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Original Article

Comparison between genders in imagery ability in Portuguese basketball practitioners

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Abstract:
Few studies address the topic that we intend to investigate concerning the comparison of gender in Basketball. The aim of this study is to compare the ability of Imagery between female and male Basketball practitioners. The sample comprised 62 subjects (31 male and 31 female) with mean age 15 ± 1.2 years, intentional nature, for convenience. We applied the Movement Imagery Questionnaire–3, Portuguese version, to quantify the subjects' ability in kinesthetic, internal and external visual image. The inferential analysis was performed with SPSS 21.0 using the T-Student test for independent samples, with $p \leq 0.05$ considered significant. With regard to gender there are statistically significant differences between the means ($p \leq 0.05$), the kinesthetic mode, with the males a higher average (24.35) and in total of the questionnaire showing the males a higher average (75.19). Statistically significant differences were found in the kinesthetic mode and total of the Movement Imagery Questionnaire -3. This suggests that males have better Imagery capacity compared to females and better capacity in kinesthetic mode. For the two genders, there was a higher score on the inside visual mode hence suggesting this as the best method to be used in Basketball players.
Key words: imagery, movement imagery questionnaire-3, basketball, sport.

Introduction

Nowadays sport professionals have been researching the development and implementation of strategies and techniques that improve motor skills performance. The aim is to improve and optimize sport specific movements and eventually, athlete's performance. In this context, imagery, can be used as an additional method to improve the process of teaching, learning and performance of motor skills. McAvinue and Robertson (2008) produced a revision about the measures of motor imagery ability and concluded that due to individual differences of the subjects' imagery ability, it became essential to measure the individual capacity of each subject, before undertaking a study that involved motor imagery. On the sports environment, imagery, can be considered as a creation or replication of an experience that was generated through information stored in one's memory. This experience can involve sensitive, perceptive and affective characteristics that can happen even in the absence of real stimuli. Usually this causes physiological and psychological effects on the subject that does the imagery (Morris, Spittle, and Watt, 2005). Holmes and Calmels (2008, p.433) presented a concept of imagery adapted from Morris et al. (2005): "Imagery in the context of sport, may be considered as the neural generation or regeneration of parts of a brain representation/neural network involving primarily top-down sensorial, perceptual and affective characteristics, that are primarily under the conscious control of the imager and which may occur in the absence of perceptual afference functionally equivalent to the actual sporting experience". According to several studies it was verified benefits of imagery capacity in the performance and learning of athletes (Callow and Roberts, 2010; Doussolin and Rehbein, 2011; Anwar et al, 2011; Gaggioli et al., 2013; Williams and Cumming, 2012). For William et al. (2012) determining which modality of imagery (kinesthetic, internal or external visual) is the most appropriate to each subject it is vital, as it leads to best results in the application of the imagery technique. Relative to the type of imagery, athletes fundamentally described four (visual, kinesthetic, auditive and olfactory), and that the visual and kinesthetic are the most used and in more diverse situations (Weinberg & Gould, 2011). When the objective is simulating an action or a movement, the focus is normally kinesthetic and visual. Visual representation contains information about what the individual "sees" in these images and can be done from two perspectives: the internal perspective, in which it is seen in the first person, known as internal visual imagery, making the individual part of the action, or rather, imagining he sees with his own eyes; the external perspective, in which one sees oneself in the third person, known as external

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visual imagery, in which the individual occupies the position of an observer as if seeing the action outsider of his own body (Holmes & Calmels, 2008). Kinesthetic modality of movement involves the representation of how it "feels" to perform an action, such as the tension of a muscle contracting when climbing stairs. This internal feeling involves awareness of position and of body movements, also known as proprioception or kinesthesia, as well as the strength and effort experienced during the movements (Callow & Watters, 2005; Kim et al., 1998). White and Hardy (1995) state that each of the visual modality perspectives serve different purposes: the perspective of visual external imagery has greater value in the performance of tasks such movement learning, and when the corporal shape or coordination is important, in other words, visualizing how the movement or action should be performed; the perspective of internal visual imagery has greater value in open abilities in which the temporal notion is important (the individual is able to visualize spatial notion and when the movement should be started). Kinesthetic modality has more impact in training and performance of athletes (Smyth & Waller, 1998; Fery & Morizot, 2000) and when the results of the movement are related with sport performance. Although there are some studies about imagery, few are the ones that investigate the comparison of genres and in the proposed sport.

