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Validity of the “Fall Back” Test for Boldness

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ABSTRACT

Synonyms for the word *boldness* include courage, fearlessness, heroism and bravery. The best examples of courage in sport are athletes who, despite difficult situations, conditions and strong competition, perform very risky elements, break records, etc. The “Fall back” measurement instrument has been used in the selection process for artistic gymnastics. Bearing in mind that this test requires a drop back down an inclined plane, it requires a degree of courage in the realization of this motor task. The aim of this research is to determine the validity of the “fall back” test and to answer the question: Is the “Fall back” test actually a measure of courage among beginners in the sport? In this study, the research sample consisted of 16 boys and 33 girls, third graders from the Jovan Cvijic elementary school in Kostolac, aged nine years (+/- 6 months). The sample of variables represented the results written using two measurement instruments: 1. Psychological survey -test of boldness and courage-PSBC (a test modeled after the-Erikson’s theory of Psychosocial Development test-About.com Psychology); 2. Situational motor measuring instrument-Fall back-MFIB.

The resulting measurements were analyzed by the appropriate statistical methods, which are congruent with the set objective and task of the study. The validity of the “Fall back” situational-motor test is determined by calculating the coefficient of correlation (r) between said composite test and a psychological test of courage. The very high coefficients of correlation that resulted in all three cases (total sample $r = .846$, sample of boys $r = .873$, a sample of girls $r = .845$) indicate a high validity level for the test, “Fall back”, that is, the subject of measurement in the test, largely corresponds with the subject of measurement in the PSBC psychological test. The height of the correlation coefficient also justifies the use of the “Fall back” test as a composite test. A high validity of the “Fall back” measurement instrument (MFIB), which is indicated by the high Pearson coefficients of correlation between the “Fall back” measurement instruments and the psychological test of courage and boldness, was established for all three samples of respondents.

Key words: boldness, test, fall back, the validity

Veljavnost padca vznak kot preizkusa drznosti

Izvirni znanstveni članek

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POVZETEK

Med sinonimi za besedo drznost so pogum, neustrašenost, korajža, junaštvo, herojstvo. Najboljši primer poguma v športu so športniki, ki kljub težki situaciji, pogojem in močni konkurenci izvedejo zelo tvegane elemente, rušijo rekorde itd. Merski instrument padca vznak se uporablja v procesu selekcije v orodni gimnastici. Ob zavedanju, da ta tehnika preizkušanja zahteva padeč vznak na nagnjeni ravnini, je za izvedbo te gibalne naloge potrebna določena mera poguma. Namen te raziskave je ugotoviti veljavnost testa s "padcem vznak" in odgovoriti na vprašanje: Je preizkus s padcem vznak dejansko merilo poguma med začetniki v športu? V tej študiji je vzorec predstavljalo 16 dečkov in 33 deklic, devet let (+/- 6 mesecev) starih tretješolcev iz Osnovne šole Jovan Cvijić v Kostolcu. Vzorec spremenljivk so predstavljali rezultati, zapisani ob uporabi dveh merskih instrumentov: 1. psihološki pregledni test drznosti in poguma – PSBC (test modeliran po Eriksonovi teoriji psihosocialnega razvojnega testa – About.com Psychology) in 2. situacijski gibalni merski instrument – padeč vznak (MFIB).

Izmerjeni rezultati so bili analizirani z ustreznimi statističnimi metodami, ki so skladne z zastavljenimi cilji in nalogami študije. Veljavnost situacijskega gibalnega preizkusa s padcem vznak je opredeljena z izračunom koeficienta korelacije (r) med omenjenim kompozitnim testom in psihološkim preizkusom poguma. Zelo visoki korelacijski koeficienti, ki so bili rezultat v vseh treh primerih (celoten vzorec $r = 0,846$, vzorec dečkov $r = 0,873$, vzorec deklic $r = 0,845$), kažejo visoko veljavnost preizkusa s padcem vznak, tj. predmet merjenja na preizkusu je v glavnem skladen s predmetom merjenja na PSBC psihološkem testu. Višina korelacijskega koeficienta tudi upravičuje uporabo preizkusa s padcem vznak kot kompozitnega testa. Za vse tri vzorce respondentov je bila ugotovljena visoka veljavnost merskega instrumenta s padcem vznak (MFIB), ki jo kaže Pearsonov koeficient korelacije med merskim instrumentom s padcem vznak ter psihološkim testom poguma in drznosti.

