

Sport anxiety, test anxiety and academic performance of primary school pupils: a correlational study

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Abstract

Background. School evaluation is an important component of the educational process in educational institutions in Romania, but little is known about the influences of academic performances and test anxiety on the anxiety in sports played by primary school pupils.

Aims. The objective of the study is to identify the level of anxiety in sports and the level of test anxiety in primary school pupils. At the same time, the study aims to highlight the influences of the academic performances of the students in three of the educational disciplines, and of test anxiety on anxiety in sports played by the pupils.

Methods. Subjects ($N = 65$) are 4th and 3rd grade students aged 9 to 10/11. The tools used are the *Sport Anxiety Scale-2* (SAS-2, 15 items), developed by Benson & Wren in 2004 and the *Children's Test Anxiety Scale* (CTAS, 30 items), developed by Smith et al. in 2006.

Results. The results obtained in the Sport Anxiety Scale for the whole group of students included in the study, in the total score of the scale, indicate an average level of anxiety in sports ($m=25.206$, $s.d=8.277$). Similar results in the Children's Test Anxiety Scale are obtained: above average levels ($m=2.033$; $s.d=0.4558$) for the whole group of subjects, in the global score of the scale. At the same time, the results obtained from the Pearson correlation indicate a direct or positive relationship between sport anxiety and test anxiety ($r=.721$, $p < 0.001$; $r^2=.519$, indicating a very strong effect size) and a negative association relationship with the academic performances of the students in the disciplines of Romanian language and literature ($r(63)=-0.426$, $p < 0.001$, and sport, $r(63)=-0.426$, $p < 0.001$, but not mathematics).

Conclusions. The obtained results confirm the hypothesis of the study: anxiety in sports is influenced by test anxiety and the academic performances of the students. Thus, students with higher levels of anxiety in sport will have higher levels in test anxiety and lower school performance in the disciplines of Romanian language and literature, and in sport.

Keywords: sport anxiety, test anxiety, correlation study, primary school, pupils.

Introduction

There has been an intense concern about defining anxiety, describing its components, types, and assessing it as a multidimensional concept. Anxiety was defined by Spielberger as a trait-state construct. Anxiety is an “existing or immediate emotional state characterized by apprehension and tension. Trait anxiety is defined as a predisposition to perceive certain situations as threatening and to respond to them with varying levels of state anxiety” (Spielberger, 1966 cited by Roberts et al., 1986). More recent concerns are also directed towards identifying the level of anxiety in different situations or contexts such as before an exam or during sports competitions, finding that a person's performance may be negatively influenced by the level of anxiety (Martens et al., 1990; Jarvis, 2002). Anxiety

consists of two sub-components, namely, cognitive and somatic anxiety. Cognitive anxiety defined by Morris et al. (1981) is the conscious awareness of unpleasant feelings about oneself or external stimuli, worry or disturbing visual images. Somatic anxiety is the physiological and affective elements of the anxiety experience that develops from autonomic arousal (Martens et al., 1990).

In defining test anxiety, the authors included these two components of anxiety in the context of an assessment or examination: test anxiety refers to the negative effects on cognitive, physiological and biological factors during a test or exam process (Sarason & Stoops, 1978 cited by Mok & Chan, 2016). A similar approach is that of Zeidner (1998), which defines test anxiety as a state of distress encompassing phenomenological, physiological, and behavioral responses that accompany concerns about

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possible negative consequences of failure on an exam or similar evaluative situation. From a theoretical perspective, two major components of test anxiety can be distinguished: 1- worry, which includes all cognitive processes and 2- emotionality, which refers to the psychological changes resulting from the autonomic nervous system arousal (Spielberger & Vagg, 1995). Worry presents a cognitive interference as it concerns cognitive distortions and self-depreciating thoughts rather than skill deficiencies (Parkinson & Creswell, 2011). The emotionality component is physiological, i.e. autonomic arousal, and associated with body symptoms such as increased heart rate, sweaty palms, or shaking (McDonald, 2001).