The objective of the present study was to investigate if there were statically significant differences in the use of the imagery modalities (kinesthetic, internal or external visual) between female and male Basketball practitioners.

Method

Participants

The sample comprised sixty two subjects (31 males and 31 females) with a mean of 15 years old of age (± 1.2 years). All subjects were capable of reproducing the four movements of Movement Imagery Questionnaire – 3 (MIQ-3) and had never used or been introduced to the imagery technique or concept previously.

In what concerns to the nature of our sample, we can say that it is intentional for convenience, since it was the most suitable to the type of study we have done and consider it of non-probabilistic, since it was selected by subjective criteria of the investigator and according to the purpose of the study (Tuckman and Harper, 2012).

Procedure

All subjects gave their written consent to participate in the study. In case of minors the consent was given by their parents. Before taking part of the study, participants were informed about the objective of the investigation and the confidentiality of personal data and results. In order to guarantee standardization of the experience all subjects received the same written form with the study procedures.

Inclusion Criteria are: (I) Level of training Under-16 or Under-19; (II) Registered with the Portuguese Federation of Basketball; (III) Practicing Basketball for at least 3 years; (IV) Consent form filled.

Measure

The MIQ-3 is an instrument composed of 12 items which evaluate individual ability of mental visualization of movements, made up of three factors (kinesthetic, visual internal and external modalities), with four items each, proposed by Williams et al. (2012). For the evaluation of the ability of imagery, two subscales with 7 grades were used, going from "very hard to see" (or feel)" to "very easy to see (or feel)", according to the Imagery modality performed. The MIQ-3 showed good internal reliability for each factor through Confirmatory factor analysis, confirming values to composite reliability above 0.7, average variance extracted above 0.5. The Imagery score is obtained through the sum of the evaluation of the internal and external visual image, and of the kinesthetic sense, each of the modalities represented from a maximum score of 28, giving an MIQ-3 total of 84. For this study a preliminary version of the MIQ-3 for the Portuguese population was used (Mendes et al. 2015), which produced values with good internal consistency in the questionnaires as a whole and in terms of the three factors, through Cronbach`s alpha (MIQ-3 =.88; kinesthetic = .79; internal visual = .79; external visual = .79).

Statistical analysis

The data was registered on Excel 2010. SPSS, 21.0 software was used for the statistical analysis. Descriptive statistics, was calculated as frequencies and percentages for nominal data and medians and interquartile ranges for ordinal data. The study hypotheses were explored using T-Student test for inferential statistics for the independent groups for the kinesthetic, internal and external visual modalities. A p value <0.05 on the "T-Student" test was considered significant, similarly to what has been done in studies in the same field (Tuckman and Harper, 2012).

Results

The results of the different sub-scales of Miq-3 in what concerns to visual internal, visual external and kinesthetic modalities, are shown below, through descriptive statistics.

Table 1. Descriptive analysis of the sum of the three sub-scales of MIQ-3 for males

Modalities	N	Min	Max	Mean	SD
Kinesthetic	31	18	28	24.35	2.457
Visual Internal	31	20	28	25.58	2.277
Visual External	31	20	28	25.35	2.374
MIQ-3	31	64	84	75.29	5.509

In males (table 1), in the kinesthetic modality, the maximum value recorded was 28 and the minimum was 18. The mean was 24.35 ± 2.46. In the internal visual modality, the maximum value recorded was 28 and the minimum was 20. The mean was 25.58 ± 2.28. Regarding the external visual modality, the maximum value recorded was 28 and the minimum was 20. The mean was 25.35 ± 2.37. In the sum of all three modalities of MIQ-3, the maximum value recorded was 84 and the minimum was 64. The mean was 75.29 ± 5.5.

