to improve his ability to take an early lead, win decisive games, and stable his mental composure to defeat Ma Long. He should prepare targeted strategies to perform consistently in critical moments and maintain strong mental fortitude during every game. This will be crucial for him to defeat opponent and win medals in future important tournaments. **Key words:** Analysis tools, decisive game, early lead

# 中國混雙組合孫穎莎、王楚欽技戰術組合 解析—以2021世錦賽四強賽為例

吳德成<sup>1</sup> 陳柏安<sup>2</sup>

<sup>1</sup>國立清華大學體育室 <sup>2</sup>國立清華大學電機研究所

E-mail: <sup>1</sup>tcwu@mx.nthu.edu.tw, <sup>2</sup>steven88524@gmail.com

**目的：**孫穎莎與王楚欽的混雙組合目前世界排名第一，獲得多個WTT大賽冠軍。希望透過解析技戰術組合之勝率，分析該混雙組合的優劣之處。**方法：**透過PYTHON標註工具與分析工具，獲取中國組合孫穎莎、王楚欽與台灣組合林昀儒與鄭怡靜在2021 世界桌球錦標賽四強賽的技戰術分析，歸納孫穎莎、王楚欽為發球方以及接發球方時各技戰術組合的勝率以及使用次數，以解析該組合的優弱勢環節。**結果與結論：**孫穎莎、王楚欽在2021世錦賽四強賽中對陣林昀儒與鄭怡靜以 3:1 擊敗台灣組合，但內容相當接近，雙方實力相當。值得一提的是，孫穎莎與王楚欽組合在這場比賽中相持球部分(板數六板以上)的表現只有贏 10 球輸 15 球，略占下風，代表對於台灣組合而言，進入相持球有機會形成比賽的突破口。相對來說，孫穎莎與王楚欽組合在板數小於五板的時候直接贏球的比例相當高，才能拿下比賽的勝利。本文著重於針對板數小於五板的情況進行解析：當孫穎莎、王楚欽組合為發球方時，利用發球搶拉拿下了四球，勝率為 100%。若是第三板使用擺短、反拉等較為被動的技術回球，勝率僅有 20%。而作為接發球方時，孫穎莎與王楚欽組合戰術積極，有19球在接發球回擊後直接結束，並且有著 63%的勝率，在接發球方面正有明顯的優勢。其中，孫穎莎最常使用的接發球技術為擺短，使用了7次，並且勝率高達86%。而王楚欽則以擰球技術為擅長，使用7次擰球作為接發球技術，同樣勝率為86%。孫穎莎與王楚欽組合戰術積極，並且主動攻擊情況下的勝率相當高。因此，林鄭組合若想要突破，需著重接發球回擊質量，主動進行攻擊。當林鄭組合作為發球方時，則需提防孫穎莎的擺短控制以及王楚欽的擰球回擊，才有取勝的機會。

**關鍵詞：**標註工具、分析工具、PYTHON、發球搶攻、桌球混雙



# ANALYSIS OF THE TACTICS USED BY THE CHINESE MIXED DOUBLES PAIRING OF SUN YINGSHA AND WANG CHUQIN AGAINST TAIWANESE TABLE TENNIS STARS LIN YUN-JU AND CHENG I-CHING AT THE 2021 WORLD TABLE TENNIS CHAMPIONSHIPS

Te-Cheng Wu<sup>1</sup>, Po-An Chen<sup>2</sup>

<sup>1</sup>Physical Education Office, National Tsing Hua University, Hsinchu, Taiwan

<sup>2</sup> Department of Electrical Engineering, National Tsing Hua University, Hsinchu, Taiwan

**Introduction:** The mixed doubles pairing of Sun Yingsha and Wang Chuqin, currently ranked number one in the world, has won multiple WTT major titles. This analysis aims to examine the strengths and weaknesses of this pairing by analyzing their winning rates against the tactics used by Taiwanese pairing Lin Yun-ju and Cheng I-ching at the 2021 World Table Tennis Championships. **Method:** The analysis was conducted using Python annotation and analysis tools to gather data on the tactics employed by both pairings in the semi-finals match, including the serving and receiving strategies used by Sun Yingsha and Wang Chuqin and their opponents. This data was used to compare the winning rates and frequency of tactics used by both pairs, allowing us to identify the strengths and weaknesses of the Chinese mixed doubles pairing. **Results and Conclusion:** In the semi-finals of the 2021 World Table Tennis Championships, Sun and Wang defeated the Taiwanese pairing of Lin Yun-ju and Cheng I-ching 3-1 in a closely contested match. It is worth noting that Sun and Wang were slightly at a disadvantage in the part of the game where both sides were using more than six shots per rally, winning only 10 points while losing 15 points., the Taiwanese pairing had opportunities to break through during those moments. On the other hand, Sun and Wang's win-loss record in exchanges of less than five is relatively high, and this is key to their victories. This article focuses on analyzing the situation where there are less than five exchanges. When Sun and Wang are serving, they have a 100% win rate when they use serve-and-attack tactics to win four points. If they use passive techniques like drop shots and blocks for the third ball, their win rate drops to only 20%. As receivers, Sun and Wang adopt aggressive tactics and have a clear advantage in receiving, with 19 points directly won after receiving, and a 63% win rate. Sun often uses the drop shot technique and has a high win rate of 86% in seven attempts, while Wang excels at using the twist return, with a win rate of 86% in seven attempts as well. Based on the above

analysis, the combination of Sun Yingsha and Wang Chuqin is aggressive in tactics and has a high winning rate when taking the initiative to attack. Therefore, if Lin and Cheng want to break through, they need to focus on the quality of their return when receiving serves and take the initiative to attack. When Lin and Cheng are the serving side, they need to be wary of Sun's short control and Wang's twist return to have a chance of winning.

**Key words: Annotation tools, analysis tools, Python, serve-and-attack, and table tennis mixed doubles**

# 國外優秀男子鉛球選手旋轉投擲 技術之研究

林根<sup>1</sup> 陳諺霆<sup>1</sup> 張銘煌<sup>1</sup> 趙榮瑞<sup>2</sup>

<sup>1</sup>國立臺灣體育運動大學競技運動學系 <sup>2</sup>國立臺灣體育運動大學球類運動學系

田徑鉛球選手國外許多研究對於旋轉推鉛球技術的優勢，並認為旋轉推鉛球技術是有助於運動成績的提升。但是在國內使用此技術的選手較少，對技術的認知和訓練處於起步階段。**目的：**本文主要針對影響投擲距離的主要運動學參數進行相關分析，以提高對旋轉推鉛球技術的認知與存在的技術差異。**對象：**以2017年倫敦世界田徑錦標賽、2018年世界室內田徑錦標賽各獲得前八名之選手刪除一位非旋轉選手，共15名男子鉛球選手，使用旋轉推鉛球技術，進行資料研究。**方法：**透過世界田聯發表的官方資料以及相關比賽影片和數據展開具體的研究，並採用文獻資料整理進行分析探討。將整個技術動作過程分為5個時間及4個階段，分別是右腳離地時間、首先支撐階段、左腳離地時間、騰空階段、右腳落地時間、其次支撐階段、左腳落地時間、最後用力階段、出手時間。對國外15名優秀男子鉛球選手使用旋轉推鉛球技術的時間、空間、速度運動學參數進行皮爾森相關分析，分析對投擲距離的影響。**結果：**國外選手在支撐階段增加肩髖扭緊程度，且在最後用力動作技術階段能夠保持較大的扭緊身體姿勢，為最後的用力儲存能量。旋轉推鉛球技術應降低左腳離地時間、右腳落地時間、左腳離地時間鉛球垂直高度，有助於鉛球各個時刻速度的增加，並獲得較大出手角度，增加投擲的距離。國內目前對於旋轉推鉛球技術的認知與運用處於起步階段，需要結合選手的身體特點及影響旋轉技術的核心能力做專業性的訓練。

**關鍵字：**鉛球、投擲技術、旋轉。

**通訊作者：**林根，[ken082508250825@gmail.com](mailto:ken082508250825@gmail.com), 0916-801-395

# A Study on the Rotational Throwing Technique of Outstanding Male Shot Put Athletes Abroad

Ken Lin<sup>1</sup> Yen-Ting Chen<sup>1</sup> Chang Ming-Huang<sup>1</sup> Jung-jui Chao<sup>2</sup>

<sup>1</sup>Department of Athletic Kinesiology, National Taiwan Sports University

<sup>2</sup>Department of Ball Kinematics, National Taiwan Sports University

Many studies abroad have shown the advantages of the rotational shot put technique for track and field athletes, and it is believed that this technique can improve athletic performance. However, few athletes in China currently use this technique, and their understanding and training of this technique are still in the initial stages. **Purpose:** This paper mainly conducts a correlation analysis on the main kinematic parameters that affect the throwing distance to improve the understanding and existing technical differences of the rotational shot put technique. **object:** Fifteen outstanding male shot put athletes who use the rotational shot put technique were studied by removing one non-rotational athlete from the top eight at the 2017 London World Athletics Championships and 2018 World Indoor Athletics Championships. **Method:** We conducted a specific study by analyzing official data from the International Association of Athletics Federations (IAAF), as well as related competition videos and data, and using literature to organize the data for analysis. The entire technical motion process was divided into five times and four stages, namely, right foot off-ground time, first support phase, left foot off-ground time, flight phase, right foot landing time, second support phase, left foot landing time, final power phase, and release time. Pearson correlation analysis was conducted on the temporal, spatial, and speed kinematic parameters of the rotational shot put technique used by 15 outstanding male shot put athletes, and their effects on throwing distance were analyzed. **result:** Foreign athletes increase the degree of shoulder and hip rotation during the support phase and are able to maintain a tighter body position with greater rotation during the final forceful action phase, thereby storing energy for the final effort. The rotational shot put technique should reduce the left foot off-ground time, right foot landing time, and vertical height of the shot put at the moment of left foot off-ground, which helps increase the speed of the shot put at various moments and obtain a larger release angle, thereby increasing the throwing distance. Currently, the recognition and application of rotational shot put technique in China are still in the initial stage, and specialized training based on the athletes' physical characteristics and core abilities that affect the rotational technique is needed.

**Keywords: Shot put, throwing technique, rotation.**

**Corresponding Author: Ken Lin, [ken082508250825@gmail.com](mailto:ken082508250825@gmail.com), 0916-801-395**

# 2020東京奧運鐵人三項男子組跑步 項目之配速分析

劉哲宇<sup>1</sup>、趙榮瑞<sup>2</sup>

<sup>1</sup>國立臺灣體育運動大學競技系 <sup>2</sup>國立臺灣體育運動大學球類系

**目的：**主要針對 2020 東京奧運會鐵人三項之跑步項目分段配速之探討。**對象：**以本屆東京奧運會鐵人三項男子組前 10 名選手為主。**方法：**透過東京奧運會官方網站，所提供之統計資料及鐵人三項實況轉播錄影帶，透過電腦及 TV，以慢動作讀取，並採取雙項數據的數值，進行研究分析。

**結果與結論：**比賽中自自行車轉換至跑步項目，第一圈的分段平均時間為 7 分 07 秒，最快為 6 分 59 秒，最慢為 7 分 17 秒。最後一圈平均分段時間為 7 分 53 秒，最快為 7 分 26 秒，最慢為 8 分 10 秒。另外跑步項目全程時間，平均為 30 分 238 秒。最快為 29 分 34 秒，最慢為 30 分 38 秒。**結論：**參賽選手實力相當、競爭激烈，成績差距不大，但跑步項目明顯自第三圈至第四圈逐漸拉開。

**關鍵詞：**東京奧運、鐵人三項、跑步、配速分析

**通訊作者：**劉哲宇 E-mail:10804018@gm.ntus.edu.tw 0958314398

404 臺中市北區雙十路一段 16 號 國立臺灣體育運動大學

# Pace Analysis of 2020 Tokyo Olympic Triathlon Men's Running Events

LIU CHE-YU<sup>1</sup>, Zhao rongrui<sup>2</sup>

<sup>1</sup>National Taiwan Sports University Department of Athletics

<sup>2</sup>National Taiwan Sports University Ball Department

**Purpose:** This study aimed to explore the segmented running pace of the men's triathlon event at the 2020 Tokyo Olympics. **Objects:** The top 10 male triathletes of this Olympic event were selected for the analysis. **Method:** Statistical data provided by the official website of the Tokyo Olympics and the live broadcast recordings of the triathlon event were used for the analysis. The data was collected through slow-motion playback on both computer and TV, and dual data values were used for research analysis. **Results and Conclusion:** During the transition from cycling to running in the race, the average segmented time for the first lap was 7 minutes and 7 seconds, with the fastest being 6 minutes and 59 seconds and the slowest being 7 minutes and 17 seconds. For the final lap, the average segmented time was 7 minutes and 53 seconds, with the fastest being 7 minutes and 26 seconds and the slowest being 8 minutes and 10 seconds. Additionally, the overall running time had an average of 30 minutes and 238 seconds, with the fastest being 29 minutes and 34 seconds and the slowest being 30 minutes and 38 seconds. **In conclusion :** The participants demonstrated similar abilities and intense competition, with minimal differences in their results, but the running event exhibited an obvious widening gap between the third and fourth laps.

