

## ORIGINAL SCIENTIFIC PAPER

# Correlation between Anxiety and Success in Swimming Training Program for Non-Swimmers

Dražen Rastovski<sup>1</sup>, Dajana Zoretić<sup>2</sup>, Klara Šiljeg<sup>2</sup>, Bojan Jorgić<sup>3</sup>

<sup>1</sup>Josip Juraj Strossmayer University of Osijek, Faculty of Kinesiology, Osijek, Croatia, <sup>2</sup>University of Zagreb, Faculty of Kinesiology, Zagreb, Croatia, <sup>3</sup>University of Niš, Faculty of Sport and Physical Education, Niš, Serbia

## Abstract

The need to determine the factors that positively or negatively affect the acquisition of swimming knowledge arose with the development of various swimming programs. The aim of this research was to determine the connection between the level of anxiety and success in the process of motor learning in swimming training program for non-swimmers. A sample of 77 children, aged (11.00±0.71), participated in a swimming training program for non-swimmers for 20 hours according to the standard method used in the Republic of Croatia. In the first and last lesson, the swimming knowledge was determined by means of a scale of eleven grades that describe the level of acquisition of swimming knowledge. Level of anxiety was assessed by modified CSAI-2CSWIM anxiety level questionnaire. Correlation analysis determined that the level of anxiety has a significant negative correlation with performance in all three observed domains, cognitive anxiety -0.273 and -2.46, somatic anxiety -0.384 and -0.337 and self-confidence -0.420 and -0.308 with results on the final test and with progress in swimming learning. The results of the conducted research showed that the level of anxiety has a significant influence on the children's swimming learning process.

**Keywords:** elite, non-elite, depression, water sport

## Introduction

Swimming as a sport and as a recreational activity has a significant positive influence on the morphological, functional, psychological, motor and intellectual development of children and youth of typical development as well as children with disabilities and various diseases (Gonenc, Acikgoz, Semin & Ozgonul, 2000; Fragala-Pinkham, O'Neil, & Haley, 2010; Jorgić et al., 2014; Fiorilli et al., 2016). According to Rastovski, Tomac, Šumanović, and Filipović (2011), swimming is one of the first sports that children begin to train due to its positive influence on the development of a young child's organism. In order for children to be able to use the positive benefits of swimming, they must first learn to swim. Therefore, trainings for non-swimmers are organized. Different training methods for non-swimmers are applied worldwide (Grčić-Zubčević, 1996; Kapus et al., 2002; Junge, Blixt, & Stallman, 2010). Over time, various tests have been developed to assess swimming knowledge by differ-

ent swimming experts (Getz, Hutzler, & Vermeer, 2006; Tirosh, Katz-Leurer, & Getz, 2008; Šiljeg, Leko, & Sindik, 2016) that can be applied to children of different ages and health conditions.

With the development of various swimming training programs and tests for the assessment of swimming abilities, the need arose to determine the factors that positively or negatively affect the acquisition of swimming knowledge. According to Rastovski (2019a), the external factors that influence the success of swimming training are the working mode or the training model, means and aids, water characteristics and the training coach. Additionally, the internal factors singled out are motor abilities morphological characteristics and the level of anxiety of students during swimming training (Köröglu & Yigiter, 2016; Stanković et al., 2017). The influence of external factors and certain motor abilities and morphological characteristics in the training of non-swimmers is somewhat predictable. These factors definitely need to be determined, consid-



Correspondence:

D. Zoretić  
University of Zagreb, Faculty of Kinesiology, Horvaćanski zavoj 15, 10000 Zagreb, Croatia  
E-mail: dajana.zoretic@kif.unizg.hr

ering that children with a higher level of anxiety tend to have a greater fear of failure, concern about mistakes, poor performance and defeat (Coreia et al., 2017; Coreia et al., 2018). Results from the research of Burton (1988) show that cognitive anxiety negatively affects success in swimming. Bielec (2007) concluded that, in addition to material conditions and external factors, the greatest issue in swimming training is fear of water or anxiety. Studying the influence of anxiety on swimming abilities, Muhamad, Sattar, Abadi and Haron (2013) concluded that female students with a higher degree of anxiety achieve lower results in the observed swimming abilities.

According to Vujanović and Tišma (2011), athletes lose up to 50% of their total technical-conditioning capacities in important competitions if there is an increased state of anxiety, which affects performance. Those children are also more inclined to feel that their unsuccessful sports performance will be criticized, which results in negative self-evaluation according to Smith, Smoll, and Cumming (2007). One meta-analysis (Woodman & Hardy, 2003) showed a correlation between cognitive anxiety and performance for competitive sports. To the best of our knowledge, no study has looked specifically at the relationship and the influence of the anxiety level on the success of training programs for non-swimmers.