Table 2. Descriptive analysis of the sum of the three sub-scales of MIQ-3 for females

Modalities	N	Min	Max	Mean	SD
Kinesthetic	31	14	28	22.35	3.411
Visual Internal	31	20	28	24.84	2.354
Visual External	31	19	28	24.03	3.093
MIQ-3	31	54	84	71.35	7.618

In females (table 2), in the kinesthetic modality, the maximum value recorded was 28 and the minimum was 14. The mean was 22.35 ± 3.41. In the internal visual modality, the maximum value recorded was 28 and the minimum was 20. The mean was 24.84 ± 2.35. Regarding the external visual modality, the maximum value recorded was 28 and the minimum was 19. The mean was 24.03 ± 3.09. In the sum of all three modalities of MIQ-3, the maximum value recorded was 84 and the minimum was 54. The mean was 71.35 ± 7.62.

Accordingly to the data obtained (Table 3), males showed higher mean values in all of the three modalities and in the sum of the modalities.

Table 3. Descriptive statistics of MIQ-3 and different modalities by gender

Group Statistics		Mean	SD
Kinesthetic	Male	24,35	2,457
	Female	22,35	3,411
Visual Internal	Male	25,48	2,448
	Female	24,84	2,354
Visual External	Male	25,35	2,374
	Female	24,03	3,093
Total MIQ - 3	Male	75,19	5,735
	Female	71,35	7,618

The next table (table 4) show the results between gender comparisons for the three modalities of imagery using the T-Student for independent samples. The results were then confirmed with Pearson correlation test.

Table 4. T-Student Test to independent samples between male and female basketball athletes.

	t	Sig.
Kinesthesic	2.649	.010
Visual Internal	1.058	.294
Visual External	1.889	.064
Total MIQ-3	2.241	.029

There were statistically significant differences between the means ($p \leq 0.05$) in the kinesthetic modality of imagery in what regards gender. Males showed a higher mean (24.35) than females in this modality. Also in sum of the three subscales of the MIQ-3, males showed a higher mean. (75.19) with a statically significant difference. There were no statistically significant differences between males and females in what concerns the internal and external visual modality. In addition, both genders showed a higher score on the internal visual modality.

Discussion

The aim of the present study was to investigate if there were statistically significant differences between genders in the three modalities of imagery within Basketball players. In a study done by Williams et al (2012) there were differences between genders in the modalities of imagery in subjects with a mean of 20.29 ± 2.25 years old. However, these differences were not statistically significant. Similarly, Campos (2014) found that female participants with a mean of 19.96 ± 2.05 years old had better values of imagery compared with males, but again these results were not statistically significant. Nevertheless, in our study results showed statistically significant differences between genders in the kinesthetic modality and in the sum of the MIQ-3. Moreover, regardless of the modality of imagery used, males always had higher mean scores than females, going to meet another study of Campos (2004) which verified that male subjects had better imagery capacity that the females in ages between 20 and 40 years. The scores registered on the use of the internal visual modality of imagery were higher in both genders when compared to the ones registered in the use of others modalities. Hence suggesting

that this type of internal visual imagery is the best method to apply in Basketball athletes. This results are consistent with other studies of Monsma et al (2009), and Williams et al. (2012). These authors also documented higher values on the visual modality of imagery in contrast with the kinesthetic. Nezan et al. (2014) confirmed that elite and sub-elite athletes achieved better internal visual modality and kinesthetic results compared to external visual modality, when studyng open sport modalities (basketball, soccer, indoor football, badminton, handball and volleyball), achieving a superior mean internal visual modality. White and Hardy (1995) stated that the internal visual modality is of greater value in open skills, when the temporal notion is important (the individual is able to visualize the spatial notion and when the movements are to be started), which is the case with basketball.

Conclusions

Our results showed that males athletes had better results in each of the imagery modalities as well as in the total of the questionnaire. These differences were statically significant different in the kinesthetic modality and in the sum of the modalities of the MIQ-3. Thus suggesting that males have a better capacity of using Imagery than females and that this ability is best on the kinesthetic modality. For both genders a higher score was obtained in the internal visual modality of imagery when compared with the external visual and kinesthetic modalities. This finding suggests that the internal visual modality is probably the best method of intervention for basketball athletes.

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