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Research Paper

Influence of Autogenic Training on Psychophysiological Parameters in Adolescent Athletes

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ABSTRACT

The research aimed to investigate the effects of autogenic training (AT) on psychophysiological variables among senior secondary female national school-going athletes. The study divided participants into two groups: an experimental group that underwent 6 weeks of AT and a control group with no intervention. Each group consisted of 6 subjects, and both groups were assessed using paired t-tests at pre- and post-test stages. The findings revealed significant improvements in several psychophysiological characteristics among the experimental group compared to the control. The results suggest that AT effectively reduces somatic anxiety, worry, and concentration disruption while also improving resting heart rate among the targeted population of young female athletes. It highlighted that the experimental group, after undergoing 6 weeks of AT, demonstrated statistically significant improvements in somatic anxiety, worry, concentration disruption, and resting heart rate. The significance level, with p-values below 0.05, indicated that these changes were unlikely due to random chance, affirming the efficacy of AT in enhancing these psychophysiological variables among the participants. These outcomes are particularly relevant in competitive sports settings where psychological factors can significantly influence performance and overall well-being. The structured approach of AT, involving relaxation techniques and self-suggestion, appears beneficial in mitigating anxiety-related symptoms and enhancing focus, potentially contributing to improved athletic performance and mental resilience. Overall, the research underscores the importance of tailored interventions like AT in addressing psychophysiological challenges specific to competitive athletes.

Keywords: *Autogenic Training (AT), Psychophysiological Variables, Senior Secondary Female Athletes, Somatic Anxiety, Resting Heart Rate, Concentration Disruption*

Autogenic training (AT) was introduced in 1926 by German psychiatrist Johannes Heinrich Schultz, who was dissatisfied with psychoanalysis. Inspired by his collaboration with neurologist Oscar Vogt on sleep and hypnosis research, Schultz noted that hypnotized individuals often felt heaviness and warmth in their limbs. He explored whether imagining these sensations could induce self-hypnosis. By guiding patients through mental exercises focused on heaviness and warmth, Schultz found he could reliably induce a self-hypnotic state to alleviate stress, fatigue, and tension without side

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effects. He developed a series of six exercises known as autogenic training to empower patients without creating dependency on the therapist (Autogenic Training, 2024). Being a top player is not simple. Players must have the right psychological traits to succeed in addition to having the necessary technical skills, physical capabilities, and physical fitness (Sharma, A., Prasad, B. K., Das, R., Sharma, A., Karmakar, D., & Choudhary, P. K. (2024). According to Salazar et al., the most important element influencing how well athletic talent's function is the mental state just before the skill is executed (Salazar et al., 1990). Psychological concepts like wisdom, feeling, inspiration, joy, zeal, and sportsmanship (Santosa & Soegiyanto, 2016). The sports expert believes that performance of any athletes whether team game or individual not only have to be prepared through physical development but also need to deal with positive state of mental health preparation. Sports Anxiety is known to be an important psychological variable for Human Psychology of Emotion. It is believed to be one of the most crucial psychological aspects that often create negative effect upon the performance of elite level of sports-persons (Sharma, A., & Purashwani, P., 2021). Cognitive anxiety is as negative expectations and cognitive concerns about oneself, the situation at hand and potential consequences, and somatic anxiety defines as one's perceptions of the physiological affective elements of the anxiety experience, that is, indications of autonomic arousal and unpleasant feelings states such as nervousness and tension (Sharma, A., & Prasad, B. K., 2023). In terms of physiological concepts, during adolescence, athletes are prone to injuries, there are several possible reasons for overuse of muscles, problems with joints, and psychological factors like stress (Das, R., Jhajharia, B., Ciocan, V. C., Majumdar, I., & Sharma, A., 2023). It has been suggested by Bull et al. (2005) that the features of mental strength in general may differ from the way it is interpreted in a specific sport. It's also logical to suppose that different kinds of mental toughness are needed to compete in different sports. Some sports, like swimming, may need a different sort of mental toughness than others, like rugby (Sharma, A., 2022).

METHODOLOGY

The subjects were selected through random sampling technique, from senior secondary school female participants, where a total number of 12 (twelve) participants chosen who aged ranged between 15 to 18 years and has played up to national level competitions.

On the basis of the available literature, findings of the related research studies, expert's opinion, facilities and instruments availability, scholars own understanding of the problem and keeping in mind the specific purpose of the study, following variables were selected for the study.