Similarly to sport anxiety, the cognitive component is characterized by negative expectations about success or self-assessment, negative self-talk, negative thoughts, fear of failure, loss of self-esteem, low self-confidence, worries about performance, images of failure, inability to concentrate and disrupted attention (Martens et al., 1990; Jarvis 2002), while the somatic component activates negative symptoms such as feelings of nervousness, difficulty in breathing, high blood pressure, dry throat, and butterflies in the stomach. It was reported that test anxiety involves a tendency for a child to expect failure in test situations, so this type of anxiety is more closely related to cognitive school performance than general anxiety (Martens et al., 1990; Jarvis, 2002; Nicholls et al., 1967 cited by Robu, 2011).

Taking this into account, in the present study we will highlight issues related to the level of anxiety in situations where students have to prove intellectual and cognitive abilities on the one hand, and motor and sports skills on the other hand. Based on the findings of Freud cited by Robu (2011), related to the fact that in objective anxiety the intensity of the emotional reaction is proportional to the magnitude of the external danger or threat, we aim to highlight the level of test anxiety and sport anxiety given by the level of threat experienced by students in these two contexts. A series of investigations have shown that assessment situations or those involving a possible failure are generally perceived as more threatening by individuals; trait anxiety is at a high level (Spielberger, 1966; Spielberger & Smith, 1966 cited by Spielberger, 1983). Highly test-anxious students tend to perceive tests as opportunities for catastrophic failure (McDonald, 2001). Their attention to the task at hand is overly drawn to their excessive worry about being tested, which disrupts the retention of information (Morris et al., 1981; Spielberger & Vagg, 1995 cited by Mok & Chan, 2016). In sport, the case of performance athletes, competition may lead to what Martens (1977) called competitive trait anxiety, understood as a tendency to perceive competitive situations as threatening and responding to these situations with feelings of apprehension or tension; competitive trait anxiety is a concept which denotes how anxious an individual typically becomes in competitive situations.

At the same time, we aim to highlight the association of sport anxiety with test anxiety in pupils, and with the school performance of primary school pupils.

If, usually, primary school assessment has a diagnostic function (assessing the pupils' level of knowledge and

skills at the time of testing) and is performed by individual written tests or practical tests in team games, pupils are in a position to prove, in addition to leadership skills, cooperative skills with the team members, as well as competition with the opponent team members.

Objectives

The objective of the study is to identify the level of anxiety in sports and the level of test anxiety in primary school pupils. At the same time, the study aims to highlight the influences of the academic performances of the pupils in three of the educational disciplines, and of test anxiety on anxiety in sports.

Hypothesis

There is a statistically significant association relationship between the level of anxiety in sports and the level of test anxiety and the school performance of primary school pupils.

Material and methods

The current study obtained the approval of the University of Oradea Ethics Committee. All participants and their parents provided an informed consent before entering the study protocol.

Research protocol

a) Period and place of the research

The current study took place during the academic years 2018-2019, between May-June.

b) Subjects and groups

Sixty-five pupils in the third grade (66.2%) and fourth grade (33.8%) from the Gymnasium School No. 11 in Oradea, Bihor county, Romania, participated in the study. They were aged between 9 and 10/11 years. Depending on gender, 50.8% were boys and 49.2% were girls.

c) Tests applied

The following tools were used:

- *Child Test Anxiety Scale* (CTAS), developed by Wren & Benson (2004). The scale includes 30 items grouped into three subscales: *Thoughts* (e.g. I think I will get a lower score), *Distracting behavior* (e.g. I move my legs under the bench) and *Automatic reactions* (e.g. My hands are shaking). The response variants are on a Likert scale, each question having 4 variants of response. CTAS assesses an individual's level of apprehension or anxiety about testing on a 1-4 Likert scale, asking for participants' response about how anxious they would feel in response to various settings and experiences. The internal consistency of the responses was assessed by calculating Cronbach's alpha value, which was 0.899.

