

## A COMPARATIVE STUDY OF STATIC AND DYNAMIC PRANAYAMA ON REACTION TO FRUSTRATION ON YOUTH

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### Abstract-

**Context:** The study investigates the effects of two different pranayama techniques on emotional responses of reaction to frustration among youth. Pranayama, a yogic practice involving breath control, has gained attention for its potential to enhance emotional regulation and stress management.

**Aims:** This study explores the potential benefits of incorporating specific breathing exercises into young people's daily routines to alleviate frustration and improve their overall wellbeing.

**Settings and Design:** The study compares the effectiveness of static and dynamic pranayama in reducing frustration among youth, using a pre-post two-group comparative design.

**Methods and Material:** Quantitative measures, including standardized psychological scales employed to assess emotional responses to frustration before and after the 15 days of intervention.

**Statistical analysis used:** Through SPSS 24.0, statistical analyses of data has conducted. For within group analyses, paired sample t-test has used and independent t-test used for between group analyses.

**Results:** The results obtained within the groups practicing static pranayama showed a statistically significant decrease in levels of aggression, fixation, regression, and overall reaction to frustration. On the other hand, the dynamic pranayama group showed a significant reduction in the levels of aggression, resignation, and overall reaction to frustration. Conversely, when comparing between the two groups, it found that the static pranayama group exhibited significantly lower levels of fixation and overall reaction to frustration compared to the dynamic pranayama group at the post-assessment stage.

**Conclusions:** The study concludes that incorporating both static and dynamic pranayama techniques into well-being strategies can enhance emotional resilience and decrease frustration levels.

**Key Words-** Static Pranayama, Dynamic Pranayama, Frustration, Yoga

### Introduction

Human creativity and problem solving have advanced throughout history, but they also raise frustration in today's fast-paced world, presenting numerous challenges. In the chaotic and demanding world of today, the youth of college are increasingly more likely to exhibit signs of frustration, despair, and anxiety<sup>[1]</sup>. The root of frustration is a sense of inadequacy to meet needs, which accompanied by emotions of uncertainty and insecurity<sup>[2]</sup>. Frustration and dissatisfaction are more likely to develop when an individual's need are not achieved<sup>[3]</sup>. Dollard et al proposed the frustration aggression theory in 1939. The original theory contended that I) every act of aggressiveness results from prior frustration and II) every act of frustration results in aggression.



The act of preventing someone from receiving an anticipated reward was described as frustration<sup>[4]</sup>. Miller (1941) expressed the idea that when people experience frustration, it tends to trigger a variety of reactions, and one of these reactions is an inclination towards engaging in some form of aggressive behavior<sup>[5]</sup>. College students may experience frustration because of feeling unsettled, anxious, and irritated by the fast-paced and rapidly changing nature of today's world. They are at a crucial juncture in their mental health, when their minds are developing and becoming

mature<sup>[6]</sup>. Long-lasting or severe frustration can raise stress levels, which, if not well controlled, may have detrimental impacts on mental health. Over the years, 31% of college students in the world tested positive for a mental health issue<sup>[7]</sup>. Stress (27.5%), anxiety (19.1%), and depression (11.9%) were the three main factors influencing students' academic development, according to the American College Health Association's National College Health Assessment<sup>[8]</sup>. It is been established in studies that college students have a low threshold for frustration, and there has not been much research on how to raise it. Low frustration tolerance is an attribute associated with both depression and aggression<sup>[9], [10]</sup>. It is of the utmost importance for all college students to recognize their frustration and know how to cope with it<sup>[11]</sup>. Frustration can arise from internal or external factors, including character faults, social dread, and external factors like congested roads, financial constraints, and strained relationships<sup>[12]</sup>. College students experience frustration from various factors, including academic demands, time management, financial stress, uncertain future, peer pressure, and personal challenges. This Study aims to develop effective self-care coping mechanisms for college students to manage frustration and promote personal growth. Yoga, an ancient practice originated in India, offers a myriad of physical, mental, and spiritual benefits for its practitioners.