Ključne besede: drznost, preizkus, padeč vznak, veljavnost

Introduction

The psychological experience of exercise is associated with positive and negative actions demanded by certain types of exercise or sport. Positive actions in gymnastics are associated with satisfaction based on mastering the complex motions and movements under special conditions, while negative actions are associated with overcoming the discomfort and anxiety that may occur.

Synonyms for the word *boldness* include courage, fearlessness, heroism and bravery. The common English word for boldness, "courage" has its origin from the Latin word – *cor*, which means heart (done from the heart, bravely). All these

terms mean the absence of fear and readiness for action. Boldness is necessary in certain situations and to achieve some goals and can be physical, moral, psychological, vital, creative, general, or personal and dependent on one's own convictions. Rate (2005) states that boldness involves self-confidence, feeling that we are doing the right thing and completing action despite fear, as well as the defense of convictions. In his later research, Rate et al. (2007) condense definitions from the available literature into one: "boldness is complex and multidimensional, and is characterized by a desire, an intentional act, which is usually executed after conscious consideration and includes objective risk and often the emotion of fear".

Rachman (1984, 2004) defines boldness as "dealing with the situation, regardless of fear", while Woodard (2004) defined it as the ability to act for a meaningful goal (noble, good, practical) regardless of any fear associated with the perceived threat that exceeds available resources. Fear and boldness are mutually dependent. According to the theory of learning, boldness includes an insight into the development of pathological fear and anxiety. Involvement in situations that require boldness reduces the possibility of development of serious anxiety problems. The researcher Muris (2009) investigated boldness among children aged 9 – 13 years. These children completed a set of questionnaires in order to determine the correlation between personality traits, psychopathology and courage. The results showed that a large percentage of children know what boldness is and take part in activities that demand it. Considering the importance of courage in the context of fear and anxiety, and recognizing the fact that many anxiety problems tend to occur at a relatively young age, it is necessary to pursue more research in this area (Muris, 2007).

Harris (1999) adds that boldness is dynamic, it changes with attitudes and needs in a given situation, but also that various "forms" of courage can be dangerous and could even jeopardize the achievement of a given goal. Cavanagh & Moberg (2000) found that boldness can be a peaceful and non-dramatic trait, and that it is demonstrated by persistent effort under difficult conditions. People generally assume that bold actions have positive and successful outcomes (Pury, Kowalski & Spearman, 2007). All these claims are important for defining and studying boldness in sport.

According to the theory of learning, boldness is implicated in the development of pathological fear and anxiety. In people who are involved in situations that require boldness and are faced with fear, there is less chance of developing serious anxiety problems (Muris et al., 2009). Mavroudis (2003) emphasizes that boldness is inversely proportional to knowledge: thus, situations when a person possesses adequate knowledge require less boldness, even in the most difficult situations. Boldness is necessary if a person has no or little knowledge about performing any process or test of the unknown solution in a given situation. In reviewing the literature, Kilmann et al. (2010) found that boldness involves five essential items: free choice when deciding whether to participate in the activity; the presence of

risk of injury or some type of damage; an assessment that the risk is reasonable and that the activity is justified; and the existence of valuable goals and conscious action despite the fear.

Boldness in sport is defined as a naturally developed interaction relationship between an athlete and the demands of the sport on a voluntary basis, even in terms of danger (Konter & Ng, 2013). The authors emphasize the interaction between factors that include the situation (for example, risk, danger or fear), personal differences (the personality, qualities, experience and knowledge of the given athlete), the particular sport (individual, team, without contact, and others) and the task faced (executing a kick in the last seconds of the competition, etc.). Boldness in sports should be dynamic and should change according to the interaction among these factors. The best examples of boldness in sport are athletes who, despite difficult situations, conditions or strong competition, perform very risky elements, break records, etc.