**Key words:** Tokyo Olympics, Triathlon, Running, Pace Analysis

**Corresponding Author :** LIU CHE-YU

**E-mail:** 10804018@gm.ntus.edu.tw 0958314398

**404 National Taiwan Sports University, No. 16, Section 1, Shuangshi Road, North District, Taichung City**

# 2023土耳其安塔利亞大滿貫女子柔道+ 78kg級比賽得分技術之分析

張齡方<sup>1</sup>、趙榮瑞<sup>2</sup>

<sup>1</sup> 國立台灣體育運動大學競技運動學系、<sup>2</sup> 國立台灣體育運動大學球類運動學系

**摘要：**本研究目的針對 2023 土耳其安塔利亞大滿貫女子柔道+78kg 比賽過程得分技術之分析。並自得分時間、方式、技術動作等進行探討分析。**方法：**利用參與比賽之機會，將整個比賽過程之內容拍攝轉錄成光碟，採用 TV 及電腦將攝（錄）影帶，經觀察讀取統計量化分析。對象以本屆 2023 土耳其安塔利亞大滿貫女子柔道+78kg 級比賽，共有七場比賽(含決賽、準決賽、銅牌戰及 5、7 名排名等)，10 人為主。**結果顯示：**一.本屆七場比賽中有效得分共 12 次，其中都以前兩分鐘決定勝負。二.得分動作以使用次數共 37 次，有效得分次數則為 10 次。其中使用成功率以反摔 3 次，得分佔 66.7% 最多，其次為掃腰、壓制、過肩摔等，而壓制、大外割與大腰等都為 0 次。三.技術種類使用情況 共 42 次，成功次數為 11，其成功率為，捨身技 66.7%，佔最多，其他分別為 寢技>腰技>手技>足技，最少為其他技術，但在使用率上;則以足技 28.6% 最多，其次為手技>腰技>關節技等。柔道大滿貫比賽乃是世界級高水準之比賽，實戰狀況相當激烈、實力差距不大、輸贏仍在為薄之間。

**關鍵字：**土耳其安塔利亞大滿貫、女子柔道，+78kg 級。

**通訊作者：**張齡方， [linfun0519@gmail.com](mailto:linfun0519@gmail.com)



# **Analysis of scoring techniques in the women's +78kg category of the 2023 Antalya Grand Slam Judo competition**

**Chang Lingfang<sup>1</sup> Jung-ji Chao<sup>2</sup>**

<sup>1</sup>Department of Athletic Kinesiology, National Taiwan Sports University

<sup>2</sup>Department of Ball Kinematics, National Taiwan Sports University

**Summary:** The purpose of this study is to analyze the scoring techniques in the women's +78kg category of the 2023 Antalya Grand Slam Judo competition. The study will explore and analyze the scoring time, method, and technical movements used during the competition. **Methods:** The content of the entire competition process was recorded on a CD using TV and computers during the competition. The recorded video was observed, read, and analyzed through statistical quantification. The study focused on the women's +78kg category of the 2023 Antalya Grand Slam Judo competition, which included seven matches (including the finals, semi-finals, bronze medal matches, and rankings for fifth and seventh places), with a total of ten participants. **Results showed:** 1. There were a total of 12 effective scores in the seven matches of this competition, with the outcome decided within the first two minutes of the match. 2. There were 37 scoring movements attempted, with 10 resulting in effective scores. The most successful scoring technique was the counter throw, with a success rate of 66.7%, followed by the hip throw, hold down, and shoulder throw, while the leg sweep, outer leg throw, and major inner reap were not successful in scoring. 3. There were a total of 42 different types of techniques attempted, with 11 resulting in successful scores. Sacrifice techniques had the highest success rate of 66.7%, followed by ground techniques, hip techniques, hand techniques, and foot techniques, with "other" techniques having the lowest success rate. However, in terms of usage rate, foot techniques were used the most at 28.6%, followed by hand techniques, hip techniques, and joint techniques. The Grand Slam Judo competition is a world-class event with a high level of competitiveness, intense real-life situations, and a narrow margin of victory.

**Keywords:** Antalya Grand Slam, women's judo, +78kg category. **Corresponding Author:** Chang Lingfang, [linfun0519@gmail.com](mailto:linfun0519@gmail.com), 0976-005-429

# 中華台北女子足球國家隊在世界盃洲際附加賽12碼驟死賽的表現分析

<sup>1</sup> 李彥廷 <sup>2</sup> 孟峻瑋

<sup>12</sup> 國立臺灣體育運動大學體育在職研究所

**目的:**中華台北女子足球隊在 2022-23 年歷經亞洲盃、世界盃洲際附加賽爭奪世界盃 32 強會內賽的門票，中華隊在 1991 年參加第一屆世界盃後，睽違 32 年再度接近世界盃舞台，兩場關鍵性比賽，皆在正規時間加延長賽踢平後的 12 碼驟死賽失利，12 碼驟死賽的開始前，總教練在安排戰術與選手佈局下的影響。**方法:**本研究採用訪談研究法，針對參與比賽並上場主踢的國家隊選手，探討女子國家隊罰點球與教練戰術安排上的影響。**結果與結論:**歷經兩位不同總教練的國家隊選手，對於教練當下給予的戰術思維與 12 碼罰點球發展無知覺差異，不過對於心理建設上面表達有實質上的需求。

**關鍵詞:** 12 碼罰點球、世界盃洲際附加賽、中華台北、總教練

# **An Analysis of Penalty Shootout of Chinese Taipei Women Football Team in World Cup Qualification**

**Purpose:** Chinese Taipei women national football team tried to secure a spot for 2023 World Cup through Asian Cup and Play-off Tournament. They could have qualified for the World Cup since 1991, had not been lost successively on penalty shootouts to both to the Philippines and Paraguay. The authors intended to explore the influence of coaches on the strategy and arrangement of penalty kick. **Method:** The research conducted in-depth interviews with national team members concerning the impact of national team coaches on penalty shootouts. **Results and Conclusion:** There is no perceptible differences on two coaches who gave tactical decision at the time, but confidence-building is needed at the given moment.

**Keywords:** Penalty shootout, World Cup Play-off Tournament, Chinese Taipei, Head coach

**Correspondence:** Professor Junwei Yu, [jwyu@ntus.edu.tw](mailto:jwyu@ntus.edu.tw)

# 2023企業女子甲級排球聯賽賽後之 得分技術分析

鄭凱鴻<sup>1</sup>、趙榮瑞<sup>2</sup>

<sup>1</sup> 國立臺灣體育運動大學競技運動學系、<sup>2</sup> 國立臺灣體育運動大學球類運動學系

## 摘要

**研究目的：**本研究針對 2023 企業女子甲級排球聯賽季後賽、挑戰賽、總決賽中，攻擊、攔網、發球及對手失誤等得分技術之分析。**研究對象：**以 2023 參加企業排球聯賽女子組之五支隊伍，高雄台電、新北中纖、極速超跑、臺北鯨華、愛山林為主。共七場比賽為主。**研究方法：**透過中華民國排球協會企業聯賽官方網站之資料取得。再配合七場比賽影帶錄製，經慢動作讀取之資料，兩者對照分析，作為最後的研究數據進行分析。**研究結果：**一、在攻擊得分顯示，以臺北鯨華 39.7% 佔最多，其次分別為極速超跑 37.2%、新北中纖 36.3%、高雄台電 34.5%，最少為愛山林 24.7%。二、在攔網得分顯示，以愛山林 12.1% > 臺北鯨華 10.5% > 高雄台電 10.4% > 極速超跑 9.8% > 新北中纖 5.7%。三、在發球得分顯示，以愛山林 9.6% > 新北中纖 7.3% > 極速超跑 6.5% > 高雄台電 4.1% > 臺北鯨華 3.4%。四、在對手失誤則以愛山林 47.1% > 新北中纖 39% > 極速超跑 31.8% > 高雄台電 28.6% > 臺北鯨華 23.4%。攻擊及攔網得分，則以臺北鯨華為五隊之冠，其次高雄台電。另外，愛山林在攻擊得分少，雖然攔網、發球得分有比其他四隊略為高一些，但是綜合整體得分技術還是五隊中較為劣勢之隊伍。

**關鍵詞：**攻擊、攔網、發球、失誤

**通訊作者：**鄭凱鴻，kaihung15@gmail.com，0933545160

地址：404 臺中市北區雙十路二段 16 號

# **Analysis of Scoring Techniques in the Women's A-League Volleyball Matches of 2023**

**Kai-Hung Cheng<sup>1</sup> and Rong-Ruey Zhao<sup>2</sup>**

<sup>1</sup> Department of Athletic Performance, National Taiwan Sport University

<sup>2</sup> Department of Ball Sports, National Taiwan Sport University

## **Abstract**

**Purpose:** This study aims to analyze the scoring techniques of attack, block, serve, and opponent errors in the playoffs, challenge matches, and finals of the 2023 Women's A-League Volleyball tournament for corporate teams. **Subjects:** The study focuses on five teams in the 2023 corporate volleyball league women's division, including Kaohsiung Power Company, New Taipei China Fiber, Extreme Speed Racing, Taipei Whale Flower, and Aishanlin. A total of seven games were analyzed. **Methods:** Data were obtained from the official website of the Chinese Taipei Volleyball Association Corporate League, and were combined with video recordings of the seven matches. The data were analyzed through comparison and slow-motion analysis to obtain the final research data. **Results:** 1. In terms of attack scoring, Taipei Whale Flower had the highest percentage at 39.7%, followed by Extreme Speed Racing at 37.2%, New Taipei China Fiber at 36.3%, Kaohsiung Power Company at 34.5%, and Aishanlin with the lowest percentage at 24.7%. 2. In terms of block scoring, Aishanlin had the highest percentage at 12.1%, followed by Taipei Whale Flower at 10.5%, Kaohsiung Power Company at 10.4%, Extreme Speed Racing at 9.8%, and New Taipei China Fiber with the lowest percentage at 5.7%. 3. In terms of serve scoring, Aishanlin had the highest percentage at 9.6%, followed by New Taipei China Fiber at 7.3%, Extreme Speed Racing at 6.5%, Kaohsiung Power Company at 4.1%, and Taipei Whale Flower with the lowest percentage at 3.4%. 4. In terms of opponent errors, Aishanlin had the highest percentage at 47.1%, followed by New Taipei China Fiber at 39%, Extreme Speed Racing at 31.8%, Kaohsiung Power Company at 28.6%, and Taipei Whale Flower with the lowest percentage at 23.4%. In terms of attack and block scoring, Taipei Whale Flower was the highest among the five teams, followed by Kaohsiung Power Company. Aishanlin had lower attack scoring, but had slightly higher block and serve scores than the other four teams. However, their overall scoring technique was still inferior compared to the other teams.

**Keywords:** Attack, Block, Serve, Error

**Corresponding author:** Kai-Hung Cheng, kaihung15@gmail.com, +886-933545160

**Address:** No.16, Sec. 2, Shuangshi Rd., North Dist., Taichung City 404, Taiwan

**(R.O.C.)**

# 不同網球教學法與課程密度對大專學生

## 初學者之成效研究

謝武進<sup>1</sup> 謝旻修<sup>3\*</sup> 梁隨燕<sup>2</sup> 梁美美<sup>1</sup>

<sup>1</sup> 僑光科技大學通識教育中心 <sup>2</sup> 國立勤益科技大學體育室 <sup>3\*</sup> 國立彰化師範大學教育研究所博

士生

**目的:**本研究在探討不同網球教學法與課程密度對大專學生初學者之成效影響。**方法:**本研究以未參加過網球學習課程的中部大專學生為受試對象，經學生同意自願參加。本研究採用實驗設計，經 14 週網球教學，以不同教學法（一般教學法及媒體輔助教學法）與不同課程密度（分散式教學法及密集式教學法）將受試者分為分散式一般教學法、分散式媒體輔助教學法、密集式一般教學法及密集式媒體輔助教學法四組教學組別，所得的資料以描述性統計與單因子變異數分析法處理。**結果:**大專學生經 14 週網球教學後：(一)不同教學法在正手擊球、反手擊球、發球、截擊及高壓球等項之學習成績均具有顯著性差異。可獲得一般教學法對於提昇大專學生網球能力的成效較媒體輔助教學法更有成效。(二)不同課程密度在反手擊球與高壓球成績未達到顯著水準；不同課程密度在正拍擊球、發球與截擊成績都具有顯著差異。可獲得密集式教學法對於提昇大專學生網球能力的成效較分散式教學法更有成效。(三)不同教學組別在正手擊球、反手擊球、發球、截擊及高壓球等項成績都具有顯著差異。可獲得密集式一般教學法對於提昇大專學生網球能力的成效，較其他三組教學法更有成效。**結論:**大專學生學習網球的成效，以一般教學法較優於媒體輔助教學法，而密集式教學法較優於分散式教學法。

**關鍵詞:** 網球教學法、課程密度、初學者

**通訊作者:** 謝旻修， [chin07@ocu.edu.tw](mailto:chin07@ocu.edu.tw)， 0933406237

# A Study on Different Tennis Teaching Methods and Lesson Densities of College Student Beginner's effective

Wu-Chin Hsieh<sup>1</sup> Min-Hsiu Hsieh<sup>3\*</sup> Sui-Yen Liang<sup>2</sup> Mei-Mei Liang<sup>1</sup>

<sup>1</sup>General Education Center, Overseas Chinese University.

<sup>2</sup>Office of Physical Education, Nation Chin-Yi University of Technology.