- *Sport Anxiety Scale-2* (SAS-2), developed by Smith et al., in 2006. SAS-2 consists of 15 items, with five items on each of the 3 subscales: *worry* as cognitive anxiety (e.g. *I worry that I will not play well*), *somatic anxiety* (e.g. *My muscles feel tight because I am nervous*), and *concentration disruption* (e.g. *It's hard for me to focus on what I'm supposed to do*). Participants responded on a 4-point scale of experience with the following anchors: 1 (not at all), 2 (a bit), 3 (pretty much), and 4 (very much). The internal consistency of the responses was evaluated by calculating Cronbach's alpha value, which was 0.875.

Table I

Results obtained in the Pearson correlation test in the overall score of the scales used and school performance

Parameters	Test anxiety	School performance in Romanian language and literature	School performance in mathematics	School performance in sports
Pearson Correlation	0.721**	-0.426**	-0.111	-0.430**
Sig. (2-tailed)	.000	.000	.385	.000
N	63	63	63	63

The scales were administered frontally to pupils in the class, after specifying the working instructions, the manner of completing the answers being an individual one.

At the same time, students were asked to complete the grades obtained in the disciplines of Romanian language and literature, mathematics, and sport. In Romania, scoring in primary school is based on four school grades: *Very Good, Good, Sufficient, and Insufficient*.

d) Statistical processing

The data in this paper were primarily presented using descriptive statistics, and then were analyzed using Pearson Correlation Coefficient with SPSS 18.

Results

Regarding the test anxiety level, the results obtained for the whole group of students enrolled in the study, in the total CTAS scale score, indicate an over-average level of test anxiety ($m=2.03$, $s.d=0.455$). The highest averages were obtained for the indicators: *I think about what my grade will be* ($m=2.96$; $s.d=0.999$), *I worry about doing something wrong* ($m=2.8$; $s.d=0.921$), *I feel nervous* ($m=2.73$; $s.d=1.004$), *I think I am going to get a bad grade* ($m=2.49$; $s.d=0.986$). Except for an item (*I feel nervous*), the others saturate the *Thoughts* subscale. The lowest averages were obtained for items: *My head hurts* (Automatic Reactions) ($m=1.46$; $s.d=0.73$), *It is hard to remember the answers* (Thoughts) ($m=1.44$; $s.d=0.662$), *I look at other people* (Off-Task Behaviors) ($m=1.46$; $s.d=0.730$). According to the results obtained on the level of the test anxiety of the students participating in the study, it was found by reference to the standard (Popa et al., 2018) that 3.1% had a low level of test anxiety, 29.93% had levels below the average, 30.06% average, 32.30% above average, and 4.61% had high levels of test anxiety. One aspect that we would like to emphasize is that 36.91% of students had above average and high test anxiety levels, which could have a negative impact on school performance. The results obtained in the Sport Anxiety Scale indicate an average level of sport anxiety ($m=25.20$, $s.d=8.277$), the highest averages being obtained in items that saturate the *Worry* subscale: *I worry that I will let others down* ($m=2.21$, $s.d=1.049$), *I worry that I will not play well* ($m=2.031$, $s.d=0.841$), *I worry that I will mess up during the game* ($m=1.98$, $s.d=0.991$), *I worry that I will play badly* ($m=1.90$, $s.d=0.976$). The lowest averages were obtained in items that saturate the *Somatic Anxiety* subscale: *My stomach feels upset* ($m=1.32$, $s.d=0.667$), *My muscles feel shaky* ($m=1.47$, $s.d=0.8$) and *Concentration Disruption: I lose focus on the game* ($m=1.38$, $s.d=0.05$). A percentage of 74.6% of the participating students had medium and low levels of sport anxiety, and 25.4% had

above average and high levels of sport anxiety. According to subscale averages, the highest average in CATS was obtained for the *Thoughts* subscale ($m=2.19$, $s.d=0.546$). A similar result was obtained for SAS-2, where the average *Worry* subscale was the highest ($m=9.95$, $s.d=3.708$). Regarding somatic manifestations, the lowest average was obtained for SAS-2 ($m=7.55$, $s.d=3.073$) among subscale results, and in CATS, the lowest average was obtained for the *Out of task* subscale ($m=1.86$, $s.d=0.547$).