Woodard (2004) states that a valid measurement instrument for boldness was compiled by the authors Schmidt & Koselka (2000). This questionnaire has seven items, of which the first three estimate overall boldness and the others, specific boldness. Counter & Ng (2013) compiled the Sport Courage Scale SCS, on the basis of previous boldness questionnaires. Using a series of qualitative and quantitative methods, a questionnaire was constructed with five factors: skills (self-confidence), decisiveness, assertiveness, initiative (dealing with fear, taking risks) and sacrifice (altruism).

The “Fall back” measurement instrument has been used so far as part of the selection process for artistic gymnastics. Bearing in mind that this test requires the participant fall back down an inclined plane, it requires a certain degree of courage in the realization of this motor task. Accordingly, it is determined with a priori validity that this test does measure a certain degree of boldness. The aim of the research is to determine the validity of the test “fall back” test and to answer the question: Does the “fall back” test actually measure boldness among beginners in sports?

Based on the aim of the research, we set the hypothesis that:

H_1 – The Fall back test measures boldness among beginners in artistic gymnastics.

Method

The sample of subjects

In this study the sample consisted of 16 schoolboys and 33 schoolgirls, third graders, from the “Jovan Cvijic” elementary school in Kostolac, aged nine years (+/- 6 months). All research procedures were in accordance with the Declaration of Helsinki. The parents signed consent for their children’s participation in the study.

The sample of variables

The sample of variables represented the results from applying two measuring instruments:

- Psychological test – boldness and courage survey – PXIO, a test modeled on the Erikson`s theory of Psychosocial Development test (http://psychology.about.com/library/quiz/bl_eriksonquiz.htm);
- Situational motor measuring instrument – fall back – MIFB.

Organization of and conditions for testing

The testing was conducted in two phases. First, students filled in the survey of boldness and courage in their regular classes, a process lasting 30 minutes.

The second phase of measurement consisted in carrying out the “Fall back” test during regular physical education classes. Before the implementation of the test, all students were warmed up and prepared for the main part of the class. The test was conducted in the main part of the physical education class.

Description of measurement instruments

Test-survey of boldness and courage

Table 1: Test survey of boldness and courage

Name and surname:	Class:	Date:		
1. Have you ever read a composition in front of the whole class?		Yes	Maybe	No
2. Did you feel good when you read the composition?		Yes	Maybe	No
3. Are you the first to reply when the teacher asks a question?		Yes	Maybe	No
4. Do you do some sport?		Yes	Maybe	No
5. Do you like to ride on roller skates?		Yes	Maybe	No
6. Do you think you're brave?		Yes	Maybe	No
7. Do others think you are brave?		Yes	Maybe	No
8. Are you afraid of heights?		Yes	Maybe	No
9. Are you afraid of water (rivers, lakes, the sea)?		Yes	Maybe	No
10. Do you like to swim?		Yes	Maybe	No
11. Do you like to jump into water?		Yes	Maybe	No
12. Do you like to go on an excursion?		Yes	Maybe	No
13. Would you help a friend in trouble?		Yes	Maybe	No
14. Do you like dogs?		Yes	Maybe	No
15. Are you afraid of bugs?		Yes	Maybe	No
16. Does someone always wait for you after school?		Yes	Maybe	No
17. Do you sleep with the lights off in the dark?		Yes	Maybe	No
18. Are you afraid of thunder?		Yes	Maybe	No
19. Do you like physical education?		Yes	Maybe	No
20. Do you have a lot of friends?		Yes	Maybe	No

Time of test implementation is 30 minutes.

