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### **Variance analysis: Doping attitude, doping behavior and sport orientation in elite martial artists**

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#### **ABSTRACT**

*The idea that sport should provide children and adolescents with an unwavering moral compass is commonly held, and is mirrored in the extensive list of personal and social benefits attributed to sport involvement. Numerous studies have reported that an athlete's drug use in sport could be credited to a complex interaction of personal and environmental. Possible contributing environmental factors include attitudes of peer groups, parents, coaches, accessibility to drugs, and cultural norms and values. In the present paper researchers want to answer the query of: do doping attitude and behavior have any significant differences in the diverse levels of gender, competing level, and type of athlete? 160 elite athletes (120 males, 40 females) with the mean age of 22 (3.1) years who had activity records in Kick Boxing, O-Sport, Sumo, Wrestling, Jiu-Jitsu, Boxing and Muay Thai were chosen by categorical sampling method and they filled questionnaires voluntary. ANOVA was used For measuring difference between athletes' doping attitude and behavior and sport orientation. it realized that athletes' professional situations did not predict the doping behavior, believe, attitude and winning orientation alternations, however, the athletes' professional situations can predict competitiveness and goal orientation alternations of elite martial artists. And athletes' diverse levels of competing did not predict the doping believe and attitude alternations, however, the athletes' diverse levels of competing can predict doping behavior, competitiveness, winning and goal orientation alternations of elite martial artists.*

**Key words:** Doping Attitude, Doping Behavior, Sport Orientation

#### **INTRODUCTION**

The idea that sport should provide children and adolescents with an unwavering moral compass is commonly held, and is mirrored in the extensive list of personal and social benefits attributed to sport involvement [1]. Due to the fact that success in sport is typically coupled with fame and financial rewards, the use of banned performance enhancing drugs (PEDs) to gain a competitive edge is tempting. According to the International Olympic Committee's (IOC's) official statistics, annually 1–2% of all the doping tests are found positive for illegal PED use [2]. It is possible that the real prevalence of doping among athletes is considerably higher than this [3];[4];[5];[6];[7]. Use of PEDs is not just limited to adult athletes, but also includes adolescents. In 2006, the New Jersey Interscholastic Athletic Association was the first state to enact random drug testing of high school athletes [8]. More recently, the University Interscholastic League (UIL) within the state of Texas spent nearly \$6 million for its high school athlete steroids testing program, the most comprehensive in the nation [9]. Athletes utilizing unhealthy doping habits at this crucial age may experience more negative health effects, and athletes starting the doping process at a younger age may use the substances for longer periods of time raising the potential for negative health consequences [10]. Most children and adolescents are involved in athletics for fun, skill development, fitness, and to build positive relationships [11]. These positive outcomes may not occur in outcome-oriented situations; however, sport participation may lead to problematic results such as doping. Studies concerning children and

adolescents report a doping prevalence between 3 and 5% [4]. Irving et al. [12] reported higher percentages of use of PED among young males as compared to females. Wroble, Gray, and Rodrigo [13] conducted a survey of 1553 pre-adolescent (10–14-year-old) athletes from 34 states and found a much lower anabolic steroid (AS) usage percentage among 10–14 year olds (0.9% male and 0.2% female). In an investigation by Stigler and Yesalis [14] that surveyed 873 Indiana high school football players, 6.3% admitted to using AS. Among adult athletes, in self-reported-use studies, doping prevalence has been estimated to be 5–15% [4]. Numerous studies have reported that an athlete's drug use in sport could be credited to a complex interaction of personal and environmental factors [15];[16];[17]. Possible contributing environmental factors include attitudes of peer groups, parents, coaches, accessibility to drugs, and cultural norms and values [18];[19]. Participants in Diacin, Parks & Allison [20] study supported athlete drug testing and identified factors that influenced their perceptions of the use of performance-enhancing substances. Their data showed that female athletes were more supportive of testing programs than males, testing by schools and the NCAA was supported but conference-wide testing programs were not, and finally that in general the athletes questioned were indifferent to drug testing [20]. It seems that researchers are unanimous with undesirability of doping in sport. It must be clarified that the reason behind doping prohibiting was initially concern enhancement of athlete's health [21]. After that doping was emerged as an unethical matter [22]. Although gender, cultural and competitive level differences among athletes have been scrutinized since the late '80s [23];[24] the relationship between these factors and doping behavior has not been empirically tested, except in one project. In the study by Lucidi, et al. [25] the classic *Theory of Planned Behaviour* (TPB) model [26] provided a theoretical framework for a study among Italian adolescents, where attitude was found to be the strongest predictor for behavioral intention. The TPB model held across different levels of sport involvement and gender [22]. In the present paper researchers want to answer the query of: do doping attitude and behavior have any significant differences in the diverse levels of gender, competing level, and type of athlete?

