

Impact of psychological gender on competition performance of elite female boxers

ALEKSANDER OSIPOV¹, MIKHAIL KUDRYAVTSEV², ALENA GALIMOVA³, MIKHAIL KOLOKOLTSEV⁴, ELENA ROMANOVA⁵, MARIYA LAZAROVA⁶

^{1,2} Siberian Federal University, Krasnoyarsk, RUSSIA

¹ Voino-Yasenetsky Krasnoyarsk State Medical University, Krasnoyarsk, RUSSIA

^{1,2} Siberian Law Institute of the Ministry of Internal Affairs of the Russia, Krasnoyarsk, RUSSIA

² Reshetnev Siberian State University Science and Technology, Krasnoyarsk, RUSSIA

³ East – Siberian Institute of the Ministry of internal Affairs of the RF, RUSSIA

⁴ Irkutsk National Research Technical University, Irkutsk, RUSSIA

⁵ Altai State University, Barnaul, RUSSIA

⁶ Faculty of Public Health, Medical University – Sofia, BULGARIA

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Abstract:

Sport professionals declare a significant interest increase of females about classes which are considered "male" sports traditionally: weightlifting and various combat sports. The investigation of gender-specific features of female's motivation to classes of masculine sports is an actual problem of sports psychology. *The purpose of this research* is determine the impact of psychological gender on competition performance of elite female athletes in amateur boxing. *Material and Methods.* Elite female athletes (n=82) who practicing amateur boxing, participated in this research. The diagnosing the psychological gender (method by O. Lopukhova) and analysis of competition scores of athletes in recommendations with guidelines of the German potential analysis system (PotAS) were performed. *Results.* There were founded that most of female participants (n=35) have the predominance of masculine psychological gender. Other part of female participants (n=32) have the predominant features of androgynous psychological gender and some female athletes (n=15) have been identified as feminine type of psychological gender. In meantime, there were no reliable differences in total number of athletes between female boxers, who have masculine or androgynous psychological gender. Participants, who have feminine psychological gender, have a significant ($p \leq 0.05$) younger chronological mean age, than other female athletes. There were significant ($p \leq 0.05$) differences in competition scores between participants, who have feminine psychological gender and other female athletes. Female boxers, who have feminine psychological gender, demonstrated a significant ($p \leq 0.05$) lower competition scores, than other participants. In their body, a significantly lower content of the muscle component was established, compared with the male and androgynous psychological gender. In meantime, there were no reliable differences in competition scores among participants, who have masculine or androgynous psychological gender. *Conclusions.* This investigation suggested that there is reliable impact of psychological gender on competition performance of female boxers, regarding female athletes with feminine psychological gender. Female athletes, who have feminine psychological gender, demonstrated a significantly lower competitions result, than female boxers, who have masculine or androgynous psychological gender. In meantime, there were no reliable effects of psychological gender on competition performance of female athletes, who have masculine or androgynous psychological gender.

Key Words: women's boxing; female athletes; psychological gender; masculinity; androgyny

Introduction

Psychologists and sport professionals state that the problem of psychological gender specificity of elite athletes, who practicing various sports deserves close attention since the composition of these psychological qualities, may vary significantly depending on the type of sports activity (Osipov et al., 2020; Fernandez et al., 2019). Sport professionals reported that there is a significant lack of scientific knowledge devoted to various aspects of sports psychology of female athletes, who practicing various types of martial arts and combat sports (Kovalev, 2019). Carlsson, (2017) emphasize that complete and robust scientific research are needed to highlight the topics of gender specific characteristics of elite athletes, who practicing different types of martial arts and combat sports, for the most complete understanding of all significant aspects of the gender creation of sports activity.