<sup>3</sup>PhD student, Graduate Institute of Education, National Changhua University of Education

## Abstract

**Purpose** : The study was to discuss the effects of different tennis teaching methods and lesson densities on COLLEGE STUDENT beginner. **Methods** : The participants are volunteers from the CENTRAL COLLEGE STUDENTS. The study was conducted by experimental methodology; the tennis teaching program was once a week for 14 weeks. The participants were divided into four groups taught in distributed general method, distributed media-assisted method, intensive general method and intensive media-assisted method by different teaching methods including the general teaching method and the media-assisted teaching method and lesson densities including the distributed teaching method and the intensive teaching method. Data were analyzed by descriptive analysis and One-way ANOVA analysis. **Results** : After the 14 weeks tennis teaching, 1. Participant performance on FORE HAND, BACK HAND, service, volley and overhead e.g., showed that different teaching methods had significant influence. The general teaching method was more effective than media-assisted teaching method in boosting COLLEGE STUDENT tennis ability. 2. Lesson densities did not show significant differences in BACK HAND, overhead performance. Lesson densities showed significant differences on FORE HAND, service, volley, while the intensive teaching method was more effective than distributed teaching method in boosting COLLEGE STUDENT tennis ability. 3. Different teaching groups showed significant differences on FORE HAND, BACK HAND, service, volley and overhead e.g., while intensive general teaching method was more effective than the other three teaching methods in boosting COLLEGE STUDENT tennis ability. **Conclusion** : The general teaching method was more effective than the media-assisted teaching method. The intensive method was more effective than the distributed teaching method on COLLEGE STUDENT tennis beginner's ability.

**Keyword** : Tennis Teaching Methods 、 Lesson Densities 、 Beginner's

**Correspondence** : PhD student Min-Hsiu Hsieh , chin07@ocu.edu.tw ,



**0933406237**

# 高爾夫選手運動傷害之探討

陳文政<sup>1</sup>、趙榮瑞<sup>2</sup>

<sup>1</sup>國立臺灣體育運動大學競技運動學系、<sup>2</sup>國立臺灣體育運動大學球類運動學系

**研究目的:**一、本研究主要探討高爾夫職業與業餘高爾夫選手之運動傷害相關及比較。**對象:**取自國立台灣體育運動大學高爾夫專長學生 8 位職業選手及 18 位業餘選手，共 26 位為主。**方法:**透過問券調查蒐集，高爾夫選手之頸部、腰部、肩部、手肘、手腕、膝蓋、腳踝等相關運動傷害，經描述性統計分析。**結果:**一、針對高爾夫職業選手運動傷害之探討：在脖子、膝蓋、手肘外側、腳踝處受傷比率各為 9%，肩膀及腰部各佔總受傷的 18%，而手腕受傷程度為所有受傷比率中最高，為 28%。二、針對高爾夫業餘選手運動傷害之探討：在肩膀、手肘外側分別各為 15%，腰部則為 31%，而手肘內側受傷比率為最高，佔總受傷率為 31%。三、職業及業餘高爾夫選手運動傷害之比較：以職業選手而言，大部分受傷部位，前三名為手腕、腰部和肩膀，而業餘選手以手肘內側、腰部居多。而職業選手手肘內側不適的狀況較少見，反而在業餘選手身上較常見。**結論:**本文在探討運動傷害比例上，職業及業餘選手之運動傷害風險不一。職業選手本身需要多注意手腕、肩膀、腰部的受傷風險，而業餘選手則更需要注意手肘內側及腰部；高爾夫是一項需要活動、精準度及身體協調性等的運動項目，因此在高爾夫的訓練下應該做好熱身活動、技術指導及控制打球的值與量，已降低運動傷害的發生。

**關鍵字:**高爾夫、運動傷害、受傷風險

**通訊作者:**陳文政，Email:qwertasddas2@gmail.com，0979501911

地址:404 臺中市北區雙十路二段 16 號

# Exploration of Sports Injuries in Golfers

Chen Wun-Jheng<sup>1</sup>, Zhao Rong-Rui<sup>2</sup>

<sup>1</sup>Department of Athletics, National Taiwan Sport University, Taoyuan City, Taiwan

<sup>2</sup>Department of Ball Games, National Taiwan Sport University, Taoyuan City, Taiwan

**Objective:** The main purpose of this study is to explore and compare the sports injuries of professional and amateur golfers. Participants: A total of 26 participants were recruited from National Taiwan Sport University, including eight professional golfers and 18 amateur golfers with a specialization in golf.

**Methods:** The data was collected through a questionnaire survey to investigate the occurrence of golf-related injuries, such as injuries to the neck, waist, shoulders, elbows, wrists, knees, and ankles, and analyzed using descriptive statistics.

**Results:** In regards to sports injuries among professional golfers, the injury rates were 9% for the neck, knees, lateral elbow, and ankle, while the shoulder and waist accounted for 18% of the total injuries, and the wrist had the highest injury rate of all, at 28%. In regards to sports injuries among amateur golfers, the injury rates were 15% for the shoulder and lateral elbow, and 31% for the waist, while the inner elbow had the highest injury rate, accounting for 31% of the total injuries. Comparison of sports injuries between professional and amateur golfers: Among professional golfers, the top three injured body parts were the wrist, waist, and shoulder, while amateur golfers had more injuries to the inner elbow and waist. Inner elbow discomfort was less common among professional golfers and more common among amateur golfers. **Conclusion:** In exploring the proportion of sports injuries, the risks of sports injuries for professional and amateur golfers were different. Professional golfers need to pay more attention to the risk of injuries to the wrist, shoulder, and waist, while amateur golfers should be more cautious about the inner elbow and waist. Golf is a sport that requires physical activity, precision, and coordination. Therefore, golfers should do warm-up exercises, receive technical guidance, and control the frequency and intensity of playing to reduce the occurrence of sports injuries.

**Keywords:** Golf, sports injuries, risk of injury

Corresponding Author: Wun-Jheng Chen, Email: qwertasddas2@gmail.com, Phone: 0979501911 Address: No.16, Sec. 2, Shuangshi Rd., Beitun Dist., Taichung City 404, Taiwan (R.O.C.)

# 2021東京奧運會桌球女子單打金牌戰

## 三段技術得、失分之探討

游舒丞<sup>1</sup>、趙榮瑞<sup>1</sup>

國立台灣體育運動大學競技運動學院研究所<sup>1</sup>

**目的:**針對 2021 東京奧運會桌球女子單打冠亞軍賽三段技術,即比賽中發球搶攻(一、三板)、接發球搶攻(二、四板)、相持球(五板後)得、失分之分析探討。**方法:**本研究使用觀察法,以 2021 年東京奧運女子單打冠亞軍賽選手陳夢、孫穎莎為研究對象,並取自國際桌球總會網站之影帶,經由個人慢動作讀取及記錄數據值,再將兩者比賽之數據對照以取得正確資料,透過描述性統計及分析結果。**結果:**(一)三段技術得分之分析:整場比賽得分數據資料顯示,陳夢整場總得分為 58 分佔 56.3%,孫穎莎總得分為 45 分佔 43.7%,各項技術得分數中,發球搶攻階段,陳夢以 16 次優於孫穎莎 9 次,接發球搶攻階段,陳夢為 14 次優於孫穎莎 12 次,相持階段方面,陳夢以 28 次多於對方 24 次,整體而言陳夢選手各項技術表現均優於孫穎莎選手。(二)三段技術失分之分析:整場比賽失分數據資料顯示,陳夢整場總失分為 45 分,佔 43.7%,孫穎莎總失分為 58 分佔 56.3%,其中發球搶攻階段失誤數,陳夢為 8 次,孫穎莎為 7 次,接發球搶攻階段陳夢以 9 次低於孫穎莎 16 次,相持段失誤數陳夢以 28 次低於孫穎莎 35 次。**結論:**依以上數據顯示兩位世界頂尖女子桌球選手在三段技術分析中,無論得分或失分,以相持球階段所佔的比率最高,可得知相持球技術穩定度的提升為取得比賽優勢之關鍵。

**關鍵詞:**奧運會、桌球、女子單打選手、三段技術分析

# Analysis of the Three Techniques of Scoring and Losing Points in the Women's Singles Gold Medal Match of Table Tennis at the 2021 Tokyo Olympics

Shu-Cheng You<sup>1</sup>, Rong-Rui Zhao<sup>1</sup>

<sup>1</sup>Graduate Institute of Competitive Sports, National Taiwan Sport University, Taiwan

**Purpose:** This study aimed to analyze the scoring and losing points of the three techniques in the women's singles gold medal match of table tennis at the 2021 Tokyo Olympics, including serve and attack (first and third board), receive and attack (second and fourth board), and prolonged rallies (fifth board and beyond).

**Methods:** The study used observation methods, with Chen Meng and Sun Yingsha as the research subjects, and their match video was obtained from the International Table Tennis Federation website. Personal slow-motion reading and data recording were performed, and the data of the two players were compared to obtain accurate information. Descriptive statistics and analysis were then conducted.

## **Results:**

### (1) Analysis of the scoring of the three techniques

The scoring data of the entire match showed that Chen Meng scored a total of 58 points, accounting for 56.3%, and Sun Yingsha scored 45 points, accounting for 43.7%. In terms of scoring, Chen Meng had 16 serve and attack points, which was better than Sun Yingsha's 9 points. In the receive and attack stage, Chen Meng had 14 points, which was better than Sun Yingsha's 12 points. In the prolonged rallies stage, Chen Meng had 28 points, which was more than Sun Yingsha's 24 points. Overall, Chen Meng's performance in various techniques was better than Sun Yingsha's.

### (2) Analysis of the losing points of the three techniques

The data of the entire match showed that Chen Meng lost a total of 45 points, accounting for 43.7%, and Sun Yingsha lost 58 points, accounting for 56.3%. In terms of losing points, Chen Meng made 8 mistakes in the serve and attack stage, while Sun Yingsha made 7 mistakes. In the receive and attack stage, Chen Meng had 9 mistakes, which was less than Sun Yingsha's 16 mistakes. In the prolonged rallies stage, Chen Meng made 28 mistakes, which was less than Sun Yingsha's 35 mistakes.

**Conclusion:** Based on the above data, it can be seen that in the three techniques analysis of the two world-class women's table tennis players, the ratio of prolonged rallies played a key role in determining the game advantage, regardless of the scoring or losing points. The stability improvement of prolonged rallies technique is the key to achieving an advantage in the match.

**Keywords: Olympics, table tennis, women's singles player, three technique analysis.**

# 2023 年世界羽球錦標賽女子雙打之技術能力分析

黃柏睿<sup>1</sup> 黃棕瀚<sup>2</sup> 黃明祥<sup>3</sup> 林勁宏<sup>4</sup>

<sup>1</sup>國立臺灣體育運動大學競技運動學系碩士班 <sup>2</sup>亞洲大學體育室 <sup>3</sup>國立臺灣體育運動大學球類運動學系

<sup>4</sup>元智大學體育室

**目的：**台灣近幾年來在國際上的羽球運動戰績耀眼，但國內女子雙打項目卻無法與國際的水準相齊，因此本研究目的在於分析世界級羽球女子雙打之技術能力，提供選手與教練在訓練與比賽時的參考。**方法：**以 2023 年世界羽球錦標賽女子雙打項目，最後半準決賽與決賽共三場之比賽為分析依據，分析比較每局勝敗兩方使用之擊球技術、發球落點與相關比賽結構之資訊。**結果與結論：**羽球女子雙打每局平均來回拍數  $558.3 \pm 55.2$  次，每分平均來回拍數  $14.6 \pm 1.5$  次。在發球方面，勝方使用發前場球次數明顯多於敗方 ( $18.9 \pm 1.5$  vs  $13.3 \pm 2.0$  次,  $p < .05$ )，且落點也明顯集中於近網中線區域 ( $16.6 \pm 3.0$  vs  $11.7 \pm 2.1$  次,  $p < .05$ )。在使用擊球技術方面，勝方使用撲球與切球之次數多於敗方 ( $11.0 \pm 4.2$  vs  $6.3 \pm 3.4$ ;  $25.7 \pm 15.3$  vs  $8.0 \pm 5.6$  次,  $p < .05$ )；相反的勝方使用對角勾球、接殺平推及挑球技術之次數少於敗方 ( $29.0 \pm 6.7$  vs  $52.9 \pm 17.5$ ;  $17.1 \pm 5.6$  vs  $24.0 \pm 5.7$ ;  $15.0 \pm 4.0$  vs  $21.0 \pm 3.2$  次,  $p < .05$ )。本研究初步主要發現女子雙打比賽中，獲勝方無明顯使用更多的後場攻擊技術，有可能運用其他技術與策略，製造前場撲球機會，贏得賽場上更多優勢。

**關鍵詞：**前場發球、撲球、切球、對角勾球、接殺平推、挑球

**通訊作者：**林勁宏，lch0325@saturn.yzu.edu.tw, +886-3-4638800 ext 2348

# Analysis Of Technical Abilities In Women's Doubles At The 2023 World Badminton Championships

Po-Jui Huang<sup>1</sup>, Tsung-Han Huang<sup>2</sup>, Ming-Shaing Huang<sup>3</sup>, Ching-Hung Lin<sup>4</sup>

<sup>1</sup>Master Program, Department of Sport Performance, National Taiwan University of Sport, Taiwan.

<sup>2</sup>Office of Physical Education, Asia University, Taiwan.

<sup>3</sup>Department of Ball Sports, National Taiwan University of Sport, Taiwan.