## MATERIALS AND METHODS

### Participants

160 elite athletes (120 males, 40 females) with the mean age of 22 (3.1) years who had activity records in Kick Boxing, O-Sport, Sumo, Wrestling, Jiu-Jitsu, Boxing and Muay Thai were chosen by categorical sampling method and they filled questionnaires voluntary.

### Measures

Performance Enhancement Attitude Scale [27]: The PEAS consists of 17 attitude statements measured on a six point Likert-type scale ranging from strongly disagree (1) to strongly agree (6). There were evidences from previous use that the scale is unidimensional and reliable, with Cronbach's alpha values above 0.70 [27];[28];[22]. The internal consistency of the scale for the present sample (Cronbach  $\alpha = 0.776$ ) and it increased to 0.812 by omitting the statements of 9, 13, 14 and 16.

Sport Orientation Questionnaire [29]: The SOQ contains 25 items that uniquely relate to one of three independent factors: (a) competitiveness, (b) winning, and (c) goals. Of the total 25 items, the competitiveness subscale consists of 13 items, whereas the winning orientation and goal orientation subscales contain 6 items each and items are completed by a five-point Likert scale that ranges from strongly agree to strongly disagree. The internal consistency coefficients for the three subscales are reported as follows: competitiveness subscale 0.94, win orientation subscale 0.86, and goal orientation subscale 0.80 [29]. In the present study, the observed internal consistencies of the SOQ were: Competitiveness ( $\alpha = 0.855$ ), Win orientation ( $\alpha = 0.817$ ) and Goal orientation ( $\alpha = 0.718$ ), however, the Cronbach's alpha for Goal orientation increased to 0.730 after omitting its first statement.

Doping Use Belief measures [22]: The DUB were operationally defined as expressions of presumed opinion regarding doping use, namely whether doping should be allowed for top and all level athletes (2 separate questions). Participants were asked to select one of the three responses: 'yes, without restrictions', 'yes, with restrictions' and 'absolutely not'. The Doping behavior latent variable was defined by two self-reported measures of doping behavior: current use of and past experience with performance enhancing substances. The internal consistency coefficients for both variables were reported 0.94 [22]. In the present study, the observed internal consistencies of the DUB were: Doping behavior ( $\alpha = 0.713$ ) and Doping belief ( $\alpha = 0.734$ ).

### Methods

Descriptive statistics were used for describing and categorizing raw data and for measuring Mean, frequency, SD and table drawing. ANOVA was used for measuring difference between athletes' doping attitude and behavior and sport orientation. Tukey was used for means differences places. Independent (**t**) test was used for measuring attitude difference between men and women. Multivariate regression was used for predicting athletes' sport orientation. For analyzing data the SPSS software was applied and 95% of confidence level was considered.

RESULTS AND DISCUSSION

The results showed that from 160 participants, 120 individuals (75 %) were male and 40 individuals (25%) were female. And 57 individuals (about 35%) were amateur athletes, 53 individuals (about 33%) were pro-amateur athletes, and 50 individuals (about 33%) were pro athletes. Also, 54 individuals (about 39%) did not believe that their future depends on performance (physical success), and 106 individuals (about 66%) believed that their future depends on performance (physical success). In addition, 83 individuals (about 52%) were competing in national level, 22 individuals (about 14%) were competing in international tournaments, 33 individuals (about 21%) were competing in Asian level, and 18 individuals (about 11%) were competing in world level, and 4 individuals (about 2.5%) were competing in Olympic Games.

The results showed that despite lack of significant difference in research variables between groups: doping believe had the highest mean ( $\bar{X}=0.34$ ) in pro athletes and the lowest ( $\bar{X}=0.25$ ) in amateur athletes, doping behavior had the highest mean ( $\bar{X}=0.4$ ) in pro athletes and the lowest ( $\bar{X}=0.18$ ) in pro-amateur athletes, doping attitude had the highest mean ( $\bar{X}=2.51$ ) in pro athletes and the lowest ( $\bar{X}=2.40$ ) in amateur athletes, winning orientation had the highest mean ( $\bar{X}=4.08$ ) in pro athletes and the lowest ( $\bar{X}=3.85$ ) in amateur athletes. Likewise, the results from Table 1 demonstrated that doping believe [F(2,157)=0.76, P=0.47], doping behavior [F(2,157)=1.83, P=0.16], doping attitude [F(2,157)=0.36, P=0.69], winning orientation [F(2,157)=0.91, P=0.40] had not significant relationship in athletes' professional situation (P<0.05), and competitiveness orientation [F(2,157)=8.30, P=0.00], goal orientation [F(2,157)=3.96, P=0.02] had significant relationship in athletes' professional situation (P<0.05). So it can be realized that athletes' professional situations did not predict the doping behavior, believe, attitude and winning orientation alternations, however, the athletes' professional situations can predict competitiveness and goal orientation alternations of elite martial artists.