Current, there has been a continuous increase in the participation of female athletes in "masculine" sports competitions (Sutresna, 2021). Unfortunately, scientists emphasize that in scientific literature there is not full and robust knowledge in the field of sports psychology of non-elite, sub-elite and elite female athletes, who are professionally practiced in various sports (Kuzmin, 2018; Iedynak et al., 2017) including amateur and professional boxing (Simpson, & Wrisberg, 2013). It's known, that amateur women's boxing is quite a young sport which has been relatively recently included in the program of the summer Olympic Games. Sport scientists & coaches point to significant interest in amateur and professional boxing among young females (Korobeynikov al., 2019). In particular, the actual problem of sports psychology is the problem of studying the female motivation to engage in initially masculine sports: combat sports, martial arts, weightlifting, etc. *Alvariñas-Villaverde, et al.* (2017) reported, that an analysis of the model of participation of men and women in sports activities shows that the most of men and women's sports choice conforms to traditional notions about men's and women's sports. *McGannon et al.* (2018) reported that gender aspects of women's motivation to engage in "male" sports activities seem to be insufficiently studied although the attempts to identify specific psychological motives for women boxing were made by the sport professionals & scientists. Currently, scientific view prevails that various martial arts and combat sports, including boxing, are performed by women who have masculine (inherent in men) character traits and a low level of emotionality (Burdzicka-Wolowik, & Goral-Radziszewska, 2014). Full analysis of the psychological profile of female boxers will provide detailed information about the specifics of female's boxing and improve the programs of sports training of female boxers to competition activities. It is believed that a detailed investigation of such aspects will allow sport professionals & scientists to answer a number of important practical questions related to determining the specificity of the sports motivation of female boxers and the influence of specific psychological motives on the athletic performance.

A scientific review allowed to determine the main purpose of this research – determine the impact of psychological gender on competition performance of elite female athletes in amateur boxing. It was hypothesized that the masculine psychological gender prevails among elite female boxers and female athletes with masculinity achieve more significant competition success.

Material & methods

Participants

The Russian young (mean age – 21.36 ± 3.21 years) women ($n=82$), who practicing amateur boxing, participated in this research. All female boxers were from 3 different sport boxing clubs and competed with each other in the same region. All female athletes competed in weight categories from 57 kg to 75 kg. To take part in this research, all female athletes were required to present the following criteria: **A)** not have any diseases or sport injuries (more than six months before the participation of this research); **B)** experienced with boxing training (more than five years); aged equal to or higher than 18-year old and less than 25-year old; **C)** taken part in official regional and national amateur boxing competitions during the current year; **D)** trained at least six times per week; **E)** be an acceptable sport qualification – sport club team members (elite athletes).

This scientific work complied with the Declaration of Helsinki. All ethical principles were observed. All procedures were approved by the local ethics committee of the Institute of Physical Education, Sport and Tourism, SibFU (Protocol No 15/2021). All female athletes gave informed consent to participate and publish the findings of this scientific research.

The research design

The overall period of this investigation conducted about 12-month (November, 2021 – November, 2022). Firstly, an assessment of the psychological gender of all female boxers was carried out (November – December, 2021). Then the competition performance results of female boxers, who were divided into groups according to the identified psychological gender, were evaluated (January – October, 2022). Also, at this stage (January, 2022), anthropometric measurements of participants were performed. Finally, the overall data analysis was conducted (October – November, 2022).

The simple and robust methods were used in this scientific work. Anthropometric examination included measurement of body length, cm and body weight, kg with calculation of body mass index (BMI), kg/m^2 . The mean height, weight of participants (all females were taken measurements in light clothing and barefooted) were measured to the nearest 0.5 cm and 0.1kg, respectively, using the electronic medical scales SECA 703 (China) with Seca 220 height meter. To determine the component composition of the body of all athletes, the circumference of the limbs was measured and the thickness of the skin-fat folds was determined using a caliper. The calculation of the content of the absolute and relative content of the muscle and fat components of the body was carried out according to the formulas of Matiegka (1921). The aerobic fitness performance of female participants was measured using the Cooper 12-minute Run Test. All participants ran for 12 minutes (as fast as possible) and the total distance covered was recorded for each participant.