<sup>4</sup>Physical Education office, Yuan Ze University, Taiwan.

**Introduction:** In recent years, Taiwan's badminton performance on the international stage has been outstanding, but the women's doubles event has not been able to match the international standard. Therefore, the purpose of this study is to analyze the technical abilities of world-class women's doubles badminton players and provide references for players and coaches during training and competition. **Methods:** The analysis is based on three matches in the women's doubles event of the 2023 World Badminton Championships, including the semifinals and finals. The study compares the hitting techniques, serve landing positions, and other relevant game structure information used by both winning and losing sides in each set. **Results & Conclusions:** The average number of shots per set is  $558.3 \pm 55.2$  times, and the average number of shots per rally is  $14.6 \pm 1.5$  times. The winning side uses more short serves than the losing side at the serving ( $18.9 \pm 1.5$  vs  $13.3 \pm 2.0$  times,  $p < .05$ ), and the landing point is concentrated in the midcourt area near the net ( $16.6 \pm 3.0$  vs  $11.7 \pm 2.1$  times,  $p < .05$ ). In terms of hitting techniques, the winning side uses more net smashes and drops than the losing side ( $11.0 \pm 4.2$  vs  $6.3 \pm 3.4$ ;  $25.7 \pm 15.3$  vs  $8.0 \pm 5.6$  times,  $p < .05$ ), while the winning side uses fewer crosscourt shots, push shots, and lob shots ( $29.0 \pm 6.7$  vs  $52.9 \pm 17.5$ ;  $17.1 \pm 5.6$  vs  $24.0 \pm 5.7$ ;  $15.0 \pm 4.0$  vs  $21.0 \pm 3.2$  times,  $p < .05$ ). The study preliminarily found that women's doubles badminton players do not necessarily use more attacking techniques from the backcourt, but instead use other techniques and strategies to create opportunities for forecourt smashes and gain more advantages on the court.

**Key word:** short service, net smash, push shot, drop shot, crosscourt shot, lob shot

**Correspondence:** Ching-Hung Lin, [lch0325@saturn.yzu.edu.tw](mailto:lch0325@saturn.yzu.edu.tw), +886-3-4638800 ext 2348



# 探討台灣主場屬地經營與觀賽動機— 以2023年東亞超級聯賽為例

陳俊豪

國立台灣體育運動大學休閒運動管理碩士在職學位學程

**目的:**研究中針對 2023 東亞超級聯賽在台灣關注度遠低於國內職業賽事，以主場屬地經營的觀點來探討 2023 東亞超級聯賽在台灣觀賽動機低之原因，再根據分析結果提供賽事相關建議。**方法:**使用文獻分析法參考屬地權、主客場優勢及觀賽動機等相關文獻，針對東亞超級聯賽在台灣地區做分析。**結果與回顧:**研究發現東亞超級聯賽在台灣主場屬地經營未明，台灣代表參賽球隊也未將主力安排上場，造成比賽成績相當不理想，進而導致台灣地區觀眾觀賽動機低。**建議:**本研究整理若仿效先前東南亞聯盟(ABL)賽制，以各球隊的母國為主場，打造出國家全主場，將「球隊=城市」的概念升級為「球隊=國家」，藉由屬地權與在地居民認同加強連結，打造出全主場優勢，將能刺激更多球迷支持球隊，提升票房及周邊商品之市場。

**關鍵詞:**屬地權、主客場賽制、觀賽動機

# **Exploring the Relationship between Home Ground Management and Spectator Motivations in Taiwan - A Case Study of the 2023 East Asian Super League.**

**Chun-Hao Chen**

Master's Program in Leisure and Sport Management for Working Professionals at National Taiwan Sport University.

**Introduction:** This study aims to explore the reasons why the 2023 East Asia Super League has a low viewership in Taiwan compared to domestic professional leagues from the perspective of local home court advantage, and provide relevant suggestions for future event organizers based on the analysis results. **Methods:** Literature analysis was used to analyze the East Asia Super League in Taiwan, with reference to relevant literature on local home court advantage, home and away game advantages, and viewership motivation. **Results and Review:** The study found that the local home court advantage of the East Asia Super League in Taiwan is unclear, and the Taiwanese representative team did not field its main players, resulting in poor performance, which in turn led to low viewership in Taiwan. **Suggestions:** Based on the analysis, this study suggests that the event could follow the format of the previous Southeast Asian Basketball League (ABL) by making each team's home country the home court and creating a national home court advantage, upgrading the concept of "team=city" to "team=country", and strengthening the connection between local residents and local identity through local home court advantage. This could stimulate more fans to support the team, improve ticket sales and market for peripheral products.

**Keywords:** Local home court advantage, home and away game advantages, viewership motivation.

# 臺灣足球發展之成效-以六年足球 發展計畫為例

曾俊穎

國立臺灣體育運動大學 休閒運動管理研究所

**目的：**足球是一種國際性運動，也是眾多運動當中最受歡迎、接受度最高的運動。近年來，臺灣為了推廣足球不惜砸重金興建各個不同軟硬體設施，希望提供球員可以在一個更好的環境下訓練，但是，球員能力並沒有因為設施變好而提升，相反，世界排名不升反跌。因此本研究希望探討受到世足的影響，臺灣所實行的足球計畫是否具有成效。**方法：**本研究將採用文獻分析法，資料來自於臺灣博碩士論文知識加值系統，當中樣本蒐集 2017 年至 2022 年期間有關臺灣足球發展並進行資料檢索，搜尋關鍵字「臺灣足球」及「足球」。**結果與結論：**第一、就推動企業足球運動發展計畫為例，計畫缺乏資金援助以支撐計畫，亦得不到企業支持，導致計畫無法順利進行，成效不佳。第二、缺乏專業球員和球隊，導致球員不能得到專業知識跟技巧應用在練習和比賽上，導致成效不佳。第三、世界排名不升反跌，雖自計畫推行後，足球設施和資源應較為完善，但是計畫實施了六年，國足在世界上的排名不但沒有上升，反是跌出 150 名外，由此可見，計畫並沒有如期達成，績效未達。針對以上結果，研究者提出以下建議：第一、嘗試與國外球隊合作，互相提供建議和交流機會，藉以提升本土球員的技術，實戰經驗和策略應用。第二、政府可以提供相關獎勵計畫，為提升民眾對足球運動的參加意願和動機，藉由興起足球熱潮，發掘優秀人才。

**關鍵字：**臺灣足球、足球計畫、運動發展。

# **The Effectiveness of Taiwan's Football Development - A Case Study of the Six-Year Football Development Plan**

Tsang Chun Wing

Department of Recreational Sport, National Taiwan University of Sport

**Purpose:** Football is an international sport and the most popular and widely accepted sport among many others. In recent years, Taiwan has spared no effort in promoting football by investing heavily in various software and hardware facilities, hoping to provide players with a better environment for training. However, the players' abilities have not improved as the facilities have improved. On the contrary, the world rankings have dropped. Therefore, this study aims to explore whether Taiwan's football program, affected by the World Cup, has been effective. **Method:** This study will use a literature analysis method, with data obtained from the Taiwan Electronic Theses and Dissertations System between 2017 and 2022. The samples collected relate to the development of football in Taiwan, and keyword searches for "Taiwan football" and "football" were conducted. **Results and Conclusions:** First, taking the example of promoting corporate football development plans, the plan lacked financial support and corporate support, resulting in an unsuccessful implementation. Second, the lack of professional players and teams means that players cannot receive professional knowledge and skills to apply in practice and games, resulting in poor results. Third, despite the relatively improved football facilities and resources after the implementation of the program, Taiwan's world rankings have not risen but instead have dropped outside the top 150. Therefore, the program has not achieved the expected results, and the performance is unsatisfactory. Based on the above results, the researcher proposes the following recommendations: First, try to cooperate with foreign teams to provide mutual advice and exchange opportunities to enhance the technical skills, practical experience, and strategic application of local players. Second, the government can provide relevant incentive programs to increase the willingness and motivation of the public to participate in football sports, thereby promoting a football boom and discovering excellent talents.

**Keywords:** Taiwan Football, Football Planning, Sport Development

# 洋將加盟臺灣職業籃球聯盟事件之影響-

## 以魔獸Dwight Howard為例

曾俊穎

國立臺灣體育運動大學 休閒運動管理研究所

**目的：**台灣職業籃球聯盟近年球隊總數創新高，當中不少球隊為了增加球隊在聯盟中的競爭力，不惜重金禮聘引入外籍球員的加入，當中以前 NBA 球星 Dwight Howard 加盟 T1 聯盟桃園永豐雲豹隊最為轟動。球隊主場更座無虛席，成功為臺灣職籃製造話題，故本研究將以蒐集有關 D.Howard 在臺灣職籃之相關報導，從而探討洋將加盟臺灣職籃對於聯盟帶來之影響。**方法：**本研究採用內容分析與論述分析作為資料分析之方法，從中分析洋將的加盟對於台灣職業籃球聯盟的影響，當中蒐集 2022 年 11 月 8 日至 2023 年 1 月 8 日期間有關 D.Howard 加盟 T1 聯盟之網路運動新聞進行資料檢索，利用 Google 新聞搜尋關鍵字「Dwight Howard」及「臺灣職籃」，透過檢索標題及內文，排除重複報導後共獲得 20 篇相關新聞作為分析樣本。**結果與結論：**D.Howard 加盟 T1 職業籃球聯盟，對於球迷、球隊、球員以及聯盟皆有帶來正面影響。首先球迷方面，球迷無疑成為最大得益者，在最少經濟負擔的情況下，一睹前 NBA 球星的風采。球隊方面，隨著 D.Howard 的加盟，大大增加球隊的知名度，同時也能借於 D.Howard 的名氣，吸引更多國際球員的加入。球員方面，與前 NBA 球星作為隊友，從中吸取更多比賽經驗與技術，從而達到自我增值，提升個人競爭力。最後在聯盟方面，T1 聯盟球隊桃園雲豹成功招攬 D.Howard 加盟，對於聯盟整體形象帶來正面影響，由其對於聯盟剛成立時，被外界質疑是為了蹭熱度，如今則能向大眾證明，T1 聯盟並非曇花一現。

**關鍵字：**職業籃球、洋將加盟、魔獸效應、T1 聯盟。

# **The Impact of Foreign Players Joining the Taiwan Professional Basketball League - A Case Study of Dwight Howard**

Tsang Chun Wing

Department of Recreational Sport, National Taiwan University of Sport

**Purpose:** In recent years, the total number of teams in the Taiwan Professional Basketball League has reached a record high, and many teams have spent a lot of money to hire foreign players to increase their competitiveness in the league. Among them, the addition of former NBA star Dwight Howard to the Taoyuan Leopards team in the T1 League caused a sensation, and the team's home court was sold out, successfully generating buzz for the Taiwan Professional Basketball League. Therefore, this study aims to collect relevant reports on D. Howard's participation in the Taiwan Professional Basketball League, in order to explore the impact of foreign players joining the league.

**Method:** This study uses content analysis and discourse analysis as the methods for data analysis. Between November 8th, 2022 and January 8th, 2023, internet sports news related to D. Howard's joining the T1 League was collected by searching for the keywords "Dwight Howard" and "Taiwan Professional Basketball League" using Google News. After removing duplicate reports, a total of 20 relevant news articles were obtained as the analysis samples. **Results and Conclusion:** D. Howard's joining the T1 Professional Basketball League had a positive impact on fans, teams, players, and the league as a whole. Firstly, fans were undoubtedly the biggest beneficiaries, as they could see the charm of a former NBA star with the least economic burden. Secondly, with D. Howard's joining, the team's visibility increased significantly, and the team could also attract more international players with D. Howard's popularity. Thirdly, as teammates with a former NBA star, players could gain more game experience and skills, thus enhancing their personal competitiveness. Finally, in terms of the league, the Taoyuan Leopards' successful recruitment of D. Howard had a positive impact on the overall image of the league, especially as the league was once questioned for riding the wave of popularity but can now prove that it is not a flash in the pan.

**Keywords:** professional basketball, foreign player signings, Superman effect, T1 League.

# 以科技接受模式探究我的健身工廠

## My Fitness Factory使用者

### 使用意願與滿意度之研究

曾耀德

國立臺灣體育運動大學休閒運動學系碩士班

**動機目的：**近年來大眾健康意識抬頭，運動風氣油然而生，健身產業也因此蓬勃發展，知名健身俱樂部結合科技開發了「我的健身工廠 My Fitness Factory 」這款 APP，並提供會員紀錄訓練課表、分享成果、辦理行政業務等等的一個平台，但使用者使用意願與滿意度卻有所不同。因此，本研究目的在於以科技接受模式探究我的健身工廠 My Fitness Factory 使用者使用意願與滿意度之研究。研究方法將採用文獻回顧法，從 Google scholar、華藝線上圖書館、臺灣博碩士論文知識價值系統等平台中搜尋相關學術期刊、論文，並進行歸納分析。**結果與結論：**結果顯示「我的健身工廠 My Fitness Factory 」使用者之使用意願與滿意度受到多種因素影響，其中知覺易用性對使用意願與滿意度影響最大。最後建議 APP 業者能夠簡化使用流程及介面，加速線上行政業務處理速度，並增加 APP 互動性與社交性，提高使用者持續使用之意願。

**關鍵字：**科技接受模式、持續使用意願、滿意度

# **A Study on the Intention to Use and Satisfaction of My Fitness Factory APP Users through the Technology Acceptance Model.**

**Yao-De Zeng**

M.A. Program, Department of Recreational Sport National Taiwan University of Sport, Taiwan.

