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Psychological Effects of Mind-Body Interventions on Core Cognitive Functioning among Adolescent Learners

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Abstract:

The present study examines the psychological effects of mind-body interventions, specifically selected pranayama, dhyan and breathing exercises, on core cognitive functioning among adolescent learners enrolled in competitive coaching programmes. Increasing academic pressure, performance expectations, and career uncertainty have increased cognitive and emotional strain among adolescents, highlighting the need for effective psychological support strategies. Using an experimental research design, a sample of 220 coaching students was divided into control and experimental groups across two batches. The experimental group participated in a structured mind-body intervention programme, while the control group continued with routine academic activities. Core cognitive functioning was assessed through a structured test measuring attentional capacity, cognitive concentration, memory efficiency, and reasoning proficiency. Descriptive statistics and paired sample t-tests were applied using SPSS. The findings revealed statistically significant improvements in all dimensions of core cognitive functioning among the experimental group, while no significant changes were observed in the control group. The study provides empirical evidence supporting the psychological and cognitive benefits of mind-body interventions in high-pressure learning environments.

Key Words: Analytical Thinking Ability, Focused Cognitive Engagement, Cognitive Functioning

Introduction:

In recent years, the number of adolescents preparing for competitive entrance examinations have exponentially increased. The growing intensity of competition has further amplified enrolment in coaching programs. The coaching-based learning systems emphasize rigorous schedules, continuous assessments, and performance benchmarking. Though this system aim to maximize academic output yet it place substantial psychological stress on adolescent learners. The system pushes them for long study hours and constant comparison with peer. It causes of amplified levels of mental fatigue and emotional strain. Since the entrance examinations and academic success is usually equated with future career security, it put a lot of pressure to perform consistently well under high expectations. Expectations from parents and teachers also reinforce a must-win mind-set. These problems collectively influence cognitive functioning such as sustained focus, memory retention, analytical thinking, and emotional regulation. Psychological research has highlighted

that chronic academic stress can impair core cognitive functioning. In high-pressure coaching environments, learners frequently report difficulty reduced cognitive efficiency. To support psychological resilience and cognitive balance, addressing these challenges requires interventions. Mind-Body interventions, particularly pranayama, dhyan and structured breathing exercises, have gained due attention in recent days. Since it is an easily accessible and non-invasive strategy, it can be good for improving psychological functioning. These interventions emphasize controlled breathing, awareness, and relaxation, which are known to influence autonomic balance and stress response mechanisms. Regular practice of breathing-based techniques may be helpful in improving attention, memory, and emotional stability. The examination of psychological effects of Mind-Body interventions on core cognitive functioning among adolescent learners is vital in the context of examination pressure and performance-driven learning environments.

Objectives of the Study:

The primary objective of the present study is to examine the psychological effects of Mind-Body interventions (pranayama, dhyan and guided breathing exercises) on core cognitive functioning among adolescent learners enrolled in coaching-based academic programs. The study aims to assess changes in key cognitive domains such as (a) Sustained Attentional Control (SCA), (b) Focused Cognitive Engagement (FCE), (c) Working Memory Capacity (WMC), and (4) Analytical Thinking Ability (ATA) with following the practice of pranayama and structured breathing exercises. The study also seeks to understand whether regular engagement in breathing-based interventions can support cognitive balance and mental clarity among adolescents experiencing qualifying examination-related stress. Finally, the research intends to contribute empirical evidence that may inform the integration of psychologically supportive practices within must-win completion scenario in academics.