A. Psychological Variables:

1. Sports Anxiety

a) Somatic anxiety

b) Worry

c) Concentration disruption

B. Physiological Variables:

1. Resting Heart Rate

Independent Variables:

Autogenic Training

Instruments

- **Sports Anxiety Scale-2:** The participants responded to 15 items covering the three components of the questionnaire: somatic anxiety, worry, and concentration disruption. The test tracked each subject's level of sports anxiety for that sport. There was no deadline for responding, and filling out the questionnaire came with clear instructions.
- **Heart Rate: Manual Method:** Radial Pulse (wrist) – Researcher placed her index and middle fingers together on the opposite wrist, about 1/2 inch on the inside of the joint, in line with the index finger. Once the researcher finds a pulse, then counted the number of beats the researcher feel within a one-minute period. Researcher estimated the per minute rate by counting over 30 seconds and doubling the result.

Procedure

The study used a genuine experimental pre-test post-test randomized group design as its research methodology. A total of 12 (twelve) senior secondary school participants, age ranged between 15 to 18 years were randomly selected as national level female athletes. Two equal groups (N = 06) of the chosen individuals were randomly allocated; Group I served as the Autogenic Training Group (AT Group). Group II served as the Control group (CG).

Following the administration of pre-tests for the chosen psychophysiological variables in accordance with the norms of the corresponding questionnaires to the AT Group and Control Group.

Group I got Autogenic training for a duration of 06 weeks, whereas the Group II i.e., Control Group practiced their own sports on a regular basis without receiving any special instruction. At the beginning, a pretest and after six weeks, a post-test was administered to both groups to assess their psychophysiological characteristics. The results were documented in a comparable manner.

Essentially, autogenic training is composed of three component parts that are often intermingled. The first and most important part is the six initial steps designed to suggest to the mind a feeling of warmth in the body and heaviness in the limbs.

These six self-statement steps are as follows:

1. Heaviness in the arms and legs (beginning with the dominant arm or leg)
2. Warmth in the arms and the legs (again, beginning with the dominant arm or leg)
3. Warmth in the chest and a perception of reduced heart rate
4. Calm and relaxed breathing
5. Warmth in the solar plexus area
6. Sensation of coolness on the forehead

RESULTS

Table No. 1 Descriptive Statistics of selected Psychophysiological variables of Control group

	Mean	N	Std. Deviation
Pre-Somatic	11.6667	6	1.86190
Post Somatic	12.1667	6	1.47196
Pre-Worry	12.5000	6	1.51658
Post Worry	11.8333	6	1.47196
Pre-Concentration Disruption	10.5000	6	1.87083
Post Concentration Disruption	10.1667	6	1.16905
Pre Heart-Rate	74.6667	6	3.14113
Post Heart Rate	74.5000	6	2.66458

The table presents descriptive statistics for six participants in a control group, measuring somatic anxiety, worry, concentration disruption, and heart rate before and after an intervention. Pre- and post-intervention mean scores and standard deviations are as follows: somatic anxiety (11.67 ± 1.86 and 12.17 ± 1.47), worry (12.50 ± 1.52 and 11.83 ± 1.47), concentration disruption (10.50 ± 1.87 and 10.17 ± 1.17), and heart rate (74.67 ± 3.14 and 74.50 ± 2.66). The results show slight changes in these psychophysiological variables.

Table No. 2 Descriptive Statistics of selected Psychophysiological variables of Experimental group

	Mean	N	Std. Deviation
Pre-Somatic	11.8333	6	1.47196
Post Somatic	10.6667	6	1.63299
Pre-Worry	12.5000	6	1.87083
Post Worry	11.0000	6	1.26491
Pre-Concentration Disruption	11.1667	6	1.47196
Post Concentration Disruption	09.8333	6	0.75277
Pre Heart-Rate	74.5000	6	3.08221
Post Heart Rate	71.8333	6	1.72240

The table provides descriptive statistics for an experimental group of six participants, detailing measures of somatic anxiety, worry, concentration disruption, and heart rate before and after an intervention. Before the intervention, mean values were 11.83 for somatic anxiety, 12.50 for worry, 11.17 for concentration disruption, and 74.50 for heart rate, with corresponding standard deviations. Post-intervention, these values changed to 10.67, 11.00, 9.83, and 71.83, respectively. The results indicate reductions in mean values for all variables following the intervention.