**Introduction:** In recent years, with the rise of health consciousness and fitness culture, the fitness industry has thrived. Well-known fitness clubs have combined technology to develop the "My Fitness Factory" app, which provides members with a platform to record training schedules, share achievements, and handle administrative tasks. However, users' willingness to use and satisfaction with the app are different. Therefore, the purpose of this study is to explore the willingness to use and satisfaction of My Fitness Factory app users through the technology acceptance model. The research method will adopt a literature review approach, searching for relevant academic journals and papers from platforms such as Google Scholar, the Airiti Library, and the Taiwan Electronic Theses and Dissertations System, and conducting inductive analysis.

**Results & Conclusions:** The results show that the willingness to use and satisfaction of "My Fitness Factory" app users are influenced by various factors, with perceived ease of use having the greatest impact. Finally, it is recommended that app operators simplify the usage process and interface, speed up the online administrative tasks processing speed, and increase the app's interactivity and sociality to increase users' willingness to continue using the app.

**Keywords:** Technology acceptance model, continued usage intention., satisfaction.

**Correspondence:** master's student Yao-De Zeng, xyzlambo@gmail.com, +886-986627801



# 以期望確認理論探討行動支付工具持續使用意願之研究-以全盈+PAY為例

曾耀德

國立臺灣體育運動大學休閒運動學系碩士班

**動機目的：**現今科技日新月異，大眾在支付工具選擇上也不再僅有現金，多數更嚮往使用更快速、便捷之行動支付工具來做消費或付款，全盈+PAY 也是目前大眾經常使用的行動支付平台之一，然而使用者對於行動支付之接受程度與持續使用意願卻有所差異，因此本研究目的在於以期望確認理論探討行動支付工具持續使用意願之研究-以全盈+PAY 為例。研究方法將採用文獻回顧法，從 Google scholar、華藝線上圖書館、臺灣博碩士論文知識價值系統等平台中搜尋相關學術期刊、論文，並進行歸納分析。**結果與結論：**結果顯示期望確認理論對於行動支付工具持續使用意願具有解釋力，其中知覺有用性與知覺易用性是影響持續使用意願之最關鍵因素。因此，建議全盈+PAY 平台業者應提供更多元支付管道，提升普及率，並簡化使用流程及介面，增加使用者持續使用之意願。

**關鍵字：**期望確認理論、行動支付、全盈+PAY、持續使用意願

# **A Study on the Continued Usage Intention of Mobile Payment Tools Based on Expectation-Confirmation Theory: The Case of Quanying+PAY.**

**Yao-De Zeng**

M.A. Program, Department of Recreational Sport National Taiwan University of Sport, Taiwan.

**Introduction:** With the rapid development of technology, the public's payment tool choices are no longer limited to cash, and many people prefer to use faster and more convenient mobile payment methods for consumption or payment. Quanying+PAY is also one of the mobile payment platforms commonly used by the public. However, there are differences in users' acceptance and willingness to continue using mobile payment. Therefore, the purpose of this study is to explore the willingness to continue using mobile payment tools based on the Expectation-Confirmation Theory, using Quanying+PAY as an example. The research method will use a literature review approach to search for relevant academic journals and theses from platforms such as Google Scholar, the Taiwan National Digital Library of Theses and Dissertations, and the Knowledge Value System of Master's and Doctoral Theses in Taiwan, and conduct inductive analysis. **Results & Conclusions:** The results show that the Expectation-Confirmation Theory has explanatory power for the willingness to continue using mobile payment tools, and perceived usefulness and perceived ease of use are the most critical factors affecting willingness to continue using. Therefore, it is recommended that Quanying+PAY platform operators provide more diverse payment channels to increase popularity and simplify the usage process and interface, thereby increasing users' willingness to continue using the platform.

**Keywords:** Expectation-confirmation theory, mobile payment, Quanying+PAY, continued usage intention.

**Correspondence:** master's student Yao-De Zeng, xyzlambo@gmail.com, +886-986627801

# 原住民拳擊選手恆毅力特質、學習適應與 參與動機之研究-以熱原拳擊隊為例

湯嘉云<sup>1</sup>、胡家旻<sup>1</sup>、陳曄諭<sup>1</sup>、王宜哲<sup>1</sup>

<sup>1</sup>天主教輔仁大學運動休閒管理學士學位學程

**目的:**探討原住民拳擊選手熱原拳擊隊,全員 20 位選手參與動機、學習適應現況、恆毅力特質、恆毅力特質與學習適應之相關情形。**方法:**質性研究,全隊 20 人進行半結構開放式深入訪談為主,再以問卷調查為輔,問卷採用李克特氏(Likert)五點量表計分方式,再用迴歸分析驗證學習適應與恆毅力之相關性。**結果與結論:**研究顯示參與動機以「成就感」、「自信心」為隊員們的主因,從產生好奇心,加入拳擊隊後,目標明確,表現出自我能力,同時他人肯定。學習適應中以「術科適應」重視程度最高,因付出長時間訓練,在術科方面成績優異、受到他人鼓勵與成就感提升,反之「學科適應」最低。而恆毅力特質皆影響到他們的生活,主要靠訓練過程培養恆毅力四大條件:興趣、訓練、目的、希望。而「恆毅力」與「學習適應」兩者互相關聯,當有高恆毅力,在學習適應就較不會輕言放棄。「學科適應」與「人際關係」也都有表現出恆毅力特質,多數隊員們雖說不喜歡學科,但他們依舊會去學習,因為輕易放棄其實對他們來說是不被認可的感覺,就算他們不喜歡也會用盡自己的方式去完成。**結論:**參與動機與恆毅力無相關,但與學習適應有相對的正相關。

**關鍵詞:**原住民、拳擊、參與動機、學習適應、恆毅力

主要聯絡人:湯嘉云

電話:0928-623312

電子信箱:tangj6014@gmail.com

地址:新北市樹林區八德街 109 號 3 樓

# **Research on perseverance, adaptability, and participation motives in aboriginal boxers-Using Urban Indigenous Boxing team as an example**

**TANG, JIA-YUN<sup>1</sup>、HU, JIA-MIN<sup>1</sup>、Chen-Hui-Yu<sup>1</sup>、WANG, YI-ZHE<sup>1</sup>**

<sup>1</sup>Bachelor's Degree Program in Sports and Leisure Management at Catholic Fu Jen University.

**Introduction:** To explore the motivation, learning adaptation, perseverance, and the relationship between perseverance and learning adaptation among the 20-member Hot Source Boxing Team, consisting of indigenous boxers. **Methods:** A qualitative study was conducted, with semi-structured, open-ended in-depth interviews as the primary method of data collection, supplemented by a questionnaire survey using a Likert five-point scale. Regression analysis was used to examine the relationship between learning adaptation and perseverance. **Results and Conclusion:** The study showed that the main motivations for joining the boxing team were "sense of achievement" and "self-confidence," which started from curiosity and became clear goals after joining the team, where they demonstrated their abilities and received recognition from others. Among the learning adaptations, "skill adaptation" was the most important, as the team had invested a lot of time in training and achieved excellent results in the field, which boosted their confidence and sense of achievement. In contrast, "academic adaptation" was the lowest. Perseverance played a significant role in their lives, and the team developed four main conditions of perseverance through the training process: interest, training, purpose, and hope. Perseverance and learning adaptation were found to be positively related, where higher levels of perseverance resulted in a lower likelihood of giving up during the learning process. Both academic adaptation and interpersonal relationships were also related to perseverance. Although many team members did not enjoy academic subjects, they still persevered and tried to complete them because giving up would not gain recognition from others. In conclusion: there was no significant relationship between motivation and perseverance, but there was a positive correlation between motivation and learning adaptation.

**Keywords: indigenous, boxing, motivation, learning adaptation, perseverance.**

**Primary contact: TANG, JIA-YUN, tangj6014@gmail.com , 0928-623312**

# 運用圖畫分析國小學童理解式球類 教學巧固球運動之學習

蔡喬安

國立臺中教育大學教師專業碩士學位學程

**目的：**理解式球類教學法的特性是在比賽中進行練習，並發展出適當的戰術，無論運動能力之好壞或基本技能正確與否，皆能參與該項運動的比賽或遊戲。本研究希望透過理解式巧固球運動課程教學探討國小學童巧固球運動課程之學習情形，分析國小學生巧固球運動課程之學習歷程，探究教學者實施巧固球運動之專業成長與省思。**方法：**本研究運用圖畫分析國小學童理解式球類教學巧固球運動之學習，對象選定臺中市某國小四年級某班級學生，進行每週兩節課為期 4 週 8 節課的理解式巧固球運動課程教學，每節課 40 分鐘，總教學時間為 320 分鐘。研究者將於每節課後蒐集圖畫學習單，內容包括圖畫及學生文字敘述，除此之外，也包含非正式訪談紀錄、教學省思及第三方觀察員紀錄表進行分析。本研究以三角檢證法進行資料、研究者、方法三角驗證。**預期結果與討論：**本研究以圖畫學習單分析學生於課程結束後對於課程印象深刻的學習情形，了解學生於課程的學習歷程轉變，藉此提升學生課堂參與度與學習動機。最後探討教師之課程設計與教學省思與精進，提供未來現場實務教學之參考依據。

**關鍵詞：**兒童繪圖、理解式球類教學法、巧固球運動

# The study of applying drawing analysis in the case of Teaching Game for Understanding on tchoukball to elementary school students

Chiao-An Tsai

Master Program of Teaching Profession, National Taichung University of Education, Taiwan

**Introduction:** Teaching Game for Understanding (TGfU) is to practice the sport during the game and to develop appropriate tactics to participate in the game regardless of the athletic ability or the correctness of the basic skills. The purposes of the study expect to explore the learning situation; to analyze the learning process of elementary school students participating in the tchoukball lessons; and to inquire into the professional growths and reflections of the teacher. **Methods:** This study focuses on the use of drawing analysis in the learning of TGfU on tchoukball for elementary school children. The research subjects will be selected from a fourth-grade class in a Taichung elementary school. There will be two lessons of TGfU on tchoukball per week for a period of 4 weeks. Each lesson is 40 minutes, and the total teaching time is 320 minutes. The researcher will collect drawings after each lesson from the research subjects, which include pictures and written narrations. In addition, informal interview records, teaching reflections, and third-party observer records are also included for analysis. This study intends to use the triangulation method to conduct data triangulation, Investigator triangulation and Methodological triangulation. **Expected Results & Conclusions:** This study applies drawing sheets to analyze students' impressive learning situation after the lessons, understand the changes of students' learning process in the lessons for improving students' engagement and learning motivation. Finally, the study will discuss the lesson design, teaching reflection and refinement from the teacher in order to provide a reference for practical teaching in the future.

Keywords: children drawing, Teaching Game for Understanding, tchoukball

Correspondence: Tsai, Chiao-An, joan93159@gmail.com, 0919452181

# 教練德行領導與運動員運動精神之關係

賴昱瑄<sup>1</sup>、高三福<sup>2</sup>、李國維<sup>1</sup>、林群叡<sup>1</sup>、吳昱樵<sup>1</sup>

<sup>1</sup>國立臺中教育大學體育學系碩士班

<sup>2</sup>國立清華大學體育學系

**目的：**東西方社會文化不同，華人文化內涵受儒家思想影響，在文化的情境脈絡下，領導模式有所差異。家長式領導是華人文化特色的領導理論，至今雖有許多運動教練家長式領導的相關研究，卻鮮少討論家長式領導中德行領導與運動精神的關係。因此，本研究欲探討教練德行領導與運動員運動精神間的關係。**方法：**透過文獻分析法，以「家長式領導、德行領導、運動員精神」為關鍵字蒐集與分析國內外相關文獻，以社會認知論為分析架構。**結果：**教練的道德領導與運動員對訓練和比賽的全心投入、尊重社會風俗、尊重比賽規則、尊重對手以及得利於比賽中的運動員精神很接近。當教練成為運動員的榜樣時，他們會尊重並追隨教練，向教練學習該行為。無論在公共或私人場合，教練都是運動員的代理人，對運動員發揮重要的影響。此外，教練的專業精神可能對運動員的體育人格具至關重要的影響。本文概述了教練德行領導和運動員精神的影響，供未來相關研究的關鍵主題方向。

**關鍵詞：**家長式領導、德行領導、運動精神

# The Relationship between Moral Leadership and Sportspersonship

Yu-Shiuan Lai<sup>1</sup>, San-Fu Kao<sup>2</sup>, Kou-Wei Lee<sup>1</sup>, Cyun-Ruei Lin<sup>1</sup>, Yu-Chiao Wu<sup>1</sup>

<sup>1</sup>Department of Physical Education, National Taichung University of Education, Taiwan

<sup>2</sup>Department of Physical Education, National Tsing Hua University, Taiwan

**Introduction :** Different from Western social culture, culture in Eastern society from a Confucianism social order. In the context of different cultures, leadership model are also different. Although there have been many studies on paternalistic leadership of sports coaches, but few have discussed the relationship between moral leadership of paternalistic leadership and sportspersonship. The aim of our study was to explore the relationship between coaches' moral leadership and athletes' sportspersonship.