Review of Literature:

Recent research highlights the holistic role of yoga, dhyan, pranayama, and yogic practices in enhancing physical, physiological and psychological outcomes among children, adolescents, and young adults. Studies on school-aged children indicate that yogic interventions positively influence cardiovascular health, vital capacity, resting heart rate, blood pressure, endurance, flexibility, and overall physical fitness (Ashwathy et al., 2015; Bhanu et al., 2015; Unkule, 2014; Selvaraj & Arumugam, 2018). Abdussalam (2015) reported significant improvements in speed, explosive power, and cardiorespiratory endurance following systematic pranayama practice. While Richter et al. (2016) observed no significant differences in executive and motor functions between yoga and physical skill training, yoga demonstrated favourable effects on behavioural aspects such as avoidance tendencies. Psychological benefits of yoga are consistently documented, including reductions in anxiety, stress, and depression, alongside improvements in self-adjustment, emotional intelligence, self-confidence, and academic performance among school and college students (Bhardwaj et al., 2015; Ashtaputre, 2015; Biradar, 2020). Recent studies have expanded yoga's applicability to diverse and special populations. Dubey et al. (2021) emphasized yoga's therapeutic value for specially-abled children by enhancing body awareness, attention, coordination, and emotional regulation. Similarly, Shavan and Sadeghian (2023) demonstrated that yoga therapy significantly improved attention, memory, and learning abilities among students with dyscalculia. Collectively, these studies establish yoga as an effective complementary intervention for promoting physical health and psychological well-being.

Research Methodology:

The present study adopted a quantitative experimental research design. It examines the impact of Mind-Body interventions on selected cognitive abilities of coaching students. The sample comprised 220 students enrolled in coaching institutes for a competitive exam. It is further classified in 2 different academic batches of control and experimental group (110 each). The participants were selected using a purposive sampling technique. A well-structured Mind-Body practice program, with a specific focus on different forms of pranayama, dhyan and guided breathing exercises was introduced to experiment group batch by a trained teacher. These practices were administered regularly over a period of 6 months under supervised conditions. The first batch participants underwent the intervention practice, the second batch followed the routine subject coaching only. To measure cognitive outcomes, a well-designed and structured test was developed to assess four key cognitive dimensions such as (a) Sustained Attentional Control (SCA), (b) Focused Cognitive Engagement (FCE), (c) Working Memory Capacity (WMC), and (4) Analytical Thinking Ability (ATA). Each dimension was scored on a scale of 10, allowing for clear comparison and interpretation of performance levels. The test was administered twice, before and after the completion of the intervention period. It generated pre-test and post-test scores for each participant. The collected data were systematically coded and evaluated using SPSS software. Mean scores were calculated to understand overall performance trends across the selected 4 cognitive domains. To examine the significance of differences between pre-intervention and post-intervention scores, a paired sample t-test was applied to compare mean differences within the same group across two both time points. The results of the analysis provided empirical insights into the effectiveness of Mind-Body interventions in enhancing cognitive functioning among coaching students.

Data Analysis:

The data collected from both the experimental and control groups were systematically evaluated. In order to examine the effect of pranayama, dhyan and guided breathing exercises on core cognitive functioning. Descriptive statistics were used to understand the overall performance levels of the participants and paired sample t-test was employed to evaluate the significance of observed variations in cognitive functioning. The analysis was specifically designed to test the following null hypothesis.

$H_0$1: Mind-Body interventions have no significant impact on core cognitive functioning among adolescent learners.

As mentioned, descriptive analysis and paired t-test, were employed to examine changes in core cognitive functioning following the Mind-Body intervention. It helped in evaluating the differences in performance mean scores and to assess whether these differences were statistically significant. The outcomes of the descriptive analysis are given in table 1-

Descriptive Analysis - Pre Test Vs Post Test (Core Cognitive Functioning)								
	Batch 1 (Control Group)				Batch 2 (Experiment Group)			
	PreTest Score	Post Test Score	Difference	Improvement	PreTest Score	Post Test Score	Difference	Improvement
Sustained Attentional Control **(SAC)**	7.491	7.245	-0.25	No	7.300	8.709	1.41	Yes
Focused Cognitive Engagement **(FCE)**	7.800	7.636	-0.16	No	8.009	8.864	0.85	Yes
Working Memory Capacity **(WMC)**	8.427	8.618	0.19	Yes	8.691	8.909	0.22	Yes
Analytical Thinking Ability **(ATA)**	8.664	8.564	-0.10	No	8.482	8.855	0.37	Yes

