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Impact Of 12 Weeks Of Surya Namaskar On Cognitive Flexibility And Decision- Making In Teenagers

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Abstract

The current study focuses on assessing the influence of a 12-week Surya Namaskar (Sun Salutation) practice on cognitive flexibility and decision-making abilities in adolescents aged between 13 and 17 years. Surya Namaskar, a classical yogic technique integrating physical movement, breath control, and mindfulness, is believed to contribute positively to cognitive and emotional functioning. For this purpose, sixty school-going teenagers were selected and randomly assigned to two groups: the experimental group engaged in daily Surya Namaskar practice for 30 minutes, while the control group continued their routine without any yoga intervention. Standardized psychological tools were used to evaluate the participants' cognitive flexibility and decision-making both before and after the intervention. The outcomes revealed a statistically significant improvement in both measured cognitive areas among students who practiced Surya Namaskar. These findings suggest that integrating Surya Namaskar into adolescents' daily routines may enhance their mental adaptability and judgment skills, contributing to overall cognitive development and better academic and social decision-making.

Introduction

Cognitive flexibility, the ability to adapt and switch between different ideas or perspectives, is crucial for effective decision-making in teenagers, allowing them to navigate complex social and emotional situations. While some aspects of this flexible thinking improve from childhood to adulthood, adolescents also experience a dopamine-driven surge in flexible behavior, leading to heightened reward-seeking and exploration, which can sometimes result in impulsive choices or risky behaviors. Higher cognitive

flexibility is linked to better emotional regulation, reduced impulsivity, and more thoughtful decision-making, whereas cognitive inflexibility can be associated with negative outcomes.

What Cognitive Flexibility Is

- It's the mental ability to shift from one concept to another and hold multiple ideas simultaneously.
- It helps individuals adapt their behavior in response to changing environments or feedback.
- It involves creativity, adaptability, and mental agility in decision-making processes.

Factors Influencing Cognitive Flexibility in Teens are:

Brain Development:

The prefrontal cortex, which controls cognitive functions like decision-making, is still developing during adolescence.

Reward Sensitivity:

Adolescence involves a period of increased reward sensitivity and exploration, driven by changes in brain chemistry, particularly dopamine levels.

Learning from Feedback:

Studies show that adolescents can be particularly adept at learning from negative prediction errors (feedback indicating a wrong choice), which is an aspect of cognitive flexibility.

Implications for Mental Health and Well-being

Positive Correlations:

High cognitive flexibility is associated with better emotion regulation, lower impulsivity, and a reduced tendency for risky behaviors.

Negative Correlations:

Cognitive inflexibility, however, has been linked to elevated impulsivity, especially in areas like emotion-driven behavior.

How to Support Cognitive Flexibility

Engage in Brain Teasers:

Activities like puzzles and riddles can challenge a teen's thinking and enhance their problem-solving and flexible thinking abilities, according to Special Ed Resource.

Adolescence represents a vital phase of human development marked by significant physical, psychological, and neurological changes. One of the most critical aspects of this period is the maturation of the brain's executive functions—particularly those related to cognitive flexibility and decision-making. These mental abilities enable teenagers to adapt their thoughts, respond to changing situations, and make sound choices in academic, personal, and social contexts. However, with the increasing demands of modern life, exposure to digital distractions, and academic pressure, adolescents often face difficulties in managing these cognitive challenges effectively.

Surya Namaskar, also known as Sun Salutation, is an ancient yogic sequence that combines twelve dynamic postures, rhythmic breathing, and focused awareness. Traditionally practiced to improve physical health, flexibility, and energy flow, this technique has recently attracted attention for its potential impact on mental and cognitive functioning. The synchronization of movement with controlled breathing in Surya Namaskar is believed to stimulate both the sympathetic and parasympathetic nervous systems, which may positively affect brain areas involved in attention, working memory, and emotional regulation.

Modern neuroscience has shown that mind-body practices such as yoga can influence brain activity, especially in areas responsible for executive functions like planning, switching attention, and evaluating options. Given these insights, integrating yoga practices like Surya Namaskar into adolescent routines may serve as an effective, non-invasive method for promoting cognitive growth and emotional resilience.

This study aims to investigate how regular practice of Surya Namaskar over a 12-week period impacts two vital cognitive domains—cognitive flexibility and decision-making—among teenagers. By exploring this connection, the study hopes to highlight the potential of yoga-based interventions in enhancing the mental performance and behavioral adaptability of adolescents during this crucial developmental stage.