The questionnaire "Masculinity, femininity and gender personality type" by O. Lopukhova (2013) to determine the characteristic psychological traits of female athletes was used. This questionnaire is the result of the validation of the questionnaire by S. Bem (1974). Unlike the translated versions of the original questionnaire by S. Bem, questionnaire "Masculinity, femininity and gender personality type", was validated on a Russian

sample (Lopukhova, 2013). All female athletes were asked to rate 27 points of this questionnaire on a scale from 1 to 5 points. Then a total score was calculated with the subtraction of 27 points (an indefinite mean value) and the obtained results are compared with diagnostic data determining the gender type of personality.

Competition performance of female boxers was assessed using rating scores awarded to participants based on PotAS recommendations. To determine the rank of competition performance, each female boxer was evaluated with regards to their performance in six (the 3-regional and 3-national) amateur boxing tournaments which were scheduled during ten months (January – October, 2022).

The female boxers' individual rank position in tournaments was evaluated in recommendations with guidelines of the German potential analysis system (PotAS) for elite sports, which recommend awarding rating scores for the final place in competition. The individual rank position for each female athlete during the competition was evaluated using a graded special point scale: first place (gold medal) – 20 points; second place (silver medal) – 15 points; third place (bronze medal) – 10 points; fifth-sixth place – 5 points; seventh-eighth place – 3 points; ninth-twelfth place – 2 points; other place (attendance) – 1 point. The competitions mean score of the female athletes' final points achieved were used for further scientific analysis.

Statistical analysis

The research data were collected and analyzed using SPSS Statistics for Windows 19.0 (SPSS Inc., Chicago, IL, USA). All research values were expressed as means and standard deviations (Mean $\pm$ SD). The normal distribution of data was checked and confirmed using the Shapiro–Wilk test. Homogeneity of variance was verified with the Levene's test. All variables presented normal distribution. The variables were compared using a one-way ANOVA for independent measures (including Tukey's HSD test). The level of significance was set at $p \leq 0.05$.

Results

The psychological gender investigation showed that of 82 elite female boxers, most of female athletes have the predominance of masculine psychological gender - 42.7% (35 women). Part of female amateur boxers have the predominant features of androgynous (a combination of masculine and feminine behavioral strategies) of the psychological gender - 39.0% (32 women). Also, some female boxers were identified as feminine type of psychological gender - 18.3% (15 women).

Table 1. Data of the type of psychological gender and competition performance of female participants

Indicators	Female boxers' psychological gender			$p \leq$
	Masculine	Androgynous	Feminine	
n =	35.0 (42.7%)	32.0 (39.0%)	15.0 (18.3%)	
Mean age	22.03 $\pm$ 2.18	21.49 $\pm$ 3.25	19.82 $\pm$ 1.36*	0.029
Mean height (cm)	169.46 $\pm$ 8.36	168.27 $\pm$ 7.43	166.38 $\pm$ 8.52*	0.016
Mean weight (kg)	66.27 $\pm$ 7.61*	63.75 $\pm$ 6.19	62.46 $\pm$ 5.09	0.027
BMI (kg/m ²)	23.24 $\pm$ 0.12*	22.68 $\pm$ 0.15	22.91 $\pm$ 0.08	0.048
Shoulder girth (cm)	32.5 $\pm$ 0.42	30.0 $\pm$ 0.38	27.5 $\pm$ 0.14*	0.039
Female boxers' competition and fitness performance				
Cooper 12-min	2895.27 $\pm$ 241.08	2902.43 $\pm$ 304.56	2846.58 $\pm$ 232.64	0.875
Run Test (m)				
Mean score	33.66 $\pm$ 15.96	29.71 $\pm$ 16.14	16.87 $\pm$ 6.31*	0.031

Note: * – $p \leq 0.05$ – (level of significance); N – number of participants.