The “Fall back” Situational motor test

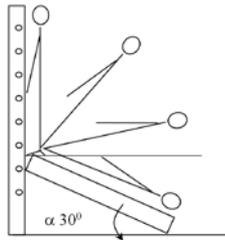


Figure 1: The "Fall back" Boldness Test

Description of the testing location:

This task is performed in a room that has Swedish wall bars. Two benches are attached at one end to the fifth bar of the Swedish wall bars, while the other end is on the ground. The aim is to form steep plane, where the angle with the ground is about 30 degrees. A padded mat is placed over the bench (Figure 1).

Execution of the task:

At the "now" signal, the subject should, within five seconds, let their body fall back down the set steep plane, keeping the body as straight as possible. From this calm, straight position (with arms next to the body), the participant is required to perform the task so as to maintain the same position from letting go to the moment of falling onto the mat. Any divergence during the realization of the task from the calm straight position will be registered as an error, according to the given table.

Rating:

Evaluation is carried out on a points scale from one to five and according to the following criteria:

Table 2: Evaluation of the "Fall back" boldness test

Num.	Errors in execution	Grade
1.	Uncompleted task	0.00
2.	Twitching of the body, head turning, sitting, stepping back	1.00
3.	Falling back with a very tucked body, turning of the head	2.00
4.	Falling back with a tucked body	3.00
5.	Falling back with a straight body, head bent to chest	4.00
6.	There are no visible changes in body posture during the fall	5.00

The task is repeated three times and includes the results of each execution. The final result is the average of all three measurements.

Practising:

The respondent has the right to a trial attempt, aiming to reduce the educational function of the test.

Methods of data processing

The results of measurements were analyzed by appropriate statistical methods, which are congruent with the set objectives and aims of the study. During the processing of the measurement results, for each repetition of the composite situational-motor test "Fall back", as well as the results from the psychological

test of boldness, the following basic measures of central tendency and dispersion of results were calculated: the arithmetic mean (M), standard deviation (SD), minimum (MIN) and maximum (MAX) result and range (R). Measures of symmetry (SKEW – skewness) and homogeneity (KURT – kurtosis) of results in tests were also calculated. Based on the symmetry of the distribution of results, it was estimated whether the test constituted an easy or a difficult motor and psychological task for the current sample of respondents, and based on the curvature distribution of the results, homogeneity of results in the tests was determined. All previously calculated parameters allowed the evaluation of discrimination by these measurement instruments. As a prerequisite for accurate assessment of the validity of the “Fall back” test, reliability of actual test was calculated (Cronbach α “coefficient”).

The validity of the “Fall back” situational-motor test was determined by calculating the correlation coefficient (r) between said composite test and a psychological test of boldness.

Data processing was carried out by the statistical software package SPSS 19.0 IBM.

Results

Descriptive statistics

Table 3: Descriptive statistics – all subjects

VARIABLES	N	R	MIN	MAX	M	SD	SKEW	KURT
MIFB 1	49	3.00	2.00	5.00	3.265	0.908	0.656	-0.204
MIFB 2	49	3.00	2.00	5.00	3.490	0.916	0.541	-0.718
MIFB 3	49	3.00	2.00	5.00	3.551	0.959	0.440	-0.997
MIFB M	49	3.00	2.00	5.00	3.436	0.891	0.627	-0.756
PXIO	49	3.00	2.00	5.00	4.020	0.901	-0.575	-0.459

*Agenda: MFIB – Measurement instrument Fall back; MFIB 1, MFIB 2, MFIB 3 – first, second and third attempt; MFIB M – mean of all three attempts.

Table 4: Descriptive statistics – boys

VARIABLES	N	R	MIN	MAX	M	SD	SKEW	KURT
MIFB 1	16	3	2	5	3.563	0.892	0.430	-0.607
MIFB 2	16	2	3	5	3.750	0.856	0.546	-1.428
MIFB 3	16	2	3	5	3.750	0.856	0.546	-1.428
MIFB M	16	2.33	2.67	5	3.688	0.847	0.560	-1.296
PXIO	16	2	3	5	4.375	0.619	-0.421	-0.454

Table 5: Descriptive statistics – girls

VARIABLES	N	R	MIN	MAX	M	SD	SKEW	KURT
MIFB 1	33	3	2	5	3.121	0.893	0.872	0.415
MIFB 2	33	3	2	5	3.364	0.929	0.674	-0.380
MIFB 3	33	3	2	5	3.455	1.003	0.528	-0.896
MIFB M	33	3	2	5	3.313	0.898	0.784	-0.408
PXIO	33	3	2	5	3.848	0.972	-0.331	-0.885

Results of central tendency and dispersion of results for all subjects are shown in Table three. The same parameters, but separately for boys and girls are shown in Tables four and five. There was no significant disturbance or deviation from the normal distribution of results.