The distribution of data for the scores obtained using the administered instruments was normal and was verified by the Kolmogorov-Smirnov test (CTAS: $z = 0.791$, $p > 0.05$, SAS-2: $z=1.023$, $p > 0.05$).

To verify the study hypothesis, the results obtained in the Pearson correlation test were included in Table I.

According to the results, a positive association relationship was obtained between sport anxiety and test anxiety, $r(63)=0.721$, $p < 0.001$, which means that students showing high levels of test anxiety in the assessed disciplines will have high levels of anxiety in sports and vice versa. This means that the level of test anxiety influences by 51.98% the variance of results in sport anxiety ($r^2=0.519$, $r=0.721$, which indicates a very strong effect size).

Also, sport anxiety is negatively influenced by the school performances of students in Romanian language and literature, $r(63)=-0.426$, $p < 0.001$, and in sport, $r(63)=-0.430$, $p < 0.001$, with above average effect sizes. As a result, the increased level of anxiety in sports in primary school students may be due to poor performance in the two school disciplines, the relationship between these being a negative one.

The association between the results obtained on the subscales of the working tools is presented in Table II.

The analysis of the data included in Table II shows that statistically significant results were obtained between all the subscales of the working instruments used, with positive or direct association relationships between *Automatic Reactions* and *Somatic Anxiety*, $r(63)=0.665$, $p < 0.001$, *Thoughts* and *Worry*, $r(63)=0.621$, $p < 0.001$, *Off-Task Behaviors* and *Concentration*, $r(61)=0.567$, $p < 0.001$. To conclude, it can be said that the results confirm the existing theories about anxiety as a trait and state; so students with high levels of anxiety evaluated during school assessments will have similar reactions during team sports games organized at school (according to the scores obtained for the Pearson coefficient r , presented above, large effect sizes were obtained in the study).

Regarding the influence of school performance, across disciplines, on the three subscales of SAS-2, it was found that:

Table II

Results obtained in the Pearson correlation test on the subscales of the working instruments used and academic performance.

Variables	Parameters	SAS-2 Subscales		
		Somatic	Worry	Concentration
Thoughts	Pearson Correlation	.443**	.621**	.549**
	Sig. (2-tailed)	.000	.000	.000
	N	63	63	62
CTAS – Subscales Off-Task Behaviors	Pearson Correlation	.563**	.448**	.567**
	Sig. (2-tailed)	.000	.000	.000
	N	62	62	61
Automatic Reactions	Pearson Correlation	.665**	.472**	.472**
	Sig. (2-tailed)	.000	.000	.000
	N	63	63	62
School performances in Romanian language and literature	Pearson Correlation	-.402**	-.289*	-.418**
	Sig. (2-tailed)	.001	.022	.001
	N	63	63	62
Academic performances School performances in mathematics	Pearson Correlation	-.119	-.042	-.131
	Sig. (2-tailed)	.353	.742	.312
	N	63	63	62
School performances in sports	Pearson Correlation	-.435**	-.312*	-.368**
	Sig. (2-tailed)	.000	.013	.003
	N	63	63	62

Somatic manifestations experienced in team sports games are negatively influenced by school performances in Romanian language and literature, $r(63) = -0.435$, $p < 0.001$, and school performances in sports, $r(63) = -0.402$, $p < 0.001$, the effect size being above average for both results. Consequently, the lower the academic performances of students in the two school subjects, the more intense will be the somatic manifestations of students during sports games and vice versa. School performance in mathematics does not influence the level of somatic manifestations, $r(63) = -0.119$, $p > 0.05$.

The level of *worry* of students in sports games is negatively influenced by school performances in the sport discipline $r(63) = -0.312$, $p < 0.05$, with a below average effect size, and by school performances in the Romanian language and literature discipline, $r(63) = -0.289$, $p < 0.05$, the effect size being average.