**Methods :** We use document analysis to collect relevant domestic and foreign literature by using the following keywords: paternalistic leadership, moral leadership, sportspersonship on a framework of social cognitive theory to analyze. **Results :** Moral leadership of coach is close to an athlete's dedication to full commitment toward participation, respect for social conventions, respect for rules and officials, respect for rules and officials, respect for the opponent and the lack of a negative approach in the game. When a team leader or coach to be a role model to athletes and show out his attitude to sports, athletes will observed and learned it. If a team leader or coach is a kind of moral leadership, they will respect and follow the coach and show the behave they learn from the coach. In moral leadership, a team leader or coach is fair and not selfish, he or she would be a model. When athletes imitate, their sportspersonship will show out as the team leaders are. No matter in public or private place, coaches are the agency to athletes, they play an important roles to athletes. Furthermore, revealed that coaches' professionalism may play a critical role for athlete's sportspersonship. We outline implications for coaches' moral leadership and athlete development and call attention to key themes for future study.

**Keywords:** paternalistic leadership, moral leadership, sportspersonship

**Correspondence:** Yu-Shiuan Lai, [shiuanhello@gmail.com](mailto:shiuanhello@gmail.com), +886-4-22183413



# 打卡熱現象:從登山打卡行為探討

## 目的地意象

霍佩璿

國立臺灣體育運動大學 休閒運動系碩士班

**目的:**後疫情時代下,隨著政府防疫政策的放寬,走出戶外是社會大眾所嚮往的,而網美攻頂拍照打卡、網路揪團爬山等行為開始盛行,吸引許多民眾參與登山活動,社群媒體也為旅遊經驗的分享提供新的傳播管道。因此,本研究將探討「打卡」行為與目的地意象之間的關係。**方法:**本研究採用文獻分析法,以關鍵字搜尋與研究相關之期刊、論文、新聞報導及文章進行分析。**結果與結論:**遊客蒐集旅遊目的地的資訊來源廣泛,網路科技發達、傳遞訊息快速,旅遊地的環境特徵、自然景色、旅遊經驗、整體氛圍皆可從網路取得,在後疫情時代下登山也成為熱門關鍵字,社群媒體之打卡功能為旅遊地提供即時分享的管道,善用這項功能,可增加遊客目的地意象之旅遊意圖。

**關鍵詞:**社群媒體、打卡、登山、目的地意象

# **Check-in Fever Phenomenon: Exploring Destination Imagery From Mountaineering Check-in Behavior**

**Pei-Fan Huo**

**Department of Recreational Sport, National Taiwan University of Sport, Taiwan.**

**Introduction:** In the post-epidemic era, with the relaxation of the government's Epidemic Prevention policies, it is the public's yearning to go outdoors, and behaviors such as Internet celebrity attacking the top to take pictures, and organizing a mountaineering group through Internet have become popular, attracting many people to participate in mountaineering activities, social media It also provides a new communication channel for the sharing of tourism experience. Therefore, this study will explore the relationship between the behavior of " check-in of social media" and destination imagery. **Methods:** This study adopts the method of literature analysis, using keywords to search for periodicals, papers, news reports and articles related to the research. **Results & Conclusions:** Tourists collect information on tourist destinations from a wide range of sources. Internet technology is advanced and information is transmitted quickly. The environmental characteristics, natural scenery, travel experience, and overall atmosphere of tourist destinations can all be obtained from the Internet. In the post-epidemic era, mountaineering has also become a popular keyword, the check-in function of social media provides a channel for instant sharing for tourist destinations. Making good use of this function can increase the tourist intention of tourists' destination images.

**Key words: social media, check-in of social media, mountaineering, destination image**

**Correspondence: Pei-Fan Huo, elva870914@gmail.com, 0922161530**

# 登山健行活動體驗價值之探析

霍佩璿

國立臺灣體育運動大學 休閒運動系碩士班

**目的:**台灣全島有三分之二的面積遍布著高山林地，因此各類型登山健行活動相當盛行（交通部觀光局，2021）。隨著疫情解封，國民也越發喜愛與嚮往親近山林、接觸大自然。本研究將以從事登山健行活動所獲得的體驗價值來做探討與分析。

**方法:**本研究採用文獻分析法，搜尋與研究相關之期刊、論文、新聞報導及文章進行分析。**結果與結論:**根據資料分析顯示，參與登山健行活動的體驗效益可分為（一）功能性結果，如：運動訓練、強健身體、生理挑戰等，（二）心理性結果，如：放鬆心情、紓解壓力、自我調適等，（三）社會性結果，如：與他人交流互動、維持人際關係等。而透過活動所獲得的體驗價值，如：幸福感、成就感、自我實現、充實生活、社會認同、自我挑戰等，則是多數活動參與者追求之終極價值。

**關鍵詞:**登山、健行、體驗價值

# Exploration And Analysis Of Experiential Value Of Mountaineering And Hiking Activities

Pei-Fan Huo

Department of Recreational Sport, National Taiwan University of Sport, Taiwan.

**Introduction:** Two-thirds of the total area of Taiwan is covered by mountain forests, making various types of mountaineering and hiking activities quite popular (Tourism Bureau, Ministry of Communications, 2021). With the lifting of the government's Epidemic Prevention policies, people have become increasingly fond of and eager to approach mountains and forests, and to connect with nature. This study will explore and analyze the experiential value gain from mountaineering and hiking activities. **Methods:** This research adopts the method of literature analysis, searching for periodicals, papers, news reports and articles related to the research for analysis. **Results & Conclusions:** According to data analysis, the experience benefits of participating in mountaineering activities can be divided into (1) functional results, such as: sports training, physical fitness, physical challenges, etc., (2) psychological results, such as: relaxation, stress relief, self-adjustment, etc., (3) Social results, such as: communicating and interacting with others, maintaining interpersonal relationships, etc. However, the experience value obtained through activities, such as: happiness, sense of accomplishment, self-realization, enriching life, social identity, self-challenge, etc., is the ultimate value pursued by most activity participants.

**Key words:** mountaineering, hiking, experiential value

**Correspondence:** Pei-Fan Huo, [elva870914@gmail.com](mailto:elva870914@gmail.com), 0922161530

# 臺中市潭子國民暨兒童運動中心

## 經營策略之初探

蘇虹螢<sup>1</sup> 李國維<sup>1</sup> 韓至恩<sup>1</sup>

<sup>1</sup>國立臺中教育大學體育學系

**目的與方法：**本文研究藉由和業者的訪談以及文獻的整理，探討臺中市潭子國民暨兒童運動中心的營運策略，以經營的背景與策略兩大面向進行探討。**結果：**(一)經營背景：採 OT 模式進行經營，該模式運作形式具有相互討論的彈性，其於 110 年 12 月 01 日正式營運，雖開幕即遇嚴重疫情，但反而爭取到更多時間，且在經過內部討論調整後，能夠有更充分的準備迎接後疫情的需求，讓該運動中心的營運聲勢高漲。(二)經營策略：組織方面採取扁平化的管理，提升溝通的效率；訂價方面因受限於促餐法則以公定價為主；促銷方面主要分為大眾行銷、區隔行銷、搭售行銷等方式進行；人力資源方面為提升返鄉就業率與帶動家鄉生機，延攬在地優秀運動人才；公共關係方面忠於服務型，每月一次里民日，里民可免費使用器材與場地，進而推展全民運動；財務方面針對預售產品建立信託專戶，保障客戶購買權益；資訊管理方面委外架設會員服務系統，提升課程運作之便利性。

**關鍵字：**委外經營、經營策略

# Exploration of the Operating Strategies of the Taichung Tanzi Civil and Child Sports Center

**Hong-Ying Su<sup>1</sup>, Kuo Wei Lee<sup>1</sup>, Zhi-En Han<sup>1</sup>**

<sup>1</sup>Department of Physical Education, National Taichung University of Education, Taiwan

**Purpose and Methods:** This study investigated the operating strategies of the Taichung Tanzi National and Children's Sports Center through interviews with stakeholders and literature review. The investigation focused on two aspects: the background and the strategies of the operation. **Results:**(1) Background: The center operates under the OT mode, which provides flexible and mutual discussions among stakeholders. Although the center opened during the COVID-19 pandemic, it gained more time to prepare for post-pandemic demands after internal discussions and adjustments. As a result, the center's operating performance was on the rise. (2) Strategies: The center adopts a flat organizational management structure to enhance communication efficiency. Price setting is mainly based on public pricing due to restrictions under the promotional meal regulations. Promotions are mainly conducted through mass marketing, segmentation marketing, and bundled sales. To increase local employment and vitality, the center recruits outstanding local athletes for human resources. In terms of public relations, the center adheres to a service-oriented approach, offering free equipment and facilities for locals to promote sports. For financial management, a trust account is established for pre-sale products to safeguard customer purchase rights. Information management is outsourced to establish a membership service system, improving course operation convenience.

**Keywords:** Outsourced management, operating strategies.

**Correspondence:** Professor Hong-Ying Su,  
ope110112@gm.ntcu.edu.tw,0972726259

# 國小體育教師實施融合式體育經驗之探究

江怡雯、林憶萍

國立臺中教育大學 體育學系碩士班

## 摘要

近年來，讓身心障礙學生回歸主流教育成為世界各國重視的教育政策。一方面保障身心障礙學生權利，另一方面也讓學生學習如何包容差異與尊重同儕。與其他學科相比，互動性高的體育課程，亦是需要提供身心障礙學生一個適切參與機會。因此，體育教師需要花費更多心力在教學上，讓身心障礙學生得以融入課程。大多數體育教師雖然支持融合式體育，但在實際教學現場還是有許多擔心與挑戰。基於此，本研究旨在深入探究國小體育教師實施融合式體育的教學經驗，透過質性研究觀點切入，採用立意取樣法，選擇3位資深國小體育教師，以半結構深入訪談方式，希望藉由資深體育教師的回饋，瞭解融合式體育實施之現況與挑戰。研究結果如下：一、教學現況：無論是場地環境、教具器材或是評量方式，不會特別為身心障礙學生而調整。二、實施需求以三面向來做分析：(一) 教師面向，受訪者認為自己需要充分的在職訓練與課程討論，才得以教授融合式體育。(二) 學校面向，行政支持與專業人力支援對體育教師很重要。(三) 政府面向，政策宣導與活動推廣需要加強，若能半強制執行可以更落實融合式體育。

**關鍵字：**融合式體育、體育教師、身心障礙學生、適應體育

通訊作者：江怡雯

通訊地址：國立臺中教育大學，臺中市西區民生路 140 號。

電話：0905796816

email：[qwer860629@gmail.com](mailto:qwer860629@gmail.com)

# **The study of elementary school physical education teachers implementing inclusive physical education curriculum**

YI-WEN JIANG, YI-PING LIN

Department of Physical Education, National Taichung University of Education, Taiwan

In recent years, the policy of integrating students with disabilities into mainstream education has become a major focus for countries around the world. Inclusive education not only protects the rights of students with disabilities, but also helps students learn how to embrace differences and respect their peers. Compared to other subjects, physical education (PE) courses require higher levels of interaction and thus require providing students with disabilities with appropriate opportunities to participate. P.E. teachers need to invest more effort to help students with disabilities integrate into P.E. classes. Although most P.E. teachers support inclusive physical education, they still have a couple of concerns and challenges in teaching. The purpose of this study is to explore the teaching experiences of physical education teachers in elementary schools by implementing inclusive physical education. This study utilized qualitative research methods with purposive sampling to select three experienced elementary school P.E. teachers as participants. Semi-structured interviews were conducted to gain insights from the teachers' perspectives on the current status and challenges of implementing integrated physical education. The questions of the interview were divided into two aspects: current teaching implementation and needs in teaching. The findings revealed that: 1. SEN students had the same teaching arrangement with normal students; 2. Teachers need more professional training in inclusive physical Education; 3. School administrative support and professional support are very important for P.E. teachers; 4. For the government, policy advocacy and event promotion need to be strengthened. If there is semi-strong control, integrated sports can be more implemented.

**Keywords:** Inclusive physical education, P.E. teachers, students with disabilities  
**Correspondence:** Professor YI-WEN JIANG, 0905796816,  
qwer860629@gmail.com



# 有運動習慣者的蛋白粉購買意願探究： 一項消費者行為的分析

吳家瑜<sup>1</sup> 陳韋廷<sup>1</sup> 巫錦霖<sup>2</sup>

國立中興大學運動與健康管理研究所

**背景：**近年運動風氣盛行，全球運動營養增補劑產值日益擴大。其中高蛋白質補給品中的蛋白粉(乳清與大豆蛋白)是運動愛好者相當受歡迎的產品，因此了解消費者購買決策的因素分析是非常重要的。**目的：**本研究旨了解運動族群購買蛋白粉的消費行為，並探討影響其購買決策的因素。**方法：**採用問卷調查法，並使用統計軟體 SPSS 進行皮爾森相關係數(Pearson Correlation)關聯性分析，以找出對於消費者購買蛋白粉最重要的影響因子。透過網路問卷發放，收集 324 位具有運動習慣受試者填寫問卷。問卷內容包括受試者的基本背景資料，和 10 大類題目:健康觀念、價格、品牌、蛋白粉種類、廣告、設計、通路、包裝形式、產品品質、產品資訊。**結果：**經回收有效問卷後，使用皮爾森相關係數(Pearson Correlation)進行統計分析後，蛋白質種類( $r=.739, p<0.01$ )、產品品質( $r=.731, p<0.01$ )與購買意願表現出高度顯著性相關 (相關係數 $>0.7, P<0.01$ )，可能為代表影響消費者購買意願的主因。**結論：**本研究結果可得知運動補給品蛋白粉的消費現況，並且經由分類項目分析出消費者對於蛋白粉的購買決策有哪些異同與潛在購買因子，其對於產品研發與推廣能有重要價值。

**關鍵詞：**蛋白粉、消費者行為、購買意願、增補劑

# Investigating the purchase intention of protein powder among people with regular exercise : an analysis of consumer behavior

Chia-Yu Wu<sup>1</sup>, Wei-Ting Chen<sup>1</sup>, Ching-Lin Wu<sup>2</sup>

Graduate Institute of Sport and Health Management, National Chung Hsing University, Taiwan.