Table 6: Reliability of the “Fall back” test of boldness

Subjects	Number of subjects	Number of particles	Coefficient of reliability „ α “
All subjects	49	3	.957
Boys	16	3	.948
Girls	33	3	.975

Calculated reliability coefficients – the Cronbach α coefficient for all respondents, and separately for the sample of boys and girls is shown in Table six. The values range from .948 (sample of boys), to .975 (sample of girls).

Table 7: The coefficient of correlation between the tests – ALL SUBJECTS; ** .01 Level of significance of the correlation coefficient

	PXIO	MIFB 1	MIFB 2	MIFB 3
MIFB 1	.757**			
MIFB 2	.846**	.868**		
MIFB 3	.831**	.834**	.944**	
MIFB M	.846**	.936**	.977**	.966**

Table 8: The coefficient of correlation between the tests – BOYS; ** .01 Level of significance of the correlation coefficient

	PXIO	MIFB 1	MIFB 2	MIFB 3
MIFB 1	.920**			
MIFB 2	.817**	.894**		
MIFB 3	.817**	.894**	1.000**	
MIFB M	.873**	.953**	** .988	.988**

Table 9: The coefficient of correlation between the tests – GIRLS; ** .01 Level of significance of the correlation coefficient

	PXIO	MIFB 1	MIFB 2	MIFB 3
MIFB 1	.706**			
MIFB 2	.858**	.849**		
MIFB 3	.842**	.809**	.924**	
MIFB M	.845**	.926**	.971**	.960**

The calculated Pearson’s coefficients of correlation are presented in Table seven (all subjects), eight (only boys) and nine (only girls). All calculated coefficients are statistically significant at the .01 level or with one percent error. Values of the correlation coefficients between the PXIO (Psychological test of boldness and courage) and MIFBM (Composite “Fall back” test, where the final result on the test is the average arithmetic mean of all three particles) range between .845 (sample of girls) and .873 (sample of boys).

Discussion

The statistical characteristics of the measurement instrument and the particles yielded useful information, especially for sports practice. They provided information about the measures of central tendency and variability measures, as well as the corresponding distributions of results of measurements in the appropriate test. In this way the discrimination (sensitivity) and weight (appropriateness) of the measurement instrument can be determined.

Evaluation of the sensitivity of the measurement instrument or its particles is performed based on the variability of the measurement results among subjects, or by standard deviation. With an effective measurement instrument, standard deviation should be around 1/3 of the arithmetic mean of the measurement results for an appropriate sample of subjects.

From the data in Tables three, four and five, it can be concluded that the sensitivity of the given measurement instruments and their particles was satisfactory, because in all cases the arithmetic mean value was higher than three times the standard deviation.

The rounded or elongation of the top of the results distribution curve indicates the homogeneity of the results based on these subjects, and is viewed based on the value of kurtosis. With a distribution that does not significantly deviate from the normal distribution of results, the value of kurtosis is around zero. Mostly these values are found in all measurement instruments and their particles. Only in the sample of boys in three cases (negative values below - 1 with particles MFIB 2 and MFIB 3, and composite test MFIB M) could a mild flattening of the distribution be observed, which indicates increased heterogeneity of the results.

Measures of asymmetry of distribution (skewness) are around zero values in all the tests and their particles. Based on these results, it can be concluded that the weight of all the tasks was appropriate for the sample of subjects. The "Fall back" test is designed as a composite test with three particles, so it was necessary, before determination of validity, to check its reliability. In kinesiology it is considered that a specific motor test has good reliability if the coefficient amounts to at least .90 for less complex, and .85 for more complex motor tests.