There were no significant differences in total number of female participants between masculine and androgynous psychological gender groups. In contrast, there were significant ($p \leq 0.05$) differences in total number of participants between female boxers, who have feminine psychological gender and other participants. In meantime, female participants, who have feminine psychological gender, have a significant ($p \leq 0.05$) younger chronological mean age, than other female athletes. There were no significant differences in chronological mean age values between female athletes, who have masculine or androgynous psychological gender.

Anthropometric measurements showed that there were significant ($p \leq 0.05$) differences in height and shoulder girth indicators between participants. Female athletes, who have a feminine type of psychological gender, have significant ($p \leq 0.05$) lower mean height and reach in comparison to other females, who have masculine or androgynous psychological gender.

Also, there were significant differences in weight and BMI indicators among the participants. Female athletes, who have masculine psychological gender, demonstrated a significant ($p \leq 0.05$) higher mean weight and BMI indicators in comparison to other participants. To determine the relationship between the type of psychological gender type and the level of content of muscle and fat mass, the component composition of the body of all athletes was studied, figure.

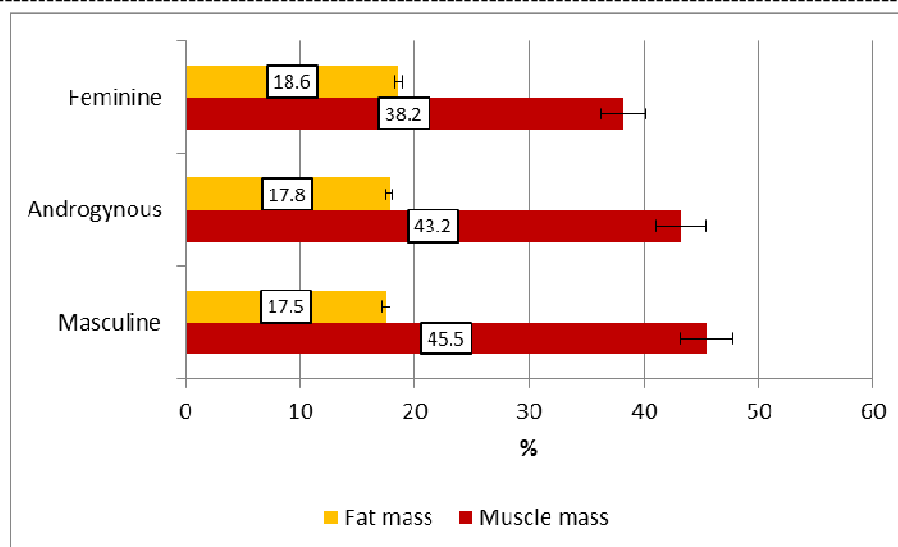


Fig. Component body composition of girls of different psychological genders

An analysis of the results of assessing the component composition of the body of athletes showed that the highest content of muscle mass (45.5%) was recorded in girls of the male psychological gender, which was significantly higher by 16.1% than in the representatives of the female psychological gender, $p \leq 0.05$. In female boxers of the androgynous gender type, the content of muscle mass was also significantly higher by 13.1% than in female athletes of the female psychological gender type, $p \leq 0.05$.

The highest content of the fat component (18.6%) was in female athletes of the psychological gender, which is 5.9% more than in the representatives of the male psychological gender (17.5%) and 4.5% than in women of the androgynous psychological gender type (17.8%), $p \leq 0.05$.

There were no significant differences in aerobic fitness performance (Cooper 12-minute Run Test) between participants. All female participants demonstrated a high level of aerobic fitness performance, regardless of psychological gender, $p \geq 0.05$.

There were significant ($p \leq 0.05$) differences in competitions mean score of the female athletes' final points between participants, who have feminine psychological gender and other female athletes. Female boxers, who have feminine psychological gender, demonstrated a reliable ($p \leq 0.05$) lower competition scores (16.87 ± 6.31 scores), than other participants. In meantime, there were no significant differences in competition scores between female athletes, who have masculine or androgynous psychological gender, table 1.