Table 1 . ANOVA for athletes' professional situation

		Sum of Squares	df	Mean Square	F	Sig.
Competitiveness	Between Groups (Combine)	3.94	2	1.97	8.30	0.00
	Within Groups	37.29	157	.23		
	Total	41.24	159			
Goal Orientation	Between Groups (Combine)	2.09	2	1.04	3.96	.02
	Within Groups	41.50	157	.26		
	Total	43.59	159			

The results from Table 2 (Tukey) demonstrated that competitiveness orientation had not significant difference between groups of amateur and pro-amateur athletes (P=0.175), professional and pro-amateur athletes (P=0.064), however, it had significant difference between groups of amateur and professional athletes (P=0.00). In addition, the results demonstrated that goal orientation had not significant difference between groups of amateur and pro-amateur athletes (P=0.716), professional and pro-amateur athletes (P=0.138), however, it had significant difference between groups of amateur and professional athletes (P=0.02). So it can be realized that professional athletes compared with amateur athletes of martial arts are various in competitiveness and goal orientation.

Table 2 . Tukey test for type of athletes

Dependent Variable	(I) Q1	(J) Q1	Mean Difference (I-J)	Std. Error	Sig	95% Confidence Interval	
						Lower Bound	Upper Bound
Competitiveness	professional	amateur	.38462*	.09444	.000	.1612	.6081
		Pro-amateur	.21771	.09609	.064	-.0097	.4451
Goal Orientation	professional	amateur	.29846*	.10987	.020	.0385	.5584
		Pro-amateur	.21411	.11179	.138	-.0504	.4786

Significant interval (p<0.05)

The results showed that despite lack of significant difference in research variables between groups: female athletes had the highest mean ( $\bar{X}=4.69$ ) in goal orientation and the lowest ( $\bar{X}=0.21$ ) in doping behavior, and also male athletes had the highest mean ( $\bar{X}=4.49$ ) in competitiveness orientation and the lowest ( $\bar{X}=2.46$ ) in doping attitude. Likewise, the results from Table 3 demonstrated that research variables (doping believe, behavior, attitude and competitiveness, winning, goal orientation) had not significant relationship between groups of men and women.

Table 3 . Mean of two groups (men and women) for research variables

Variable	Believe	Behavior	Attitude	Competitiveness	Goal	winning
Sig	0.78	0.10	0.46	0.52	0.06	0.89

The results showed that despite lack of significant difference in research variables between groups: doping believe had the highest mean ( $\bar{X}$ =0.87) in athletes competing in Olympic level and the lowest ( $\bar{X}$ =0.24) in athletes competing in Asian level, doping behavior had the highest mean ( $\bar{X}$ =0.80) in athletes competing in World level and the lowest ( $\bar{X}$ =0.16) in athletes competing in Asian level, doping attitude had the highest mean ( $\bar{X}$ =3.07) in athletes competing in Olympic level and the lowest ( $\bar{X}$ =2.30) in athletes competing in Asian level, competitiveness orientation had the highest mean ( $\bar{X}$ =4.76) in athletes competing in Olympic level and the lowest ( $\bar{X}$ =4.26) in athletes competing in Asian level, winning orientation had the highest mean ( $\bar{X}$ =4.27) in athletes competing in World level and the lowest ( $\bar{X}$ =3.33) in athletes competing in Olympic level, goal orientation had the highest mean ( $\bar{X}$ =4.69) in athletes competing in international tournaments and the lowest ( $\bar{X}$ =4.27) in athletes competing in Asian level. Likewise, the results from Table 4 demonstrated that doping believe [F(4,155)=2.119, P=0.08], doping attitude [F(4,155)=1.17, P=0.32] had not significant relationship in athletes' diverse levels of competing (P<0.05), and doping behavior [F(4,155)=3.166, P=0.016], competitiveness orientation [F(4,155)=2.79, P=0.028], winning orientation [F(4,155)=2.98, P=0.02], goal orientation [F(4,155)=3.499, P=0.009] had significant relationship in athletes' diverse levels of competing (P<0.05). So it can be realized that athletes' diverse levels of competing did not predict the doping believe and attitude alternations, however, the athletes' diverse levels of competing can predict doping behavior, competitiveness, winning and goal orientation alternations of elite martial artists.

