EFFECT OF PATTERN RECOGNITION ABILITY TRAINING ON JUDGING PERFORMANCE OF MALAYSIAN RHYTHMIC GYMNASTIC JUDGES

By

TEH LAH HOONG

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

January 2010

Dedicated to

Mom
(who supported me in whatever I do although sometimes grudgingly!),

Dad
(who had a lot of faith in my abilities but left before I could finish this work),

Choon, Shawn, Wayne and Joy
(for their unconditional love and understanding of me)

Abstract of thesis presented to the Senate of Universiti Putra Malaysia
in fulfilment of the requirement for the degree of Doctor of Philosophy

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Chairman: Dr. Mohd. Majid Bin Konting, PhD

Faculty: Educational Studies

Studies have shown that expert judges are typically very accurate in their evaluations as compared to non-experts. Although the judging task challenges the limited capacities of attention, memory and speed of processing of judges that are characteristic of humans, expert judges have learned to circumvent processing limitations encountered by novice judges by acquiring certain cognitive structures. One possible acquisition from the repeated judging tasks could be an improvement in the pattern recognition skills. This research examined the significance of pattern recognition ability in the judging performance of Malaysian rhythmic gymnastics judges who were correspondingly classified by the Malaysian Gymnastics Federation as expert, non-expert and novice.

In the first study, thirty participants categorised by the Malaysian Gymnastics Federation were subjected to a series of pattern recognition ability test (PRAT) and judging performance evaluation tasks. The initial results of the first study using ANOVA analyses showed that there were significant differences between the level of expertise for the pattern recognition ability of each of the four body movement groups (jumps, balances, pivots and flexibilities) but results of the 3 X 4 (Expertise X Movement Series) MANOVA indicated no significant main effects [Pillai's trace = 0.45, F (8, 50) = 1.81, p > 0.05].

However, for their judging performance, ANOVA analyses showed that there were significant differences between the level of expertise for the pattern recognition ability of each of the five apparatus (rope, hoop, ball, clubs and ribbon). The results of the 3 X 5 (Expertise X Apparatus) MANOVA indicated there were significant main effects [Pillai's trace = 0. 79, F (10, 48) = 3.10, p < 0.05]. This finding was confirmed with a univariate ANOVA. Significant effects were observed for all components of the evaluation exercise as well as for the total (p < 0.05). Post-hoc comparisons revealed that there were significant differences between the experts and non-experts with the novices but there were no differences between the experts with the non-expert participants in their judging performance. However, when the participants were regrouped according to their movement pattern recognition ability; low, average and high, the results showed that there were very significant differences in the judging performances of the three groups classified according to their movement pattern recognition ability [F (2, 27) = 127.55, p = 0.00, w = 0.93].

In the second study, a selected group of non-expert judges had undergone a series of pattern recognition training for three weeks as treatment. The results of the main effects revealed that there were significant differences between the two groups of treatment and non-treatment participants on the PRAT scores [Pillai's trace = 0. 93, F (1, 8) = 9.81, $p < 0.05$, $\eta_p^2 = 0.93$]. This finding was confirmed with a univariate ANOVA. Significant effects were observed for all components of the PRAT as well as for the total ($p < 0.05$). A post-hoc test (Scheffe) verified that the treatment participants were improving significantly more than the non-treatment participants. As for the judging performance, the results of the main effects revealed that there were no significant differences between the two groups of treatment and non-treatment participants on the judging performance scores [Pillai's trace = 0. 82, F (5, 4) = 3.60, $p > 0.05$]. However, univariate analyses revealed that there were significant effects to the judging performance of the ball [F (1, 8) = 5.89, $p < 0.05$] and clubs routines [F (1, 8) = 7.21, $p < 0.05$]. The data collected partially support the proposition that pattern recognition ability training will bring a significant improvement particularly in the judging performance of ball and clubs routines which have a dominance of the balance difficulties.

These findings confirmed that pattern recognition ability was an important characteristic of the expertise of the rhythmic gymnastics judges. Besides, the findings gives hope that pattern recognition ability could be trained in order to contribute further to the advancement of the expertise of rhythmic gymnastics judges in their judging performance.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia
sebagai memenuhi keperluan untuk Ijazah Doktor Falsafah

KESAN LATIHAN KEUPAYAAN MENGENAL PASTI CORAK TERHADAP PRESTASI PENGHAKIMAN PARA HAKIM GIMRAMA MALAYSIA

Oleh

TEH LAH HOONG

Januari 2010

Pengerusi: Dr. Mohd. Majid Bin Konting, PhD

Fakulti: Pengajian Pendidikan

Kajian-kajian lepas telah membuktikan bahawa para hakim pakar senantiasa tepat dalam tugasan penilaian berbanding dengan hakim-hakim bukan pakar. Walaupun tugasan penghakiman mencabar keupayaan manusia yang terhad dari segi tumpuan, daya ingatan dan kepantasan pemprosesan dalam kalangan hakim-hakim, para hakim pakar dapat mengatasi had-had pemprosesan yang dihadapi oleh hakim-hakim baru dengan memperolehi struktur-struktur kognitif tertentu. Salah satu pemerolehan daripada pengulangan tugasan penghakiman boleh merupakan peningkatan dalam kemahiran keupayaan mengenal pasti corak. Kajian ini memeriksa kesignifikan keupayaan mengenal pasti corak kepada prestasi penghakiman para hakim gimrama yang diklasifikasikan oleh pihak Persekutuan Gimnastik Malaysia sebagai pakar, bukan pakar dan novis.