Dicussion

This scientific work investigated that there is a significant impact of amateur female boxers' psychological gender on there competition performance, regarding female athletes with feminine psychological gender. Was found, that female participants, who have feminine psychological gender, demonstrated a reliable ($p \leq 0.05$) lower result of competitions, than other female participants, who have masculine or androgynous psychological gender. This investigation showed that female athletes, who have masculine psychological gender, have higher body weight and BMI indicators than female boxers, who have androgynous or feminine psychological gender. Also, founded, that female participants, with feminine psychological gender have a significant ($p \leq 0.05$) lower mean height and reach indicators, than other participants, who have masculine or androgynous psychological gender.

Well known that the achievement of competition success in martial arts and combat sports depends on a number of psychological factors: confidence in their abilities, sufficient motivation, mental stamina, resistance to stress and other (Slimani et al., 2017). Impact of psychological gender on formation of sports identity of females, who practicing various combat sports and martial arts, including female's amateur boxing, has been recognized by sport professionals & psychologists (Aranson, 2021; Dougan, & Graham, 2019). *Cardoso et al.*, (2016) reported that majority of female athletes, who practicing different types of martial arts identify themselves with the androgynous psychological gender. In meantime, scientific literature presents evidence that female athletes, who practicing various martial arts, have mainly inclined to psychological masculinity (Burdzicka-Wolowik, & Goral-Radziszewska, 2014).

Scientific knowledge on the investigation of gender-role orientations of women practicing "male" sports show that the orientation of masculinity has a positive effect on the level of competence of athletes in contrast to the orientation of femininity (Guillet et al., 2006). However, Burdzicka-Wolowik, (2014) reported that there is not enough exact knowledge about correlation between the psychological gender (androgynous, feminine or

masculine) of female athletes, who practicing various martial arts and level of competition performance of female athletes. This investigation showed that there were no significant differences in competition performance of female boxers, who demonstrate predominance of masculine or androgynous psychological gender. In meantime, it was investigated that female boxers, who have feminine psychological gender, demonstrated a significantly ($p \leq 0.05$) lower competitions results, than other female athletes. According to our data, a study of the body composition of all female boxers showed that athletes of male and androgynous psychological gender have significantly higher values of muscle mass in their body compared to female psychological gender, $p \leq 0.05$. This provides the advantage of athletes of these psychological genders in speed-strength qualities, which are the most significant in martial arts (Hendarto et al., 2018). Thus, may be conclude that the orientation of masculinity or androgyny has a higher positive effect on the level of competition performance of female amateur boxers in contrast to the orientation of femininity.

Any inferences made in this scientific work have important limitations. These limitations associated with low total number of elite female athletes, who participated in this research and small period of competition activity of female boxers (only six amateur boxing tournaments). Furthermore, the main findings of this research, related to the evaluation of competition success, could have significant affected by rapid weight loss procedures in female boxers for competition success. Also, must take into account that the findings may strongly depend on the mean chronological age of participants. Investigators reported that after the chronological age of 24 years old, female athletes, who have orientation of masculinity predominate in women's boxing (Osipov et al., 2019).

Conclusions

As a result of the conducted scientific research, the predominance of representatives of the male and androgynous psychological gender type among female boxers was established. According to the scientific project, their number was 2.3 and 2.1 times more than female athletes of the psychological gender.

The analysis of the obtained data made it possible to establish a significant difference between the results of the competitive activity of female boxers and their psychological gender. The effectiveness of the competitive activity of athletes classified as male and androgynous psychological gender turned out to be 2 and 1.8 times higher, respectively, than that of female athletes. One of the reasons for the high performance of female boxers of the male and androgynous psychological gender type is the significantly high content of the muscle component in their body, which provides them with an advantage over the female psychological gender.

The obtained materials of the research project can be used in the training process of training female boxers to improve their sports results.

Conflicts of interest

The authors declare that this scientific work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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