Table 4 . ANOVA for athletes' diverse levels of competing

		Sum of Squares	df	Mean Square	F	Sig.
Doping behavior	Between Groups (Combined)	5.100	4	1.275	3.166	.016
	Within Groups	62.423	155	.403		
	Total	67.523	159			
competitiveness	Between Groups (Combined)	2.770	4	.692	2.790	.028
	Within Groups	38.475	155	.248		
	Total	41.245	159			
Winning orientation	Between Groups (Combined)	8.868	4	2.217	2.982	.021
	Within Groups	115.219	155	.743		
	Total	124.086	159			
goal orientation	Between Groups (Combined)	3.610	4	.903	3.499	.009
	Within Groups	39.987	155	.258		
	Total	43.597	159			

Table 5 . Tukey test for athletes' diverse levels of competing

Dependent variable	(I) Q10	(J) Q10	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Doping behavior	world	National	.51640*	.16500	.018	.0610	.9718
		International	.48737	.20169	.116	-.0693	1.0441
		Asian	.63889*	.18595	.007	.1256	1.1521
		Olympic	.43056	.35079	.735	-.5377	1.3988
Competitiveness	International	National	.15658	.11947	.685	-.1732	.4863
		Asian	.38578*	.13713	.043	.0073	.7643
		world	.05284	.15835	.997	-.3842	.4899
		Olympic	-.12238	.27081	.991	-.8699	.6251
Goal orientation	National	International	-.06309	.13496	.990	-.4356	.3094
		Asian	.36115*	.11583	.018	.0415	.6809
		World	-.01258	.14634	1.000	-.4165	.3913
		Olympic	.25964	.28811	.896	-.5356	1.0549

Significant interval (p<0.05)

The results from Table 5 (Tukey) demonstrated that doping behavior had significant difference between groups of athletes competing in National and World levels (P=0.018), and athletes competing in Asian and World levels (P=0.007). The results also demonstrated that competitiveness orientation had significant difference between groups of athletes competing in International tournaments and Asian level (P=0.043). The results also demonstrated that

goal orientation had significant difference between groups of athletes competing in National and Asian levels ( $P=0.018$ ). There were not any significant differences between other groups in athletes' diverse levels of competing. So it can be realized that athletes competing in world level compared with athletes competing in National and Asian level of martial arts are various in doping behavior. In addition, athletes competing in International tournaments compared with athletes competing in Asian level of martial arts are various in competitiveness. Likewise, athletes competing in National level compared with athletes competing in Asian level of martial arts are various in goal orientation.

### CONCLUSION

In contrasting with the results from Bloodworth, et al. [30], Breivik, Hanstad and Loland [31], Chambers [11], Laure [4], Irving, et al. [12], Wroble, Gray, and Rodrigo [13], Stigler and Yesalis [14], Yesalis, Buckley, & Anderson [32], Gough [33], indicating the usage of PEDs mostly by young men compared with young women and regarding the results from Petróczy, Aidman and Nepusz [34], Petroczy [27], Zenic, Stipic and Sekulic [35], and the present results indicating no differences between men and women and doping attitude, behavior and believe it can be concluded that gender cannot predict the changes of research variables (Doping Believe, Behavior, Attitude and Competitiveness, Goal, winning Orientation) in elite martial artists. The present results were in contrast with the results from Tsorbatzoudis, et al. [36], Atkinson [37] indicating the analyzed participants' attitudes toward PEDs, a one-way ANOVA statistical test found no statistical significant differences among the different groups of athletes competing in diverse levels. And the present results were in common with the results from Breivik, Hanstad and Loland [31], Smitha et al. [38] indicating that athletes' attitudes about drugs were fundamentally shaped by sport's culture. Other significant factors on doping attitude and behavior included its commercial scale, closely identifiable others, early experiences and critical incidents of players and athletes, and their level of performance. So, regarding the literature of research Breivik, Hanstad and Loland [31], Smitha et al. [38] and in contrast with the research from Atkinson [37] and the present results it can be concluded that level of competing can predict the changes of research variables (Doping Behavior and Competitiveness, Goal, winning Orientation) in elite martial artists. Calfee, Fadale [39] suggested that in recent years, research indicates that younger athletes are increasingly experimenting with these drugs to improve both appearance and athletic abilities. So, regarding the present results and the results from Calfee, Fadale [39], Barkoukis, et al. [40], Whitaker, et al. [41], Backhouse, Susan, and McKenna [42], indicating differences of research variables in athletes' professional situation, and also in contrasting with the results from Tsorbatzoudis, et al. [36] indicating lack of significant differences of competitiveness orientation in groups with diverse types of athletes, in can be concluded that types of athletes can predict the changes of research variables (Competitiveness and Goal Orientation) in elite martial artists. This paper suggests to study a vast range of female participants for the same researches. Moreover, it should be considered by researchers to exploiting participants from team and/or no-contact sports for analyzing these variables.

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