Consequently, the aim of this research is to determine the correlation between the level of anxiety and success in the process of learning swimming skills for non-swimmers.

## Methods

### Participants

A total of 77 children non-swimmers, with no injury (35 boys and 42 girls) aged ( $11.0 \pm 0.71$ ) were selected from elementary school. All participants were non-swimmers without experience in water environment. Prior to testing, all individuals volunteered and had their parents sign an informed consent form. The advantages and disadvantages of participating in this study were explained to them. The Human Ethics Committee of the Faculty gave its approval to the planned study in accordance with the Helsinki Declaration. Approval number: PZR/16-04-2014-Ad2F.

### Procedures

A sample of 77 children's non-swimmers were trained for 20 lessons according to the standard method of Grčić-Zubčević (1996), which is applied in the Republic of Croatia. Lessons were performed 2 time per week lasting one school lesson (45min).

### Swimming knowledge

In the first and last lesson, the swimming knowledge was assessed according to the criteria established by Grčić-Zubčević (1996). The degree of success is determined through a scale of eleven grades that describe the degree of acquisition of swimming knowledge.

### Anxiety level of questionnaire

The level of anxiety was assessed by a modified CSAI-2CSWIM anxiety level questionnaire (Rastovski, 2019b). It consists of 27 items arranged in three subscales that measure: Cognitive anxiety - cognitive anxiety (w), somatic anxiety (s) and self-confidence (c). On a 4-point Likert scale, participants assessed how they mostly felt, with 1 indicating the absence of a certain feeling, and 4 indicating the intense presence of a certain feeling. Questionnaire has satisfactory reliability of the entire questionnaire (Cronbach  $\alpha=0.748$  and average correlation (AVR) =0.106), as well as all three subscales.

### Data processing methods

In all variables, basic descriptive parameters were calculated: mean, standard deviation (SD), range (Min - Max), and median (Median). Before further data processing, the process of normalization of the variables was carried out. Correlation analysis was used to determine the correlation between the level of anxiety and success in the process of motor learning during the training of non-swimmers. The data analyses were performed by using IBM SPSS Statistics (version 19. IBM Corp. Armonk, NY, USA). Level of significance was set at  $p < 0.05$ .

## Results

Table 1 shows the results of the acquisition of swimming knowledge at the initial and final measurement, as well as

**Table 1.** Descriptive statistics for the acquisition of swimming knowledge and for the level of anxiety

Variables	Mean	SD	Median	Min	Max
ISWK	1.29	0.70	1.00	1.00	3.00
FSWK	8.79	2.15	9.00	1.00	11.00
PSWK	7.5	2.09	7.00	0.00	10.00
CA	1.77	0.53	1.67	1.00	3.75
SC	3.04	0.58	3.17	1.50	4.00
SA	3.42	0.49	3.56	1.67	4.00
AG	2.60	0.21	2.63	2.07	3.04

Note. ISWK - initial swimming knowledge, FSWK - final swimming knowledge, PSWK - progress in swimming knowledge, CA - cognitive anxiety, SC - Self-confidence, SA - Somatic anxiety, AG - anxiety general

the achieved progress. In addition, the table also shows the results for three subscales of anxiety cognitive anxiety, self-confidence, and somatic anxiety as well as for general anxiety.

The presented results show that significant progress was made in swimming knowledge between the initial and final testing (Mean $\pm$ SD =7.5 $\pm$ 2.1). The result for general anxiety (AG) was 2.60 $\pm$ 0.21, 1.77 $\pm$ 0.53 for CA, 3.04 $\pm$ 0.58 for SC and

3.42 $\pm$ 0.49 for SA.

The results in Table 2 indicate that there is a negative correlation between anxiety levels and performance in each of the three areas that were studied: cognitive anxiety ( $r=-0.273$  and  $-2.46$ ), somatic anxiety ( $r=-0.384$  and  $-0.337$ ), and self-confidence ( $r=-0.420$  and  $-0.308$ ), with the score on the final test results and progress in learning to swim, and all coefficients are low to moderately related.

**Table 2.** Spearman's rank correlation coefficient of the variables Final and Progress of swimming learning with anxiety domains

Variables	FSWK	PSWK
SA	-.384**	-.337**
SC	-.420**	-.308**
CA	-.273*	-.246*

Note. FSWK – final swimming knowledge, PSWK – progress in swimming knowledge, CA - cognitive anxiety, SC - Self-confidence, SA - Somatic anxiety,

## Discussion

In the present study, the correlation between the level of anxiety and success in the process of motor learning during the training of non-swimmers was determined.