**Introduction:** The global sport nutritional supplements market is growing remarkably in the past few year. Among all products, protein powder (whey and soy protein), a high-protein supplement, is one of the most popular product for sports enthusiasts. Therefore, to understand the purchase decision factors of consumers are much in need.

**Purpose:** The goal of this study is to investigate the consumer behavior of purchasing protein powder and the factors influences purchase decisions. **Methods:** Pearson correlation coefficient is used to identify the most deciding factors for consumers while purchasing protein powder. 324 questionnaires were collected through internet. In addition to background information of the participants, the questionnaire included 10 categories: health concept, price, brand, types of protein powder, advertising, design, channel, manner of packaging, product quality, and product information. **Results:** After gathering effective questionnaires, statistical analysis was performed by using Pearson correlation coefficient. The results showed that types of protein powder ( $r=.793$ ,  $p<0.01$ ) and product quality ( $r=.731$ ,  $p<0.01$ ) highly correlated with purchase intention (correlation coefficient  $> 0.7$ ,  $P<0.01$ ) which indicated the most deciding factors in terms of purchase intention of consumers. **Conclusion:** The results of this study identified the primary factors in consumer purchasing decisions to protein powder. These findings may provide significant value for product development and promotion in the industry.

**Key words:** protein powder, consumer behavior, purchase intention, supplements

**Correspondence:** Chia-Yu Wu, dosomiso222@gmail.com, +886-908717127

# 探討臺灣登山安全管理:文獻回顧

邵蕎卉 林明宏

國立中興大學運動與健康管理研究所

**緒論：**近年臺灣因山林解禁政策鬆綁、疫情放寬，使登山人口呈現爆發式成長，根據內政部消防署資料顯示，山域意外事故救援案件在解禁後屢創新高。然而，目前多數文獻皆以個案方式探討登山安全，鮮少研究針對臺灣登山安全管理進行文獻回顧。因此，本研究旨在應用文獻回顧方式探討臺灣登山安全管理。**方法：**本研究搜尋中英文期刊論文電子資料庫（2005年1月至2023年1月），以關鍵字「登山安全」、「登山管理」、「登山事故」、「登山風險管理」等搜尋文獻，最後篩選出符合主題17篇，探討登山安全管理的期刊論文。**結果：**17篇論文中，以風險管理理論探討登山安全管理（各2篇）；有8篇主要探討登山活動管制制度；有7篇探討山難搜救，其餘均為登山管制作為及登山嚮導制度的討論。**結論：**多數文獻皆以探討制度面為主，少數探討登山教育無痕森林等登山安全教育面的問題，研究指出臺灣多數山難發生隊伍多為自組成團和商業團體，然而文獻回顧中卻較少提及商業團體規範及管制制度如何輔助自主團體減少山難發生，建議未來可以以此為方向，借鑒國外成熟制度，改善臺灣登山品質，減少山林憾事的發生。

**關鍵詞：**登山安全、登山管理、山難事故

# Exploring the Safety Management of Mountain Climbing in Taiwan: A Literature Review

CIAO-HUIE SHAO, MING-HONG LIN

Graduate Institute of Sport and Health Management, National Chung Hsing University, Taiwan.

**Introduction:** In recent years, Taiwan's mountain climbing population has experienced explosive growth due to the relaxation of the mountain forest ban and the epidemic. However, at present, most of the literature discusses mountain climbing safety in a case-by-case manner, and few studies have been conducted to review the literature on mountain climbing safety management in Taiwan. Therefore, this study aimed to apply the literature review approach to investigate the safety management of mountaineering in Taiwan. **Method:** This study searched the electronic database of Chinese and English journal articles (from January 2005 to January 2023) for the key words "mountaineering safety," "mountaineering management," "mountaineering accidents," and "mountaineering risk management," and finally selected 17 journal articles on mountaineering safety management that fit the theme. **Results:** Among the 17 papers, 2 papers each discussed mountaineering safety management with risk management theory; 8 papers mainly discussed mountaineering activity control system; 7 papers discussed mountain disaster search and rescue; and the rest discussed mountaineering management behavior and mountaineering guiding system. **Conclusion:** Most of the papers are mainly about the system, and few of them are about mountaineering safety education, such as mountaineering education without traces of the forest. The study points out that most of the teams in Taiwan are self-organized groups and commercial groups, but the literature review rarely mentions how the regulation and control system of commercial groups can assist independent groups to reduce the occurrence of mountain accidents. It is suggested that the future direction can be taken to improve the quality of mountain climbing in Taiwan by referring to mature systems overseas, and to reduce the occurrence of mountain and forest accidents.

**Keywords:** Mountaineering Safety, Mountaineering Management, Mountain Accidents

# 一種新型靈活指數風險優先級數方法探討

## 運動員流行疾病傳播風險之應用

李宗憲<sup>1</sup> 吳家瑜<sup>1</sup> 林明宏<sup>2</sup>

<sup>1</sup>陸軍軍官學校管理科學系 <sup>1、2</sup>國立中興大學運動與健康管理研究所

**目的:**針對2020年至2022年COVID-19疫情大流行後，我們發現擁有高度傳染風險疾病對運動員的訓練乃至比賽均有深切影響，因此本研究旨在探討運動員傳播風險，並引入一種新型靈活指數風險優先級數方法處理風險評估問題。**方法:**本研究提出一種新方法並命名為指數迴歸風險優先數（RERP<sub>N</sub>），用來取代傳統風險優先數（RPN）方法；新方法將通過三位不同領域專家以實際案例進行評分，並對案例中嚴重度(S)、發生頻率(O)、偵測(D)等三個參數，以指數的形式運用簡單的加法函數計算及應用迴歸係數的權重實施驗證解答，並依新的ERP<sub>N</sub>為評比準則來進行排序，計算所得之結果除降低重覆編號及改善違反測量尺度的原則，也因增加迴歸係數權重使解答合理性，本研究所提指數迴歸風險優先數(RERP<sub>N</sub>)方法，將讓風險評估更具有效性及可靠性。**結果:**此方法的特色在於可以同時考量各項風險因素的重要性及影響程度，並進行動態調整以因應疫情變化。**討論:**此外，本研究也發現，運動員之間的接觸機會和室內訓練地點的選擇是影響傳播風險的重要因素，因此運動場地和賽事管理上的措施需要加強，以有效降低風險。這項研究成果可提供未來相關領域參考，並且在應對類似公共衛生事件方面，也有一定的實用價值。

**關鍵字:**失效模式與影響分析（FMEA）、風險優先數（RPN）、指數風險優先數（ERP<sub>N</sub>）；三角模糊數（TFN）

# Application of a New Flexible Index Risk Priority Number Method to Investigate the Transmission Risk of Infectious Diseases Among Athletes

**Zong-Sian Li<sup>1</sup>, Chia-Yu Wu<sup>1</sup>, Ming-Hung Lin<sup>2</sup>**

Institute of Innovation and Circular Economy, Asia University, Taichung 413, Taiwan

<sup>1</sup>、<sup>2</sup>Graduate Institute of Sport and Health Management, National Chung Hsing University, Taiwan.

**Purpose:** In response to the profound impact of highly infectious diseases on athlete training and competition following the COVID-19 pandemic from 2020 to 2022, this study aims to investigate the transmission risk among athletes and introduce a new flexible index regression risk priority number (RERP) method for risk assessment.

**Methods:** This study proposes a new method called the index regression risk priority number (RERP) to replace the traditional risk priority number (RPN) method. The new method will be validated through the scoring of three different domain experts using practical cases. The severity (S), occurrence frequency (O), and detection (D) parameters in the case will be calculated and applied in exponential form using a simple addition function and the weights of regression coefficients. The results will be sorted according to the new ERP as the evaluation criterion, which reduces duplicate numbering and improves compliance with measurement scales, while the increased weight of the regression coefficient enhances the rationality of the solution. The proposed RERP method will make risk assessment more effective and reliable.

**Results:** The feature of this method is that it can simultaneously consider the importance and degree of influence of various risk factors and dynamically adjust them in response to changes in the epidemic situation. **Discussion:** In addition, this study found that the opportunity for contact among athletes and the choice of indoor training locations are important factors affecting transmission risk, and therefore measures need to be strengthened in sports venues and event management to effectively reduce risk. This research result can provide reference for future relevant fields and has practical value in responding to similar public health emergencies.

**Keywords:** Failure Modes and Effects Analysis (FMEA), Risk Priority Number (RPN), Exponential Risk Priority Number (ERP), Triangular Fuzzy Number (TFN).

**Correspondence:** Zong-Sian Li, f0939607076@gmail.com, +886-939607076

# 擁有未成年子女之媽媽個人休閒活動安排 與考量因素之探討

張哲維

國立台灣師範大學體育與運動科學研究所

**研究目的:**適當安排休閒活動，將有助於提高日常生活品質，並維持生理與心理的健康。不過，女性卻時常面臨到休閒阻礙，部分原因即來自於家庭義務。家務負擔剝奪已婚女性參與個人休閒活動的機會。為人母後，小孩更降低她們從事個人休閒的意願。若小孩為未成年，影響最為顯著。因此，養育未成年小孩無疑是造成女性從事個人休閒阻礙的原因之一。期待透過了解該族群個人休閒活動規劃之特性，與其考量因素，作為日後政府與相關產業增加女性參與個人休閒活動比例的策略參考。**研究方法:**本研究透過範域文獻回顧的形式進行，並以媽媽、休閒活動、小孩等關鍵字搜索。理論架構方面，將休閒活動區分為知識型、藝術型、運動型、社交型、服務型五大類。考量因素則根據 Torkildsen 的理論區分為個人性、環境性與機會性因素。**結果與討論:**擁有未成年子女之媽媽個人休閒活動安排集中於三種類型，分別為知識型、運動型、社交型。個人性因素主要考量該休閒活動所花費的時間、金錢。環境性因素則包括科技媒介、場館設備等。機會性因素則包含交通、資源取得是否方便的問題。

**關鍵詞：**小孩、媽媽、休閒活動

# **Discussion on personal leisure activities arrangement and consideration factors of mothers with minor children**

**Che-Wei Chuang**

**Graduate Institute of Physical Education and Sport Sciences, National Taiwan Normal University, Taiwan**

**Introduction:** Appropriate arrangements for leisure activities will help improve the quality of daily life and maintain physical and mental health. Women, however, often face barriers to leisure, partly due to family obligations. The burden of housework deprives married women of the opportunity to participate in personal leisure activities. After motherhood, children reduce their willingness to engage in personal leisure. The effect is most pronounced when the child is a minor. Therefore, raising minor children is undoubtedly one of the reasons that prevent women from engaging in personal leisure activities. It is expected that by understanding the characteristics of personal leisure activities planning of this group and their considerations, it will serve as a reference for future strategies of the government and related industries to increase the proportion of women participating in personal leisure activities. **Methods:** This study was conducted through scoping review and searched with key words such as mothers, leisure activities, and children. In terms of theoretical framework, the leisure activities were divided into five categories: intellectual, artistic, sports, social, and service. The evaluation factors were divided into personal, environmental, and opportunity factors according to Torkildsen's theory. **Results & Conclusions:** Mothers with minor children focus on three types of personal leisure activities: intellectual, athletic, and social. Personal factors include time and money spent on the leisure activity. Environmental factors include technology and facilities. Opportunity factors include the convenience of transportation and resources.

**Key words:** children, mothers, leisure activities



# 運動團隊管理系統開發與設計

張晏瑜

國立中興大學運動與健康管理研究所

## 摘要

國內各級學校的體育事務繁雜，凡舉體育相關之競賽、器材、課程等等，都屬體育組承辦之業務，而運動團隊的管理也是業務的重要內容之一。本系統開發的目的，希望管理者在團隊的管理上能夠更加方便，教練在選手的管理、銜接上更有系統，也解決傳統紙本資料容易流失的問題。本系統設計針對3種不同的角色定位，均需登入才能進行相關操作。第一身分為選手(家長)，可瀏覽選手的賽事及測驗成績，第二身分為教練，團隊功能的部分，可記錄團隊選手測驗成績、輔導紀錄以及出缺勤狀況，方便教練掌握學生表現及轉組的銜接。教練功能的部分，可於教練課表紀錄完整的訓練課表，並設計賽事管理功能，匯出選手分項表等，進行賽事前中後的管理。第三身分為管理者，管理者可進行團隊建立及教練群的管理功能，並統整及維護各項資料。運動團隊系統的建立，期望能讓教練及管理者在團隊管理上更加輕鬆，也為每一位選手的成長留下紀錄，保留珍貴的縱向資料，為國內體育研究提供相關材料。未來期望，本系統能結合現行的學務系統，讓資料的轉移及建置單純化，讓系統的價值更加提升。

**關鍵字：**運動團隊、運動管理、管理系統、體育事務

# Development and design of sports team management system

Yen-Yu Chang

國立中興大學運動與健康管理研究所

## Abstract

The sports affairs of domestic schools at all levels are complicated. All sports-related competitions, equipment, courses, etc. are undertaken by the sports team, and the management of sports teams is also an important part of the business. The purpose of this system development is to make it more convenient for managers to manage the team, and for coaches to be more systematic in the management and connection of players, and to solve the problem of easy loss of traditional paper materials. This system is designed for 3 different roles, all of which require login to perform related operations. The first identity is the players (parents), who can browse the players' competitions and test results. The second identity is the coach. The team function part can record the team players' test results, counseling records, and absence status, so that the coach can grasp the student's performance and transfer. Group cohesion. In the part of the coaching function, the complete training schedule can be recorded in the coaching schedule, and the game management function can be designed, and the player breakdown table can be exported to manage before, during and after the game. The third identity is the manager, who can carry out team building and management functions of the coaching group, and organize and maintain various data. The establishment of the sports team system is expected to make it easier for coaches and managers to manage the team. It will also record the growth of each player, retain precious longitudinal data, and provide relevant materials for domestic sports research. In the future, it is expected that this system can be combined with the current academic system to simplify the transfer and construction of data and enhance the value of the system.