Validity and reliability are not two separate measures, and they are connected to a certain extent. Thus, for example, for a test that has low reliability, one can expect a low validity. Thus, it can be said that the validity of the test depends on its reliability: to be valid, a test must be highly reliable, but high reliability does not necessarily imply high validity. In other words, it is just one precondition, but not the only one (Petz, 1992).

The high reliability coefficients shown in Table six confirmed the results of previous studies (Velickovic, 1999), in other words, that the "Fall back" test has a very high degree of reliability. This statement applies to the entire sample of respondents ($\alpha = .957$), and the sample of boys ($\alpha = .948$) and girls ($\alpha = .975$).

The “Fall back” measurement instrument was designed with the intention of obtaining a fast and efficient way of checking the degree of boldness in children. However, until this study, this measuring instrument had been applied only on the basis of its a priori validity. A priori validity was determined by analyzing the motor task, which was to be implemented without the possibility of perception of movement (the subject is falling backwards) and while experiencing a freefall down a steep plane. The assumption was that respondents who have very low levels of boldness would not dare to carry out the task, because they would not be able to see where their bodies were going; that this realization would thus mean additional turning of the head in the direction of movement in an attempt to see where the body was falling; and that this would result in a disruption of the straight body position, with the goal of making a safer landing.

All of these factors contribute to enable proper selection of children who have a high degree of boldness, a trait that is crucial for further participation in gymnastics, which is rich with elements having high requirements in terms of boldness. On the other hand, with all the other kids, with ascertainment of the low degree of boldness, with contents of artistic gymnastics would additionally increase that this conative characteristics is lifted to a higher level. Specifically, training in the execution of new gymnastic elements implies a conscious journey towards conquering fear of the unknown and of seemingly dangerous motor tasks.

It was necessary to confirm the validity of the hypothetical determination of congruent validity by calculating the coefficient of correlation of results obtained in the “Fall back” test C (MFIB M) against an older, well established test that has the same object of measurement (psychological test for boldness and courage – PXIO), as well as convergent validity, which includes the correlation of results obtained by different methods of measurement (motor task and psychological test) on the same subject of measurement.

To calculate the Pearson’s correlation coefficient between the composite “Fall back” test (the final result is calculated by average value of three measured values) and the psychological test that assesses the level of boldness and bravery, both the congruent, and convergent validity were used for the estimation.

The resulting very high correlation coefficients in all three analyzed cases (total sample $r = .846$, sample of boys $r = .873$, a sample of girls $r = .845$) indicate a high validity level for the “Fall back” test, that is, that the subject of measurement in this test largely coincides with the subject of measurement in the psychological test PXIO (Tables 7, 8 and 9).

The height of the correlation coefficient also justifies the use of the “Fall back” test as a composite test. The lowest correlation in all three cases was ascertained between the results of the first attempt at the “Fall back” test (MFIB 1) and the psychological test (PXIO), which implies that the the weakest and insufficient validity would be reached by using only one attempt. On the other hand, the motor

task in the MFIB test has a very short duration, and allowing three attempts does not reduce its test effectiveness.

Conclusion

We achieved a high level of validity for the “Fall back” measurement instrument (MFIB), shown by the high Pearson’s correlation coefficients between the “Fall back” measurement instrument and the psychological test of bravery and boldness, in all three samples of respondents (boys, girls and all students aged nine years). Based on the results, hypothesis H_1 , which states:

H_1 – The “Fall Back” Test measures boldness among beginners in artistic gymnastics,
is accepted.

It is necessary to emphasize that the finding of high validity for the “Fall back” motor measurement instrument does not constitute a permanent characteristic. This is because the validity, as well as other metric characteristics are quantitative values obtained with the test parameters in specific situations, in one study, and on respondents with certain characteristics.

In future research, testing should be done on a larger test sample. Additionally, the test could be conducted on an older sample of respondents, in order to check the validity, effects and metric characteristics.

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