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# VALIDATION OF A TEST FOR THE STUDY OF VIOLENCE AMONG ATHLETES

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**ABSTRACT**

*The lack of a validated methodology severely hampers the study of violence among athletes. Questionnaires and surveys with unproven psychometric characteristics used in various studies cast doubt on the results obtained. The current study presents the results of the construction of a test to investigate violence among athletes. The test is based on the questionnaire for the study of violence among athletes proposed by Vertommen et al. (2016), as its final version is a modified methodology. The study includes 314 current and former athletes. The survey was conducted online. Exploratory and confirmatory factor analysis were applied to the empirical data. The analysis results provide the basis for adopting a two-factor test structure with corresponding physical and emotional abuse subscales.*

**Keywords:** physical violence, emotional violence, exploitative and confirmatory factor analysis

**INTRODUCTION**

The problem of violence against athletes is among the current issues in sport. Several studies have found that it exists. It has not been found on a large scale, but regardless of the strength, frequency, and form, any violence towards athletes is unjustified. The study of violence in sports is hampered for several reasons. The definition of violence itself is too diverse to allow for a single, universally accepted conceptualization of the idea, affecting the approaches and methods of its study. Most research has focused on establishing the presence of violence in sport, its forms, the characteristics of the athlete on whom it is perpetrated, and the specifics of the perpetrator. Differences by gender, age, sports qualification, and sports experience have been sought.

Violence in sports is a fact. It is enough to read the International Olympic Committee's position paper “The IOC Consensus Statement: harassment and abuse (non-accidental violence) in sport” (Mountjoy et al. 1., 2016) to accept this fact and realize the need to research and study it. One of the FEPSAC (European

Federation of Sport Psychology) Position statements - 6. Sexual exploitation in sports (2002) also points to the problem of violence in sports.

The phenomenon of violence affects everyone, especially those working in the field of education and sports. Violence, particularly violence in sports, has various manifestations and is often identified with acts of aggression and bullying. As Vladova and Kuleva (2021) point out, in recent years, the phenomenon of violence among children and young people in all its forms and dimensions has been gaining popularity both in scientific research and in the study of governmental and non-governmental organizations like UNICEF and others.

In the specialized scientific literature, violence is seen as physical, mental, emotional, and sexual. Each of these forms can occur at home, in the workplace, and in the community. According to the place of manifestation, violence is classified as domestic, workplace, or community violence (Vladova, Kuleva, 2021). In recent years, many cases of sexual violence in the sports community have been recorded (BBC News, 2018; Murphy, Barr, 2021; Evans

et al., 2016; Brackenridge et al., 2005; Vertommen et al., 2015; Vertommen et al., 2016; Mountjoy et al., 2016; Gündüz et al., 2007; Rintaugu et al., 2014).

## MATERIALS AND METHODS

### *Background*

This study is based on the research and published results of Vertommen and co-authors. In a comprehensive study on samples of Dutch and Flemish citizens (Vertommen, Schipper-van Veldhoven, Wouterse, Kampen, Brackenridge, Rhind, Neels, Van Den Eede, 2016; Vertommen, Kampen, Schipper-van Veldhoven, Wouters, Uzieblo, Van Den Eede, 2017) a large volume of data have been collected, some of which have been published, and other parts are yet to be presented to the scientific community. These studies were carried out with a questionnaire containing four sections: a demographic and descriptive section, and three sections that explored the subjects' experiences in their sporting careers. This section of the questionnaire included 14 questions related to psychological violence, 10 questions reflecting physical violence, and 17 questions related to sexual violence, including sexual harassment and abuse. The survey was conducted online. Participants were aged 18 to 50 years. The study was retrospective - the subjects had to recall whether there had been events in their sports practice, fixed in the questions of the methodology. The methodology was constructed on the basis of expert assessments and responses of respondents in a pilot study. Depending on the experts' opinion and the frequency of different forms of violence among the people surveyed, the questions in the methodology were categorized into three groups - low, medium, and high severity of violence. The methodology was not analyzed regarding its factor structure and psychometric characteristics. It is a priori assumption that the

three main forms of violence are reflected by the three sections of the methodology - psychological, physical, and sexual violence. On the other hand, the answers to the questions are dichotomous, and in the case of a positive answer, further clarifications follow about the severity of the violence, gender, age, sports qualification of the athlete, and the characteristics of the perpetrator of violence (Vertommen et al., 2016; Vertommen et al., 2017).