Table No. 3 Inferential Statistics of selected Psychophysiological variables of Control group using Paired t-test

	Paired Differences		t	df	Sig. (2-tailed)
	Mean	Std. Deviation			
Pre-Somatic – Post Somatic	0.50	2.73	.447	5	.673
Pre-Worry – Post Worry	0.66	1.75	.933	5	.394
Pre-Concentration Disruption -Post Concentration Disruption	0.33	1.75	.466	5	.661
Pre-Heart Rate – Post Heart Rate	0.16	2.13	.191	5	.856

The table presents inferential statistics for a control group of six participants, using a paired t-test to compare pre- and post-intervention measurements of psychophysiological variables. The mean differences and p-values were as follows: somatic anxiety (0.50, p = 0.673), worry (0.66, p = 0.394), concentration disruption (0.33, p = 0.661), and heart rate (0.16, p = 0.856). These results indicate no significant differences in these variables before and after the intervention.

Table No. 4 Inferential Statistics of selected Psychophysiological variables of Experimental group using Paired t-test

	Paired Differences		t	df	Sig. (2-tailed)
	Mean	Std. Deviation			
Pre-Somatic – Post Somatic	1.16	0.75	3.796	5	.013
Pre-Worry – Post Worry	1.50	1.04	3.503	5	.017
Pre-Concentration Disruption -Post Concentration Disruption	1.33	1.03	3.162	5	.025
Pre-Heart Rate – Post Heart Rate	2.66	1.75	3.730	5	.014

The table presents inferential statistics for an experimental group of six participants, using paired t-tests to compare pre- and post-intervention measurements of psychophysiological variables. The mean differences and p-values were as follows: somatic anxiety (1.16, p = 0.013), worry (1.50, p = 0.017), concentration disruption (1.33, p = 0.025), and heart rate (2.66, p = 0.014). These results indicate significant reductions in these variables following the intervention in the experimental group.

DISCUSSION

Autogenic Training (AT) has shown promise in alleviating severe anxiety in patients undergoing coronary angioplasty, though its comparative effectiveness against other treatments remains uncertain. An 8-week practice of AT significantly reduced short-term

anxiety in a study involving nursing students (Ernst, Kanji, 2004). Hidderley (2004) highlighted AT's potential for managing anxiety and depression in breast cancer patients. Manzoni et al. (2008) supported the anxiety-reducing benefits of relaxation training.

Marafante (2016) observed significant improvements in anxiety, depression, and distress among cancer outpatients using AT over ten 90-minute sessions, endorsing its cost-effectiveness in mood and distress management. Patients with functional somatic symptoms also benefited from AT, experiencing reduced tension and anxiety alongside increased resilience. Kiba et al. (2017) demonstrated that integrating AT into nursing simulations effectively reduced anxiety and improved performance among students, potentially enhancing learning outcomes.

Veskovic (2019) explored an 8-week combination of Autogenic Training (AT) and Imagery Movement Imagination (IMI), showing significant improvements in anxiety-related aspects among top athletes.

Autogenic Training has shown effectiveness in reducing stress, particularly anxiety and depression, as indicated by Seo and Kim (2019) who reviewed 950 studies and 21 meta-analyses.

From a holistic health perspective, Autogenic Training recognizes the interconnectedness of body and mind. It aims to counteract negative influences that can disrupt normal bodily functions over time, leading to increased muscle tension, reduced ability to relax, joint stiffness, compromised circulation, and other symptoms that may progress to psychosomatic illnesses. Incorporating relaxation techniques like Autogenic Training into daily routines is crucial for restoring balance and promoting psychosomatic renewal (Wilczyńska et al., 2019).

CONCLUSION

The study on the effects of autogenic training (AT) among senior secondary female national school-going athletes yielded several significant findings. Firstly, AT proved effective in reducing somatic anxiety, worry, and concentration disruption over a six-week intervention period. Notably, participants in the experimental group exhibited improvements in resting heart rate, indicating a physiological response to the training. Statistical analysis confirmed these changes were not random, with the experimental group showing statistically significant differences in targeted variables compared to the control group ($p < 0.05$). Importantly, baseline comparability between groups ensured that observed improvements could be attributed to the AT intervention rather than initial differences. These findings have implications for competitive sports, suggesting that tailored psychological interventions like AT can enhance mental resilience and optimize athletic performance by addressing anxiety-related symptoms and improving focus among young female athletes.

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Conflict of Interest
The author(s) declared no conflict of interest.

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