**Keywords:** sports teams, sports management, management systems, sports affairs

# 臺灣高中籃球聯盟HBL與CXL

## 之差異分析

韓至恩<sup>1</sup> 李國維<sup>2</sup> 蘇虹螢<sup>1</sup>

<sup>1</sup>臺中教育大學體育學系研究生 <sup>2</sup>臺中教育大學體育學系助理教授

**目的：**本研究的目的在探討，高中體總所推動之高中籃球聯賽（High School Basketball League，簡稱：HBL），和何凱成所創辦的球學聯盟(Choxue League，簡稱：CXL)，從組織架構、運作規劃、比賽賽制來分析彼此之差異。**方法：**研究採取質性個案研究法，透過文件分析來蒐集 HBL 與 CXL 的資料，並分析彼此之差異。**結果：**一、組織架構：1. HBL 是由高中體總所辦的賽事，而 CXL 則是個人創辦的學生籃球聯盟。2. HBL 是教育部指定的輔導學生升學之聯賽，體育總會則是教育性質的半官方體育組織，體育總會組織成員幾乎都由各層級學校教育工作者集結而成，高中體總於 2006 年轉為社團法人，而 CXL 由何凱成創辦，組織成員則包含公關部門及其他工作人員，相對體育總會的成員多在學校內服務，球學聯盟對於運動產業及商業模式的理解則可能較為突出。二、運作規劃：高中體總的經費大多仰賴教育部體育署的補助，且主辦籃球、足球、排球、壘球四大聯賽，也必須執行教育部的相關政策計劃，並且以教育、培養國家運動人才為目的，並與升學制度結合，前八強球隊之球員則可獲得升學保送，而相關經費的挹注及收入則不完全皆投入在籃球，並利用集中式賽制讓球員、球賽增加曝光度，而 CXL 創辦人何凱成，以自身在美國長大及參與美國運動賽事和於 NFL 工作之經驗，和團隊共同規劃賽制、經費運用、數據分析和賽事直播等面向，並期望改變現有教育體制，強調主客場制的賽制、球員的學業成績規範、學校球隊可自己經營並營利分潤的概念，和利用數據分析與直播來達成教練、球員、家長三贏之局面。三、比賽賽制：HBL 從過去的主客場制演變為今日的集中式賽制，每一階段在單一場館為期一周將賽事完成，優點可減少各校交通住宿之花費、集中轉播增加賽事和球員曝光度、場館及工作人員較好協調安排，但短期需打多場高強度賽事，則面臨須長時間訓練和球員身心健康之疑慮，而 CXL 則強調各校須有自己的室內場館，學校須努力加強自己的軟硬體設備並營運自己的球隊，並特別設定學業成績限制，未達標則無法上場比賽，並建立清楚的分潤制度，讓各校有清楚努力的目標，但目前 CXL 的成績並未具有保送大學的資格。**結論：**CXL 並不單純是一個籃球聯盟，更像是在衝擊目前的教育體制和臺灣運動環境，而 HBL 也歷經非常多年，才創造出如此驚人的關注度，兩方從屬性、制度和組織核心不盡相同，但期待在彼此碰撞的火花下，讓本國運動環境向前邁進。

**關鍵詞：**高中體總、高中籃球聯賽、球學聯盟、HBL、CXL

**通訊作者：**韓至恩，[ope110115@gm.nchu.edu.tw](mailto:ope110115@gm.nchu.edu.tw), +886954085487

# Study Taiwan High School Basketball League HBL And CXL

HAN, ZHI-EN <sup>1</sup>, Lee, Kuo-Wei <sup>2</sup>, SU, HONG-YING <sup>1</sup>

**Purpose:** The purpose of this research is discussing the High School Basketball League aka HBL which is promoted by CTSSF and Choxue League (CXL) which is promoted by Ho, Kai-Cheng. Through organization structure, operational planning and competition system, we can analyze the differences of these two league. **Method:** This research uses Qualitative Research Method. Collecting data of HBL and CXL through the file analysis and analyzing the differences. **Result:** 1. Organization Structure: HBL is promoted by CTSSF. CXL is a basketball league which is established by Person. HBL is a counseling student enrollment league which is designated by the Ministry of Education. CTSSF is half-official sport organization with educational nature and constructed by different level of educator. CTSSF turns into corporation aggregate in 2006. CXL is established by Ho, Kai-Cheng. League members include PR department and other workers. Unlike most CTSSF members have their service at school, CXL has more understanding in Sport industry and Business Mode. 2. Operation planning: The expenditure of CTSSF rely on Sports Administration, MOE. To host the four league competition (basketball, soccer, volley ball and soft ball), they need to follow related policies of Ministration of Education with the purpose of teaching and cultivating talented player and connecting with enrollment system. The team members of the Best eight team receiving chances of admission to school. The income and cost of related expenditure are not all focus on basketball. They used centralized competition system to expose the game and players. The founder of CXL, Ho, Kai-Cheng uses his experiences of attending America sports competition and his work experience in NFL, he collaborated with related group discussing competition system, data analysis and game broadcast and hoped to changed existing education system. Focus on Home and Guest team competition system, player's studying score specification and the concept of school team can share the earning. Using data analysis and broadcast for triple-win circumstances (coach, player and parents). 3. Competition system: HBL changed the Home and Guest team competition system into centralized competition system. Every phase completes all the competition in the same competition gymnasium in a week. The benefits are deducing the cost on traffic and hotel, focus on broadcasting more games and highlighting the players and the arrangement of workers and gymnasiums are easy. The drawbacks are players need to attend high intensity games in short time and need to face the physical and mentally concern under long time training. CXL emphasizes

on each school need to have their own indoor stadium. School needs to improve on both software and hardware and manage their own team. Setting a particular study score limit of players can't attend a game if their score didn't pass the standards and an exact earning share system to make every school knows their target to achieve, but right now scores in CXL does not have the school enroll qualification to college.**Conclusion:** CXL is not a merely basketball league but a shock to the educational system and sports environment of Taiwan when HBL takes years to create amazing attention. Though both league differ from attributes, competition system and members, we can hope both leagues make progress in Taiwan's sport environment.

**Key words:** CTSSF, high school basketball league, HBL, CXL

**Correspondence:** HAN,ZHI-EN, [ope110115@gm.nchu.edu.tw](mailto:ope110115@gm.nchu.edu.tw), +886-954-085-487

# 2022日本與台灣女子高爾夫巡迴賽之分析

林怡瀨<sup>1</sup>、張彥翔<sup>1</sup>、趙榮瑞<sup>2</sup>

<sup>1</sup>國立台灣體育運動大學競技運動學系、<sup>2</sup>國立台灣體育運動大學球類運動學系

**目的：**針對日本、台灣女子職業巡迴賽比賽過程之數據分析。**研究對象：**以 2022 日本、台灣女子職業高爾夫巡迴賽獎金排行各前十名，共 20 名之數據進行比較。**方法：**本研究依據透過日本女子職業高爾夫巡迴賽 (JLPGA)與台灣女子職業高爾夫巡迴賽(TLPGA)之官方網站所記錄的資料數據，數據內容包括平均開球距離、開球準確性、標準桿上果嶺率、沙坑救球率與總桿平均數，將資料整理後進行統計分析。**結果與結論：**一、開球平均距離方面台灣(237.2 碼)平均優於日本(236.9 碼)。開球準確性中日本(69.9%)平均優於台灣(66.5%)。標準桿上果嶺率方面日本(73.1%)平均優於台灣(57.9%)，因日本選手開球準確性高於台灣選手。沙坑救球率中，台灣(34.7%)平均優於日本(45.8%)。總桿平均數中日本(70.5%)平均優於台灣(72.4%)，標準桿上果嶺率較高而影響總桿平均數。二、若要降低總桿平均數，則需提升開球準確性與標準桿上果嶺率，總桿平均數相對會隨之降低。

**關鍵字：**女子高爾夫、職業巡迴賽、總桿平均數

**通訊作者：**林怡瀨，[pns029@yahoo.com.tw](mailto:pns029@yahoo.com.tw)，0932-504-259

# Analysis of the 2022 Japan-Taiwan Ladies Golf Tournament

Yi-Hui Lin<sup>1</sup>, Yen-Hsiang Chang<sup>1</sup>, Jung-Jui Chao<sup>2</sup>

<sup>1</sup>Department of Athletics, National Taiwan Sports University, <sup>2</sup> Department of Ball Sports, National Taiwan Sports University

**Purpose:** To analyze the data of Japan and Taiwan Women's Professional Tour. Research object: Compare the data of the top ten players in the 2022 Japan Ladies Professional Golf Tournament and the Taiwan Ladies Professional Golf Tournament, a total of 20 players. **Method:** This study is based on data recorded through the official websites of the Japan Ladies Professional Golf Tournament (JLPGA) and the Taiwan Ladies Professional Golf Tournament (TLPGA). The green rate, bunker save rate and total score average are collected and analyzed statistically. **Results and conclusions:** 1. Taiwan (237.2 yards) is better than Japan (236.9 yards) on average. In terms of kick-off accuracy, Japan (69.9%) is on average better than Taiwan (66.5%). In terms of the percentage of greens hit on par, Japan (73.1%) is on average better than Taiwan (57.9%), because Japanese players have higher tee-off accuracy than Taiwanese players. In bunker saving rate, Taiwan (34.7%) is on average better than Japan (45.8%). Japan (70.5%) is better than Taiwan (72.4%) in the total score average, and the green rate in par is higher, which affects the total score average. 2. If you want to reduce the total score average, you need to improve the accuracy of tee shots and the percentage of greens hit in standard par, and the total score average will decrease accordingly.

**Keywords:** women's golf, professional tour, scoring average Corresponding

**Author:** Yi Hui Lin , pns029@yahoo.com.tw , 0932-504-259

# 深度學習技術對體育課程高爾夫揮桿動作

## 自動評分之應用

許家得<sup>1</sup> 馬君萍<sup>2</sup> 黃憲鐘<sup>1\*</sup>

<sup>1</sup>國立中興大學體育室

<sup>2</sup>僑光科技大學國際貿易系

### 摘要

**目的：**本研究藉由 AI 深度學習技術應用對高爾夫課程揮桿動作自動評分，以科技化的方式輔助高爾夫動作教學與評分。**方法：**利用 AI 人工智慧技術，在高爾夫的揮桿動作上，透過解析圖像預測出人體的骨架位置，並以骨架向量之間的角度差距為核心概念，撰寫相關演算法得知動作標準，並以科學化自動評分高爾夫揮桿動作。**結果：**以 AI 人工智慧應用學習模擬和傳統評分方式，完全準確達 34%，相差 1 分達 38%，相差 2 分達 4%，相差 3 分達 3%，兩者則有顯著正相關。**結論：**AI 深度學習技術讓體育教學評分更科學化，不僅大幅度降低了運動教學和評分的成本，並且能夠有效提升運動學習的成效和體育多元教學之應用。

**關鍵詞：**深度學習、高爾夫、技術評分



# Application of deep learning technology to automatic scoring of golf swing on the PE class

Chia-Te Hsu<sup>1</sup> Chun-Ping Ma<sup>2</sup> Hsien-Chung Huang<sup>1\*</sup>

<sup>1</sup> NCHU Office of physical education and sports

<sup>2</sup> Department of International Trade, Overseas Chinese University

## Abstract

**Purpose:** This study uses AI deep learning technology to automatically score golf swings, and assists golf skills teaching and scoring in a technological. **Method:** Using AI artificial intelligence technology to predict the skeleton position of the human body by analyzing the image in the golf swing, and taking the angle gap between the skeleton vectors as the core concept, write the relevant algorithm to know the action standard, and Automatically score your golf swing with scientific results. **Results:** Using AI artificial intelligence application learning simulation and traditional scoring methods, the complete accuracy is 34%, the difference of 1 point is 38%, the difference of 2 points is 4%, the difference of 3 points is 3%, and the both too has a significant positive correlation. **Conclusion:** AI deep learning technology makes sports teaching scoring more scientific, not only greatly reduces the cost of sports teaching and scoring, but also can effectively improve the effectiveness of sports learning and the application of multiple sports teaching.

**Keywords:** deep learning, golf, skill scoring