This study aims to examine the feasibility of creating a psychological test to assess violence in sports. The basis for its construction is the Interpersonal Violence against Children in Sport questionnaire (IViS) (Vertommen, Schipper-van Veldhovenc, Wouterse, Kampenf, Brackenridge, Rhindh, Neelsi, Van Den Eede., 2016).

The test includes 24 questions regarding physical and psychological violence. It is assumed that they are separated into two subscales, but also that some of the questions are too similar in content, and their inclusion would not be justified. As the issue of sexual violence is too sensitive and the respondents may not be honest enough, this part of the questionnaire was not included in the study.

To assess the frequency of specific forms of violence, a Likert-type scale with four grades was used - no, it never happened; yes, it happened once, at most twice; it happened often; yes, it happened very often (systematically).

The survey was conducted online in Google Forms. The questionnaire was distributed through the distance learning platform of the National Sports Academy "V. Levski" (<http://www.virtual.nsa.bg/>) and on social networks.

### *Participants*

The empirical study included 314 subjects, and only 6.7% (n = 21) of them stated that they were not athletes but were involved in organized sports. The remaining study subjects

were divided into four groups: current and former athletes – on the national team and on club levels (Table 1). To ensure anonymity, as well as to minimize anxiety while responding, the questions of demographic nature were general as we were not interested in location, team, and other personal information that would poten-

tially embarrass the respondents. Our subject of interest was the gender of the coach/coaches with whom the studied athletes worked.

The sample size conformed to the empirical rule of no less than  $50+8k$ ;  $k$  - the number of variables in the data matrix (the number of items in the test)  $50+8*24 = 242$  (Byrne, 2010).

**Table 1.** *Subjects studied, their competitive activity, and coaches*

Variables	Groups	Frequency (n)	Valid Percent (%)
<b>Gender</b>	Female	170	54.1%
	Male	144	45.9%
	Total	314	100%
<b>Age</b>	Up to 20 years	118	37.6%
	21-39 years	161	51.3%
	40 + years	35	11.1%
<b>Coaches</b>	Female(s)	64	20.4%
	Male(s)	199	63.4%
	With female and male	51	16.2%
<b>Competitive activity</b>	Competitor_club	114	36.3%
	Competitor_National team	25	8.00%
	Former competitor_club	107	34.1%
	Former competitor_National team	47	14.9%
	I was not a competitor	21	6.7%

## RESULTS AND ANALYSIS

Based on the original methodology, it is assumed that the initial attributes (the 24 items) correlate with each other to varying degrees and can be aggregated into a smaller number of generalized variables - factors. The primary evaluation of the data provides the basis for the application of factor analysis:

- Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .909

- Bartlett's Test of Sphericity =  $\chi^2 = 4620.240$ ;  $df = 276$ ;  $p = .001$

Maximum likelihood factor analysis and varimax rotation were performed to establish the internal structure of the test. The results point to a four-factor solution. The first factor integrates indicators related to emotional abuse - insults, neglect, and bullying. The other three

factors contain indicators related to physical violence - direct and indirect, and threats, but these factors are not sufficiently differentiated and clearly distinct. On the other hand, some of the indicators are included with similar factor weights in more than one-factor family - cross-sectional loadings.

The obtained results point to a two-factor solution, also consistent with the structure of the original methodology.

Factor weights were analyzed to assess convergent validity. For a sample  $N = 250 \div 350$ , the critical value of the factor weights was .35 (Gaskin, 2012). Items with smaller factor weights than this critical value were not found.

To assess discriminant validity, cross-sectional loadings and factor correlations matrix were analyzed.

The first factor includes 14 indicators. For three of them, No. 2, “You were shaken”, No. 3, “Objects were being thrown at you” and No. 23, “You were physically threatened, but not actually attacked” cross-sectional strains were observed. These indicators were included with similar factor weights in the second factor. The rule for a difference in factor weights greater than .2 was not followed for these indicators. These three indicators were excluded from the factor family. The content of the remaining indicators gives reason to define this factor as emotional abuse.