At the heart of this holistic discipline lies the art of breathing, known as pranayama. Pranayama encompasses various breathing techniques, two of which are fast and slow breathing. Dynamic (fast) breathing techniques such as "Kapalabhati" in yoga involve rapid exhalations and passive inhalations, promoting energized bodies, invigorating minds, and releasing toxins, improving cardiovascular, respiratory, mental, and physical health<sup>[13]</sup>. Static (slow) breathing, like "Nadi Shodhan" or "Alternate Nostril Breathing," promotes inner tranquility and focus by controlling and rhythmic breaths through one nostril, harmonizing vital energy, and reducing stress, anxiety and promoting mental clarity. Slow breathing aids in meditation for inner tranquility and focus. Breathing slowly and deeply replenishes the air in all areas of the lung while reducing ventilation in the dead space. As a result, stress is reduced, the autonomic system is shifted to the parasympathetic system, and physical and mental health are improved.<sup>[14], [15]</sup>. Slow breathing, with less than 10 breaths per minute, reduces psychological and physiological stress, synchronizing brain activity in emotions, thinking processes, and memory networks.<sup>[16], [17], [18]</sup>. In this exploration of static and dynamic breathing in yoga, we will delve into the unique benefits and applications of each technique, highlighting their specific effects on the mind to reduce frustration. The objective of this study is to provide significant insights into the potential benefits of introducing specific breathing exercises into the routines of young people in order to manage frustration and improve their general well-being. This study inspect the effects of Static (slow) and Dynamic (fast) Pranayama techniques to enlighten the practical and effective tactics to support youth's emotional and psychological health.

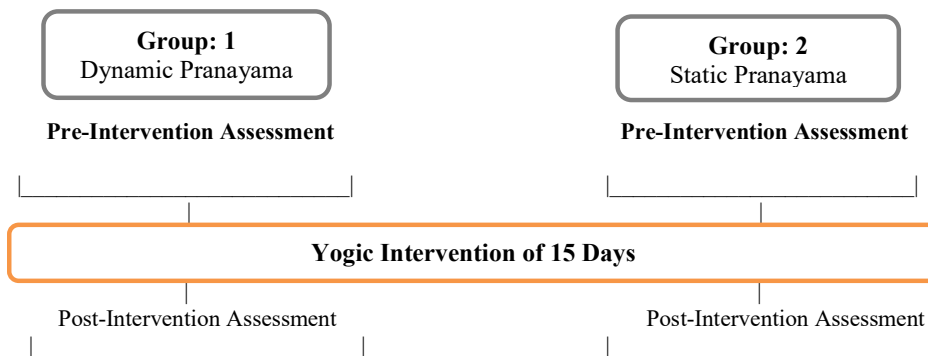
**Methods**

**Subjects-**

Total 30 subjects participated with the age range of 19-23 years from H.N.B. Garhwal University, Uttarakhand, India. Participants randomly assigned into two groups: Dynamic (Fast) Pranayama Group and Static (Slow)Pranayama Group by using a computer-generated random number sequence. Both groups consisted of 15 volunteers each. Volunteers excluded having nasal pathology, chronic diseases and any medication. Institutional ethical consent (Ref. No./2019/07) was taken and signed informed consent also has obtained from the volunteers.

**Study Design-** This study employs a pre-post two group comparative design to investigate the effectiveness of static and dynamic pranayama (Breathing Exercises) on reaction to frustration among youth. The design allows for the establishment of causal relationships and minimizes bias through random assignment of participants to different groups.

**Figure 01: Design of the Intervention Assessment**  
*The Reaction to Frustration Scale (RFS) Administered to Participants As Follows:*

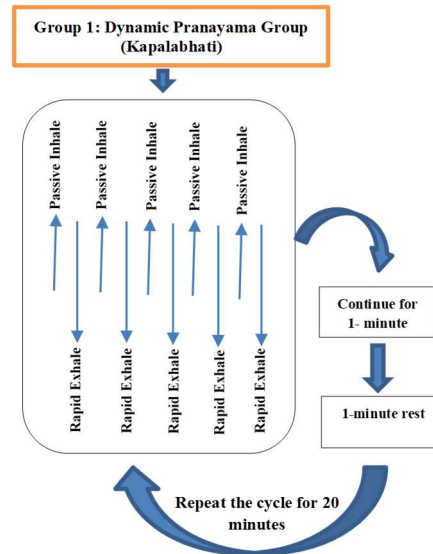


**Yoga Intervention-** Under the guidance of a certified yoga practitioner, static (slow) and dynamic (rapid) breathing practice conducted. The Intervention conducted in the following manner-