Review of Literature

Surya Namaskar, an integral practice within the yogic tradition, has long been appreciated for its physical benefits. However, in recent years, its impact on mental and cognitive well-being has gained attention. According to studies conducted by yoga researchers like Telles et al., practicing synchronized yoga postures with conscious breathing can improve brain function, particularly executive control processes. These improvements may result from increased oxygenation of the brain and enhanced neurochemical balance during such activities.

Cognitive flexibility refers to the brain's ability to adapt thinking and behavior in response to changing environments, new rules, or unexpected outcomes. It allows individuals to shift between different mental tasks, manage multiple concepts simultaneously, and think creatively. In adolescents, this function is especially critical as they are required to transition between academic subjects, respond to social cues, and handle emotional changes. Research by Diamond (2013) highlights the role of physical activity combined with mindfulness in enhancing cognitive flexibility.

Decision-making is a complex cognitive process that involves evaluating information, weighing pros and cons, and selecting appropriate actions. During adolescence, the brain's prefrontal cortex—responsible for such high-level functions—is still developing. As a result, teenagers often face challenges in making thoughtful, long-term decisions. External stimuli such as stress, peer pressure, and lack of self-awareness can further impair their judgment. Studies have shown that practices promoting mindfulness and body awareness, such as yoga, may strengthen self-regulation and decision-making.

While there is growing interest in the application of yoga and mindfulness in educational settings, there remains a gap in specific research focusing on Surya Namaskar and its direct impact on executive functions like flexibility in thinking and rational decision-making. Most prior research tends to explore the broader effects of yoga or meditation on stress reduction, academic performance, or general mental health. This study narrows the focus to examine how Surya Namaskar alone—without the inclusion of other yoga practices—can influence two key aspects of cognitive functioning in teenagers.

Methodology

To explore the cognitive benefits of Surya Namaskar, a quasi-experimental research design was implemented. The study followed a pre-test and post-test control group structure.

Sixty adolescents aged 13–17 were randomly selected from urban schools and divided into two groups:

Experimental Group (n = 30): Practiced Surya Namaskar for 30 minutes daily, six days a week, for 12 weeks.

Control Group (n = 30): Followed their normal routine without yoga intervention.

Each session for the experimental group included 5 minutes of warm-up, 20 minutes of Surya Namaskar (12 rounds), and 5 minutes of cool-down and relaxation.

The following tools were used to assess cognitive changes:

1. Cognitive Flexibility Scale (Martin & Rubin, 1995)

2. Decision-Making Style Inventory (Scott & Bruce, 1995)

Data were analyzed using SPSS software. Paired sample t-tests and independent sample t-tests were used to measure within-group and between-group differences, with a significance level of $p < 0.05$.

Results

Pre-test results showed no significant difference between the experimental and control groups in both cognitive flexibility and decision-making.

Post-test results, however, revealed that the experimental group had significantly higher scores in both parameters.

Cognitive Flexibility:

- Experimental Group: 59.4 ± 4.1

- Control Group: 49.1 ± 4.9

Decision-Making:

- Experimental Group: 63.2 ± 4.7

- Control Group: 54.3 ± 5.2

These findings confirm that regular Surya Namaskar practice led to marked cognitive improvement in teenagers.

Discussion

The results clearly demonstrate that regular practice of Surya Namaskar can bring about improvements in key cognitive areas in teenagers. The likely reason for this effect is the integration of breath, movement, and focus, which may stimulate brain regions responsible for executive functioning.

This aligns with earlier research suggesting that activities combining physical and mental discipline—such as yoga—can promote neuroplasticity and support decision-making, attention control, and adaptability.

Furthermore, adolescents reported feeling more confident and focused during daily tasks and academic activities. Given the simplicity, accessibility, and cost-effectiveness of Surya Namaskar, this practice can be easily implemented in schools and community programs to foster cognitive and emotional development.

However, the study's limitations include a relatively small sample size and the short duration of the follow-up. Future research can explore long-term cognitive effects and compare Surya Namaskar with other physical or mindfulness-based interventions.

Conclusion

The study concludes that a 12-week Surya Namaskar program can significantly improve cognitive flexibility and decision-making in teenagers. As a cost-effective and accessible practice, it holds potential as a tool for enhancing academic and personal development in adolescents.

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