The second factor contains indicators of physical violence. For indicator No. 4, “You

were held/restrained forcefully” cross-sectional loadings were observed and therefore excluded. And indicator No. 14, “You were shouted or cursed at” does not meaningfully correspond to the other indicators, which are clearly related to physical abuse, either directly or indirectly. It was also excluded from the factor structure. The second factor was defined as physical violence.

The two factors explained 54% of the variance of the construct examined (Table 2). The correlation between them was .61, which means that they had only 37% shared variance ( $.61^2 = .37$ ).

**Table 2.** *Factor structure of the construct under study*

Items names	Item	Component	
		1	2
13 You were put down, embarrassed, or humiliated	V13	.780	.215
17 You were called names or otherwise offended	V17	.768	.185
18 You were ignored such that it made you feel bad	V18	.765	.156
11 You were being teased	V11	.739	.149
1 You were forced to go on training/playing / competing while you were injured or exhausted	V1	.724	.175
15 You were negatively criticized about your appearance or weight	V15	.694	.184
16 You were negatively criticized for your performance	V16	.678	.115
12 You were being bullied	V12	.656	.329
22 You were threatened with being thrown out (of the team, club, gym, etc.)	V22	.623	.446
20 People were gossiping or telling lies about you	V20	.596	.068
19 You were criticized or threatened because you did not want to participate in training sessions or matches/competitions	V19	.580	.373
9 You were grabbed by the throat / choked	V9	.037	.856
8 You were forced to the ground/knocked down	V8	.209	.810
6 You were punched/hit with a fist	V6	-.006	.782
10 You were beaten up	V10	.355	.705
5 You were slapped/hit with an open hand	V5	.273	.677
7 You were hit with an object (e.g., shoe, racket, hockey stick)	V7	.313	.545
21 Your belongings were damaged or stolen to humiliate or scare you	V21	.146	.535
24 You were pressured into / forced to start taking substances to lose weight or enhance your performance	V24	.277	.468

The pure factor structure and high factor weights imply a high internal consistency of the indicators that define them. Reliability analysis - Cronbach's alpha and Composite Reliability (Raykov 1997) were used to assess internal consistency.

The resulting subscales were characterized by high internal consistency. For the first subscale, Cronbach's Alpha = .91 (Table 3), there were also high correlations of individual indicators with the scale.

**Table 3.** *First subscale - emotional abuse -  $\alpha=.91/CR=.91$*

Items names	Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1 You were forced to go on training/playing / competing while you were injured or exhausted	V1	17.06	42.706	.673	.899
11 You were being teased	V11	17.30	43.731	.684	.898
12 You were being bullied	V12	17.73	46.200	.656	.900
13 You were put down, embarrassed or humiliated	V13	17.50	44.212	.755	.895
15 You were negatively criticized about your appearance or weight	V15	17.31	43.702	.652	.900
16 You were negatively criticized about your performance	V16	16.73	44.500	.615	.902
17 You were called names or otherwise offended	V17	17.18	42.594	.720	.896
18 You were ignored such that it made you feel bad	V18	17.19	43.122	.712	.896
19 You were criticized or threatened because you did not want to participate in training sessions or matches/competitions	V19	17.75	46.716	.599	.903
20 People were gossiping or telling lies about you	V20	17.19	45.048	.527	.907
22 You were threatened with being thrown out (of the team, club, gym, etc.)	V22	17.70	45.826	.656	.900

For the second subscale, physical abuse, Cronbach's Alpha = .82 (Table 4), there were

again high correlations of individual indicators with the scale.