Similarly to the other two subscales of SAS-2, the level of *concentration* of students during sports games is influenced by academic performance in the Romanian language and literature discipline, $r(63) = 0.418$, $p = 0.001$, with an over-average effect size, and by school performance in sport $r(63) = 0.368$, $p < 0.05$, with a below average effect size.

Discussion

The study aims to investigate aspects of anxiety during classroom assessments as well as during team sports played in school. Thus, based on the results obtained in the tools used in the research, we highlighted the level of anxiety of pupils in the school environment, in two different contexts: the tests for assessing competences in school subjects and participation in team sports during physical education classes.

Although testing appears to be a potentially useful method to enhance long-term retention, it may also induce anxiety, which can be unfavorable to learning (Mok & Chan, 2016). The experience of anxiety, as an emotional state, is normal in any situation where there may be a

danger that causes physical or psychological impairment, for example, situations that are threats to self-esteem or psychological well-being (Robu, 2011). However, above average and high levels of anxiety can lead to personal destruction and low performances (Abulghasemi, 2008; Bochiş & Florescu, 2018; Hong & Karstenson, 2002; Onyeizugbo, 2010; Zeidner & Matheus, 2003).

It is worrying for parents and teachers to test youth who have test anxiety, who may experience more anxiety disorder and depression symptomatology than their non-test anxious peers (Weems et al., 2010), and that anxiety may become chronic during childhood, it may persist in adolescence and adulthood (Goodwin et al., 2004). It is necessary to have a better understanding of how students meet school requirements, given that educational systems are oriented towards achieving school performance. Therefore, it is of particular importance for the teaching staff to ensure a safe climate in teaching, but especially evaluation, and to ensure a supportive class climate. The role of the teacher has been highlighted in many studies, from postulates based on a philosophy of values that teachers teach to student generations: "Voices of teachers not only spread the new ideas among people but also facilitate the free movement of values" (Florescu, 2015) to responsibilities for developing the psychological processes necessary for students to learn. Clipa (2015) points out, "The educator, given his training and the importance of his/her activity, is a stimulating force of a people's spirit, able to generate positive chain reactions on the part of the people he educates, to increase their thirst for knowledge and to put into motion their motivation". It is important to understand the role of climate in school beyond academics. Laurian-Fitzgerald et al. (2015) write, "The climate of classroom and school should consider the other parts of the brain in addition to academic knowledge". Bochiş & Şandra (2018) offer some recommendations for teachers: 1. provide a favorable climate for school assessments, 2. use of positive feedback on the results obtained, and 3. focus

on the learning effort more than on the obtained result. Parnabas & Mahamood (2013) also synthesize the ways in which teachers and other speculators can use techniques to deal with stressful situations, including testing, cognitive restructuring and emotional self-control. According to the authors, cognitive techniques are positive self-talk, physical activity, goal setting, thinking on practice, thinking stopping, remember the worst case scenario, focus on what you can control, imagery and simulation, while somatic techniques are meditation, breathing techniques, progressive relaxation, autogenic training and biofeedback.

The study does not capture the level of anxiety in sports according to the interest of pupils in sport (hobby), the level of competitiveness or skills of the pupils, which need to be investigated in future studies.

Conclusions

1. High levels of anxiety were obtained in more than a quarter of the students, both in the Children's Anxiety Scale and the Sport Anxiety Scale-2, which means that school-based assessment situations and sports games at school are perceived by students as threatening, stressful or demanding.

2. The level of anxiety in sports of primary school students is in an association relationship and is influenced positively by the level of test anxiety and negatively by the school performance of students in the disciplines Romanian language and literature, and sport. Thus, the level of anxiety that pupils experience during school appraisals and contests, often completed with a score, influences the level of anxiety in sport during team sports competitions, where the result obtained places the participating students in one of the two positions: losers or winners. At the same time, the low school performance in disciplines that seek to develop communication skills and motor skills negatively influences and leads to an increase in students' level of anxiety in sport.

Conflicts of interests

There are no conflicts of interests.

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