Bagi kajian pertama, tiga puluh peserta yang dikategorikan oleh Persekutuan Gimnastik Malaysia telah melalui satu siri ujian keupayaan mengenal pasti corak (PRAT) dan prestasi tugasan penghakiman. Keputusan awal kajian pertama dari rekabentuk ANOVA menunjukkan bahawa terdapat perbezaan tahap kepakaran untuk keupayaan mengenal pasti corak setiap jenis pergerakan badan (lompatan, imbangan, pivot dan kelenturan) tetapi keputusan 3 X 4 (Tahap Kepakaran X Pergerakan Badan) MANOVA menunjukkan bahawa tiada kesan utama yang signifikan [Pillai's trace = 0.45, F (8, 50) = 1.81, $p > 0.05$].

Bagi prestasi penghakiman, analisa ANOVA telah menunjukkan bahawa terdapat perbezaan tahap kepakaran untuk prestasi penghakiman setiap alatan gimrama (tali, gelung, bola, belantan dan reben). Keputusan 3 X 5 (Tahap Kepakaran X Alatan) MANOVA menunjukkan bahawa wujud kesan utama yang signifikan [Pillai's trace = 0. 79, F (10, 48) = 3.10, $p < 0.05$]. Dapatan ini disahkan dengan ANOVA univariat untuk semua komponen penilaian prestasi penghakiman serta untuk keseluruhan penilaian tersebut ($p < 0.05$). Perbandingan *post-hoc* mendedahkan bahawa peserta pakar dan bukan pakar adalah jauh lebih baik daripada peserta novis dalam prestasi penghakiman tetapi tiada perbezaan wujud di antara peserta pakar dengan peserta bukan pakar. Walau bagaimanapun, apabila para peserta dikumpulkan semula mengikut keupayaan mengenal pasti corak; iaitu rendah, sederhana dan tinggi, adalah didapati terdapat perbezaan yang signifikan dalam prestasi penghakiman di antara ketiga-tiga kumpulan yang diklasikasikan mengikut keupayaan mengenal pasti corak [F (2, 27) = 127.55, $p = 0.00$, $w = 0.93$].

Dalam kajian kedua, sebilangan hakim bukan pakar adalah terpilih untuk melalui satu siri latihan keupayaan mengenal pasti corak selama tiga minggu sebagai rawatan kajian. Keputusan tentang kesan utama telah menunjukkan bahawa terdapat perbezaan skor PRAT yang signifikan di antara peserta rawatan dan bukan rawatan [Pillai's trace = 0. 93, F (1, 8) = 9.81, $p < 0.05$, $\eta_p^2 = 0.93$]. Dapatan ini disokong dengan ANOVA univariate yang mencatatkan kesan signifikan untuk semua komponen PRAT serta keseluruhan keupayaan ini ($p < 0.05$). Ujian *post-hoc* (Scheffe) mengesahkan bahawa peserta kumpulan rawatan meningkat prestasi mereka dengan signifikan berbanding dengan kumpulan bukan rawatan. Bagi prestasi penghakiman, keputusan kesan utama menunjukkan bahawa tiada perbezaan di antara peserta rawatan dan bukan rawatan [Pillai's trace = 0. 82, $F (5, 4) = 3.60$, $p > 0.05$]. Walau bagaimanapun, analisa univariat menunjukkan bahawa terdapat kesan signifikan kepada prestasi penghakiman alatan bola [$F (1, 8) = 5.89$, $p < 0.05$] dan belantan [$F (1, 8) = 7.21$, $p < 0.05$]. Data yang dikumpulkan separa menyokong usul bahawa latihan keupayaan mengenal pasti corak akan membawa peningkatan dalam prestasi penghakiman para hakim gimrama terutamanya kepada rutin-rutin yang mempunyai lebih banyak kemahiran imbangan.

Dapatan kajian mengesahkan bahawa keupayaan mengenal pasti corak adalah ciri yang penting dalam kepakaran hakim gimrama. Keputusan kajian ini juga memberi harapan bahawa keupayaan mengenal pasti corak boleh dilatih supaya memberi sumbangan kepada peningkatan kepakaran para hakim dalam prestasi penghakiman mereka.