**Table 4.** *Second subscale - physical violence -  $\alpha=.82/CR=.87$*

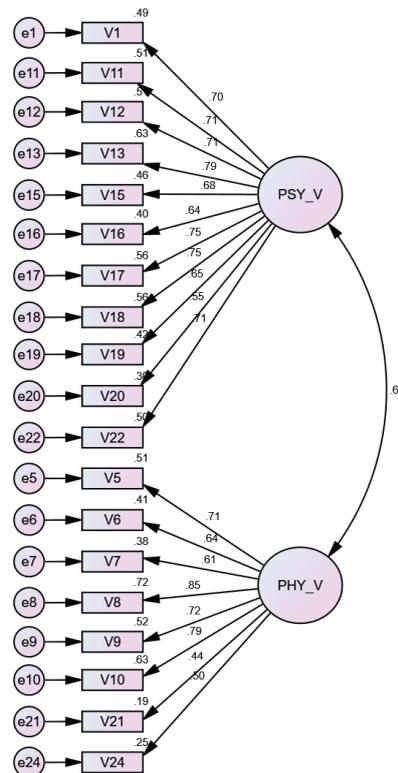
Items names	Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
5 You were slapped/hit with an open hand	V5	7.90	5.058	.634	.790
6 You were punched/hit with a fist	V6	8.02	5.773	.574	.806

7 You were hit with an object (e.g., shoe, racket, hockey stick)	<b>V7</b>	7.74	4.595	.519	.823
8 You were forced to the ground / knocked down	<b>V8</b>	7.98	5.217	.749	.781
9 You were grabbed by the throat/choked	<b>V9</b>	8.04	5.864	.692	.804
10 You were beaten up	<b>V10</b>	7.94	5.009	.719	.779
21 Your belongings were damaged or stolen to humiliate or scare you	<b>V21</b>	7.92	5.616	.402	.822
24 You were pressured into/forced to start taking substances to lose weight or enhance your performance	<b>V24</b>	7.88	5.235	.447	.821

The analysis of the results, regarding the factor structure and internal consistency of the test indicators for the study of violence in athletes, showed that they were characterized by strong correlational relationships, with unambiguous criterion-relatedness and high internal

consistency.

Confirmatory factor analysis was also performed to verify the obtained results. The initial structural model consisted of the two factors identified in the exploratory factor analysis and their associated indicators (Figure 1).



**Figure 1.** Baseline structural model of the test for assessment of violence in sport \*Legend: PSY\_V - Psychological Violence; PHY\_V - Physical Violence

**Model parameters:**

A number of distinct sample moments: 190

A number of distinct parameters to be estimated: 39

Degrees of freedom (190 - 39): 151

Factor weights, multiple correlation coefficients, and modification indices were analyzed to verify model fit and model refinement.

The factor weight of indicator No. 21 (Your belongings were damaged or stolen to humiliate or scare you) was too small,  $\lambda=.48$ , and explained the variance of 19%. The indicator was excluded from the factor model.

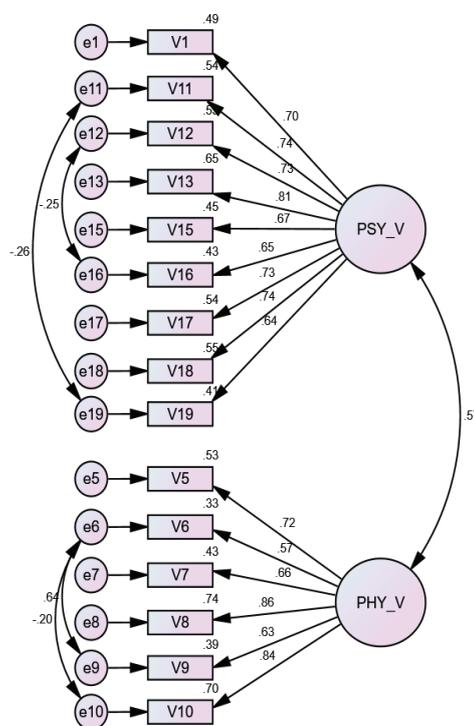
Item No. 24 (You were pressured into / forced to start taking substances to lose weight or enhance your performance) also had a factor weight of less than .6,  $\lambda=.48$ , and an explained variance of 23%. Cross-loading on both factors was also observed for this attribute. It was also excluded from the structural model.

Item No. 20 had a factor weight of .55 and a variance of 31% and was excluded from the

model.

Only those associated with residue release were used to estimate their covariance of the modification indexes. Consistently, residuals were correlated:  $e6 - e9$ ;  $e19 - e22$ ;  $e22 - e11$ ;  $e6 - e10$ ;  $e11 - e19$ ;  $e12 - e16$ .