**Group 1 (Dynamic Pranayama) - Kapalabhati:**

In Group 1, participants engaged in the practice of Kapalabhati, a 20-minute intervention technique performed six days a week. During this practice, participants instructed to sit comfortably in a meditative posture, maintaining an upright spine, relaxed shoulders, and hands resting on their knees. They were then guided to perform rapid breathing by exhaling vigorously and inhaling passively. To exhale, they expelled air forcefully with successive abdominal contractions, followed by a passive inhalation where the abdominal muscles allowed to relax. This rapid exhalation-inhalation cycle repeated as swiftly as possible, aiming for a rate of 60 strokes per minute. Following a one-minute practice session, they engaged in a one-minute period of rest <sup>[19]</sup>. This practice-rest cycle repeated for a duration of 20 minutes(Fig.2).

**Figure 02: Protocol for Practicing Dynamic Pranayama (Kapalabhati)**

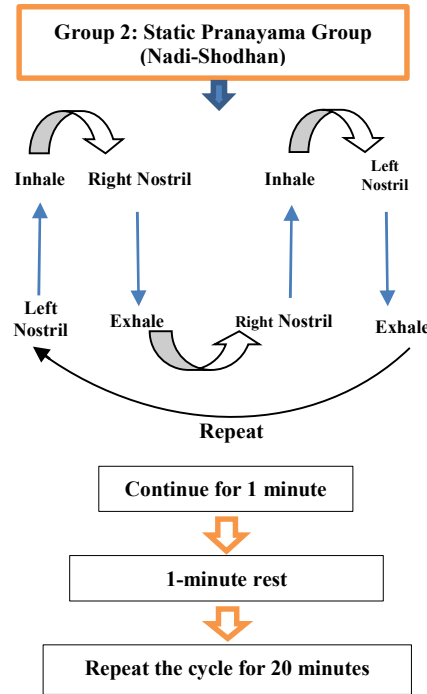


**Group 2 (Static Group) -Nadi Shodhan Pranayama:**

Group 2 participants practiced Nadi Shodhan, or Alternate Nostril Breathing, six days a week. Participants were encouraged to focus on their breath and maintain a calm state of mind. The entire practice conducted for 20 minutes, where 1-minute practice and 1-minute rest performed as a technique. Participants began by inhaling deeply and slowly by the left nostril while the right nostril remained closed. After completing the inhalation, they gently closed the left nostril with the ring

finger and simultaneously released the closure of the right nostril, allowing for a smooth exhalation by the right nostril. Then inhaled through right nostril while the left nostril remained closed. After completing inhalation, they closed the right nostril with right thumb and released the closure of left nostril, exhaling smoothly through the left nostril. This marked the completion of one full round of Nadi Shodhan Pranayama. Each cycle of this practice repeated for one minute, after which participants engaged in a one-minute period of rest. This alternating cycle of practice and rest continued for a total duration of 20 minutes. This concluded one full round of Nadi Shodhan Pranayama<sup>[19]</sup>. (Fig.3).

**Figure 03: Protocol for Practicing Static Pranayama (Nadi-Shodhan)**



**Assessment Tool-**

Dr. B.M. Dixit and Dr. D.N. Srivastava created the "Reaction to Frustration Scale (RFS)" as a psychometric instrument in 2005. This self-report questionnaire intended to measure how people respond to unpleasant circumstances and how frustrated they feel. This questionnaire has a validity score of 0.61 and a reliability score of 0.82 for boys and 0.79 for females. According to Maier (1949), this scale covers the four reactions namely-aggression, resignation, fixation, and regression. Total items are 40, 20 of which are positive and 20 are negative. It is a six-point scale, and the scoring has been objectified by giving each of the six positive item alternatives a score ranging from "Five to Zero" (from Most Liked to Least Liked). The scores given to each alternative for negative items were inverted from "Zero to Five"<sup>[20]</sup>.

**Statistical analysis:** Through SPSS 24.0, statistical analyses of data has conducted. For within group analyses, paired sample t-test has used, for each variable and independent t-test used for between group analyses.