Table 1- Descriptive Analysis - Pre Test Vs Post Test

As per the descriptive analysis results, the mean scores of SAC, FCE, WMC and ATA for both the experimental and control groups are given here. In the control group, the mean differences between the two testing phases were not found with meaningful improvement. SAC, FCE, and ATA remained almost unchanged or decreased, while slight declines were noted in WMC. It indicates no positive fluctuation in cognitive functioning in the control group. The group without interventions does not show any sign of improvement in most of the cognitive domains. The experimental group demonstrated consistent and noticeable improvements across all measured domains. This group followed the pranayama, dhyan and breathing exercise intervention. The SAC recorded a substantial increase in mean score. FCE, WMC and ATA also gained improvements. The mean score differences indicate a positive shift in overall cognitive functioning of Batch 2. The table a shows the difference between experimental and control group outcomes. The descriptive findings suggest that the pranayama, dhyan and breathing exercise intervention contributed to enhanced mental focus, sustained concentration, improved information retention, and better logical processing.

To statistically validate these observed differences, paired sample t-tests were applied separately to each group. The results are given in table 2 & 3 for both the groups separately.

Paired Samples Test- Batch 1(Control Group)					
	Paired Differences		t value	Sig. (2-tailed)	Significance
	Mean	Std. Deviation			
Pre & Post Test - **SAC**	.2455	1.1667	2.206	.029	No
Pre & Post Test- **FCE**	.1636	1.7792	.965	.337	No
Pre & Post Test - **WMC**	-.1909	1.1129	-1.799	.075	No
Pre & Post Test - **ATA**	.1000	1.0222	1.026	.307	No

Table 2- Paired Samples Test-Batch 1(Control Group)

Paired Samples Test- Batch 2 (Experiment Group)					
	Paired Differences		t value	Sig. (2-tailed)	Significance
	Mean	Std. Deviation			
Pre & Post Test - **SAC**	-1.4091	1.4670	-10.074	.000	Yes
Pre & Post Test- **FCE**	-.8545	1.5255	-5.875	.000	Yes
Pre & Post Test - **WMC**	-.2182	.7588	-3.016	.003	Yes
Pre & Post Test - **ATA**	-.3727	1.0033	-3.896	.000	Yes

Table 3- Paired Samples Test-Batch 2 (Experiment Group)

The results, presented in above table 2 & 3, reveal that none of the cognitive variables in the Batch 1 (control group) showed statistically significant change as the p-values exceeds the 0.05 level. The Batch 2 (experimental group) exhibited statistically significant differences across all domains of core cognitive functioning. It is enough to indicate that the observed improvements were not happened itself, it was because of the pranayama, dhyan and breathing exercise intervention. Based on these results, the null hypothesis was rejected. The combined evidence from descriptive statistics, and paired t test endorses the effectiveness of pranayama, dhyan and breathing exercises in enhancing core cognitive functioning among adolescent learners. The paired t-test analysis establishes a clear contrast between the control and experimental groups. It supports the causal inference that the observed cognitive improvements can be attributed to the Mind-Body intervention rather than the routine academic exposure alone.

C**onclusion:**

The findings of the study clearly indicate that mind-body interventions in the form of pranayama, dhyan and structured breathing exercises have a significant positive impact on core cognitive functioning among adolescent learners. The experimental group demonstrated meaningful improvements in attentional capacity, concentration, memory efficiency, and reasoning proficiency, on the other hand, the control group showed no statistically significant change. These results support the effectiveness of such interventions in enhancing cognitive processes under conditions of academic stress. The study reinforces the relevance of incorporating psychologically informed wellness practices within coaching and competitive learning contexts. By addressing cognitive strain and mental overload, mind-body interventions can contribute to improved mental clarity, sustained attention, and overall cognitive resilience. The study offers practical implications for educators, psychologists, and academic managers seeking evidence-based strategies to support adolescent learners facing intense performance demands.

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