The results showed that indicator No. 22 (You were threatened with being thrown out (of the team, club, gym, etc.)) was associated with the residues of several other indicators. In addition, it loaded on a second factor, cross-loading. This necessitated its exclusion from the structural model. Before its exclusion,  $RMSEA = .077$ , and after its exclusion,  $RMSEA = .069$ . The latest change to the model was the residual valuation exemption  $e6 - e10$  (Figure 2).



**Figure 2.** Final version of the structural model

The final structure model (Figure 2) indicators are listed below:

**Indicators of physical and emotional violence in sport**

*Physical violence*

1. You were slapped/hit with an open hand

2. You were punched/hit with a fist
3. You were hit with an object (e.g., shoe, racket, hockey stick)
4. You were forced to the ground/knocked down
5. You were grabbed by the throat/choked
6. You were beaten up

*Emotional violence*

1. You were forced to go on training/playing / competing while you were injured or exhausted
2. You were teased
3. You were bullied
4. You were put down, embarrassed, or humiliated
5. You were negatively criticized about your appearance or weight
6. You were negatively criticized about your performance
7. You were called names or otherwise offended
8. You were ignored such that it made you feel bad
9. You were criticized or threatened because you did not want to participate in training sessions or matches/competitions

**Model fit** (model characteristics)

The compliance indices of the structural model provide the basis for its validation - CMIN/DF=2.377; CFI=.953; SRMR=.054; RMSEA=.066; PClose=.012. If we use the indices NFI=.92 (Bentler-Bonett normed fit index - Delta1) and RFI=.91 (Bollen’s relative fit index - rho1), we can assume that the analyzed structural model is 92% on the way from the independence model to the saturated model, whose value is 1.

**Construct Validity**

Determining the validity and reliability of the measurement model is mandatory in confirmatory factor analysis. Validity is defined as the degree of accuracy of the measurements. One of the main objectives of confirmatory factor analysis is to assess construct validity. Construct validity is the extent to which a set of measured indicators actually reflects the latent theoretical construct that these indicators are intended to measure (Sharif, 2013, 2015; Hair et al., 2014).

Criteria were used to assess construct validity:

- Composite Reliability (CR);
- Average Variance Extracted (AVE);
- Maximum Shared Squared Variance (MSV);
- Average Shared Square Variance (ASV).

The AMOS Plugin (2016), the master validity tool developed by Gaskin and Lim, was used. The obtained values of the criteria and the ratios between them provided a basis for the validation of the construct validity of the model (Table 5). The CR values were greater than .7, which means that construct validity was achieved in terms of discriminant validity, the empirical rules were also satisfied AVE >.5 and AVE > MSV.

**Table 5.** Indicators of construct validity

	CR	AVE	MSV	MaxR(H)	PV	FV
PV	.904	.511	.330	.908	<b>.715</b>	
FV	.864	.520	.330	.891	.575***	<b>.721</b>

Assessment of the validity of the factor construct provided grounds for accepting it as correct, adapted, and consistent with the theoretical construct.

**DISCUSSION**

The study of violence in sports has many issues. There is a specific subculture in sport that affects the relationship between athletes and

their coaches. And if in other social spheres and communities, some relationships are judged as a form of violence, in sport, the same relationships can be perceived within the boundaries of normal. The perception and evaluation of certain relationships in sports are also ambiguous. They are different for men and women, different in different age periods, and influenced by sports experience and qualifications.

Ex-post-facto research on violence in sports also has its limitations. The opinions and assessments of adults and former athletes, about events related to their past “sports life” can be influenced by the accumulated life experience, changed over time perceptions and assessments of the same events, inaccurate memories, and the degree of emotional saturation of specific events.

Despite the problems and difficulties, violence in sports must be studied. The methodology for its study analyzed in this paper allows for ongoing monitoring of relationships within sports teams and athletes’ families and for a timely response when significant deviations from normal acceptable sports relationships are identified (Appendix A). It is hoped that, along with other methods and methodologies, it will provide essential information about the presence of violence against athletes.

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