**Result:**

**Table 01:** Inter and Intra Groups Comparison between Dynamic and Static Pranayama

Variables		Groups		Inter-group Comparison
		Dynamic	Static	
		Mean ±SD	Mean ±SD	
Aggression	Pre-intervention	24.07±4.06	24.53±3.85	p =0.749
	Post-intervention	18.13±4.52	18.53±4.66	p =0.813

	<b>Intra-group comparison</b>	p=0.009**	p<0.001***	
<b>Resignation</b>	Pre-intervention	25.93±4.33	24.67±3.2	p =0.371
	Post-intervention	23.07±3.13	22.67±2.92	p =0.72
	<b>Intra-group comparison</b>	p=0.027*	p=0.056	
<b>Fixation</b>	Pre-intervention	27.73±6.5	25.73±3.47	p =0.305
	Post-intervention	23.93±2.99	20±5.9	p =0.032 <sup>#</sup>
	<b>Intra-group comparison</b>	p=0.06	p=0.005**	
<b>Regression</b>	Pre-intervention	29.4±6.21	29.2±6.16	p =0.93
	Post-intervention	28.93±4.11	26.07±6.34	p =0.155
	<b>Intra-group comparison</b>	p=0.807	p=0.02*	
<b>Reaction to Frustration (Overall)</b>	Pre-intervention	107.13±5.79	104.13±4.26	p =0.118
	Post-intervention	94.07±7.46	86.67±11.33	p =0.045 <sup>#</sup>
	<b>Intra-group comparison</b>	p<0.001***	p<0.001***	

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001 by Paired t-test. <sup>#</sup>p<0.05 by Independent t-test

The results given in the table (1). When compared by paired t-test the intra-group results of dynamic pranayama group showed a significant decrease in aggression (P=0.009\*\*) and resignation (P=0.027\*) after 15 days practice, as compared to their pre states. While fixation and regression have shown statistically insignificant reduction. On the other hand in static pranayama group, except resignation, a significant decrease has found in aggression (P<0.001\*\*\*), fixation (P=0.005\*\*) and regression (P=0.02\*) post 15-days of training period as compared to their pre states. In the inter group comparison, independent t-test results show that fixation was significantly lower (P =0.032\*) in static pranayama group at post state as compared to the respective state of dynamic pranayama group. Intra group comparison for Reaction to frustration shows highly significant decrease (P<0.001) in both the groups while the inter group comparison for reaction to frustration shows that there is a significant reduction (P=0.045\*) in static group at, post state, as compared to the respective state of dynamic group.

## Discussion

The findings of this study present intriguing vision into the effects of static and dynamic pranayama practice on youth's reactions to frustration. Findings revealed a noticeable reduction in frustration in both groups, indicating the potential efficacy of these techniques in improving emotional regulation. Such improvements are crucial for managing the emotional challenges posed by frustrating situations. The current study contributes to the field by directly comparing static and dynamic pranayama techniques. The significant difference observed between the groups suggests that variations in breath patterns influence the outcomes. This aligns with studies showing that different pranayama practices can have distinct physiological and psychological effects. Our findings were in line with earlier research that discovered multiple cognitive domains significantly improved after

practicing various yoga breathing techniques<sup>[21]</sup>. This study specifically revealed a significant decrease in frustration in both static and dynamic pranayama groups. The static pranayama group