The results obtained from this research clearly confirm that the level of anxiety has a significant negative correlation with success in all three observed domains, cognitive anxiety (CA) -0.273 and -0.46, somatic anxiety (SA) -0.384 and -0.337 and self-confidence (SC) -0.420 and -0.308 with the results on the final test (FSWK) and with (PSWK) progress in learning to swim (Table 2). The results coincide with the results of previous research, according to Woodman and Hardy (2003), and Kais and Raudsepp, (2005).

Šilić (2014) points out that an emotional experience, such as anxiety, leads to discomfort, psychological activation and a tendency to escape or avoid an unpleasant situation. Such activation manifests itself differently in the observed domains. However, it is certainly one of the factors that can negatively affect a non-swimmer child, i.e., his success in learning to swim. The obtained results coincide with research by Burton (1998), who applied the CSAI-2 to swimmers and concluded that cognitive anxiety negatively affects success. Negative thoughts before a swimming competition reduce swimming capacity (Lin et al., 2021). Determined anxiety reduced capacities in children with a higher level of cognitive anxiety. Therefore children with higher anxiety were not able to complete the assigned tasks or concentrate on the non-swimmer training lessons. Instead, they tried to overcome their cognitive anxiety, which resulted in poorer progress and performance.

Salovey and Sluyter (1997) points out that the group of primary emotions includes, among others, fear and shame. This group of emotions (fear and shame) are dominant for a child in a newly created situation, such as the training of non-swimmers. Fear of a new environment and fear of endangering one's own life are certainly some of the strongest emotions. Furthermore, cognitive anxiety, or fear for one's own life, when training non-swimmers can be the result of a bad experience, especially the one related to the fear of drowning the child has previously experienced in a swimming pool. This was confirmed by Irwin, Irwin, Ryan and Drayer (2009) who stated that the fear of drowning is the strongest predictor of low swimming competence. This research also confirmed the connection between self-confidence and success in teaching non-swimmers. Although the correlation coefficients were low to moderately related ( $r=-0.273$  to  $-0.420$ ), the current results show a negative correlation between anxiety levels and performance in each of the three areas that were studied: cognitive anxiety, somatic anxiety and self-confidence. Persons with high self-confidence will interpret the symptoms of competitive anxiety as an incentive, a challenge, an opportunity to achieve their goal

and success. On the contrary, persons with lower self-confidence will see such symptoms as a hindering and threatening factor to success (Hanton, Mellalieu, & Hall, 2004). According to Šilić (2014), in order for self-efficacy to develop, a person must believe that he/she has everything under control and that what he/she does is done with the intention of achieving a certain goal. Consequently, even in the training of non-swimmers, it is necessary to work on increasing self-confidence in children so that they can master the tasks set more easily. This is achieved by gradually assigning tasks through games and respecting the principle from an easier to a harder task.

The research results showed that somatic manifestations are negatively related to success in training non-swimmers. Somatic anxiety occurs due to excitement and/or unpleasant feelings such as tension and stress and is manifested through a series of physiological symptoms (McNally, 2002; Kais & Raudsepp, 2005). Physiological symptoms that occur in the training of non-swimmers are specific and often related to the environment in which non-swimmers are trained. These external factors are related to water temperature and chlorine. It often happens that children have a "reduced" tolerance to lower temperature and chlorine evaporation. In this way, they actually try to justify their discomfort in the new situation. Any somatic manifestation can distract the students' attention from the lesson. Therefore, the students' attention will partly be focused on the symptoms, that is, on concealing them, while the manifestations themselves can significantly affect the quality of the lesson. Somatic manifestations must also be noticed by swimming coaches and are one of the basic elements for recognizing an increased level of anxiety in children who are learning to swim. The results of the conducted research showed that the level of anxiety in it all domains (cognitive, somatic anxiety and self-confidence) has a significant impact on children's learning to swim.

The main limitation of the present study is not objectively measuring swimming knowledge of the participants. Moreover, children's participation in some other extra-curricular activities may contribute to the difference in social anxiety prior to engaging in swimming classes. Furthermore, maturation level was not determined. Future studies should include younger children without engagement in other sport activities.

## Conclusion

In conclusion, there is a negative correlation between anxiety levels and performance in each of the three areas that were studied: cognitive anxiety, somatic anxiety, and self-confidence, with the score on the final test results and progress in learning to swim. The findings of the research revealed that anxiety levels are significantly connected with how effectively children learn to swim.

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**Conflict of Interest**

The authors declare that there are no conflicts of interest.

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