exhibited more significant results in relation to aggression, fixation, and regression. The reduction in aggression suggests that static pranayama has the potential to mitigate hostile feelings and impulsive responses, fostering a more balanced emotional state. This is because Nadi Shodhan pranayama reduces sympathetic activity, activate parasympathetic nervous system, while Kapalabhati produces sympathetic stimulation, and withdraw parasympathetic action. Furthermore, the decrease in fixation and regression indicates that static pranayama might aid individuals in moving away from obsessive thought patterns and regressive behaviors. Controlled, deep breathing is a key component of Nadi Shodhan Pranayama, with an emphasis on extending the inhalation and exhalation. Breathing slowly and deeply causes the lung's stretch receptors to be stimulated, which might turn on the parasympathetic nervous system and trigger a relaxing response. The vagus nerve is the primary nerve of the parasympathetic nervous system. Pranayama's unique stress reduction mechanism involves the bidirectional vagal system, which mediates stress, visceral, and autonomic arousal. Stretching the diaphragm and respiratory muscles activates the bottom-up mechanisms, causing the vagus nerve to send inhibitory impulses, resulting in a calm and alert mental state. Deep and controlled breathing increases oxygen intake and carbon dioxide elimination, leading to improved oxygenation of tissues. This can have a calming effect on the body, promoting Parasympathetic Nervous System activity<sup>[22]</sup>. The dynamic pranayama group (Kapalabhati), in comparison, also showed notable effects, although the degree of the reduction in aggression, resignation, fixation, and regression was considerably less. This pranayama technique has a distinctive effect on emotional aspects because it is dynamic and characterized by stimulating breathing patterns. The observed benefits be explained by its emphasis on boosting energy and reducing stress, which might have a different impact on emotional reactions than the relaxing effects of static pranayama. Numerous investigations conducted to determine how Kapalabhatiaffects heart rate variability, support the idea that during the process, it promotes parasympathetic withdrawal and sympathetic activation, parasympathetic modulation is significantly higher after the resting interval. A study including 57 first-year medical students found that practicing frequent pranayama, such as Kapalabhati, helped them lower their stress levels and heart rate variability (HRV) by decreasing their very low frequency and low frequency, increasing their high frequency (HF), and decreasing their LF/HF ratio. After Kapalabhati, this indicates improved parasympathetic regulation and decreased sympathetic heart drive <sup>[23]</sup>. In divergence, A research study with 20 healthy participants found that Kapalabhati increases sympathetic activation arousal, potentially causing cardiac health issues and promoting cardiac arrest<sup>[24]</sup>.

However, it was noticed in another study that while parasympathetic withdrawal occurs right after Kapalabhati, after 20 minutes of relaxation, there was a considerable increase in parasympathetic dominance in all of the patients<sup>[25]</sup>. The parasympathetic nervous system is activated during slow breathing since the per minute rate is less than 7 breaths<sup>[26]</sup>. Slow breathing activates the vagus nerve, a parasympathetic nervous system component, counteracting stress and activating the relaxation response. This leads to reduced heart rate, lower blood pressure, and a sense of calm. As far as we are aware, there has not been any research done on how short-term pranayama training affects young people's responses to frustration. In yogic principles, it is expressed that different pranayama have different effects. Telles and Desiraju have shown how the heart rate fluctuates When different

pranayama are performed<sup>[27]</sup>. The results of another study, compared the acute effects of rapid and slow breathing methods on heart rate variability, show that Kapalabhati affects autonomic state by increasing sympathetic activity while decreasing vagal activity<sup>[28]</sup>. However, a few comparative studies have done on the outcomes of training in slow and rapid pranayama. The purpose of this study was to compare the effects of 15-day short-term training in static (slow) and dynamic (rapid) pranayama on young people's response to frustration. Additionally, it intended to research a variety of frustrated behavior mechanisms. Aggression, resignation, fixation, and regression are some of the several ways it shows up. Therefore, the primary aim of this study was to compare the effect of static and dynamic pranayama practice for a relatively short period of time (15 days) on various aspects measured by a "reaction to frustration" scale. This scale likely assesses

how individuals respond emotionally and behaviorally when faced with situations that cause frustration or stress. The study aimed to see how these two types of pranayama techniques might influence people's reactions to frustrating situations after 15 days of practice. The improvements in aggression, fixation, and regression within the static pranayama group suggest that this technique might have a unique impact on frustration regulation and coping strategies. Static pranayama's emphasis on consistent breath patterns and sustained attention might facilitate better control over impulsive reactions, leading to reduced frustration.

## Conclusion

The outcomes of this study offer important insights into the possible benefits of pranayama techniques in improving emotional regulation and frustration management in youth. Both the static and dynamic pranayama groups improved significantly on the frustration scale. These findings imply that both pranayama approaches help to balance the autonomic nerve system and minimize reaction to frustration. It concluded that incorporating both static and dynamic pranayama techniques into well-being strategies has the potential to provide a wide range of positive effects that can enhance emotional resilience by reducing the frustration level. This conclusion emphasizes the need of taking into account individual preferences and needs while adopting a pranayama technique for dealing with frustration and emotional responses.

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