

**THE IMMEDIATE EFFECT OF UJJAYI PRANAYAMA ON
COGNITIVE ABILITIES OF MALE PARTICIPANTS: PRE –
POST DESIGN**

Dissertation submitted by

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Under the Guidance of

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TO
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CERTIFICATE

This is to certify that **POOJA SINGH** who has got MSc registration with start from August 01, 2018 by Swami **Vivekananda Yoga Anusandhana Samsthana, deemed to-be University**, has successfully completed the required training in acquiring the relevant background knowledge in Yoga Therapy and has completed the M.Sc. course of 2 years to submit this research project entitled **The immediate effect of ujjayi pranayama on cognitive abilities of male participants: pre-post design.**

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DECLARATION

I hereby declare that the subjected study was conducted by me at **Swami Vivekananda Yoga Anusandhana Samsthana (S-VYASA)**, Bengaluru, under the guidance of **Dr. Soubhagyalaxmi**.

I also declare that the subject matter of my dissertation entitled “ **The immediate effect of ujjayi pranayama on cognitive abilities among male volunteers** ” has not previously formed the basis of the award of any degree, diploma, associate-ship, fellowship or similar titles.

DATE:Pooja Singh

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Pooja Singh

**STANDARD INTERNATIONAL TRANSLITERATION CODE USED TO
TRANSLITERATE SANSKRIT WORDS**

a	=	अ	ñac	=	ञ	pa	=	प
ā	=	आ	ach	=	च	pha	=	फ
i	=	इ	ajaj	=	छ	bab	=	ब
ī	=	ई	ha	=	ज	ha	=	भ
u	=	उ	ñ	=	झ	ma	=	म
ū	=	ऊ	ṭaṭ	=	ञ	yar	=	य
ṛ	=	ऋ	ha	=	ट	a	=	र
ṝ	=	ॠ		=	ठ	la	=	ल
E	=	ए	ḍa	=	ड	Va	=	व
Ai	=	ऐ	ḍha	=	ढ	Śa	=	श
O	=	ओ	ṇa	=	ण	Ṣa	=	ष
Au	=	औ	ta	=	त	Sa	=	स
Ṁ	=	अं	tha	=	थ	Ha	=	ह
Ḥ	=	अः	da	=	द	Kṣa	=	क्ष
Ka	=	क	dha	=	ध	Tra	=	त्र
kha	=	ख	na	=	न	Jña	=	ज्ञ
ga	=	ग						
gha	=	घ						

Abstract

Introduction:

Attention

Is the behavioral and cognitive process of selectively concentrating on a discrete aspect of information, whether deemed subjective or objective, while ignoring other perceivable information. *ujjayi pranāyāmā* is the process through which one can calm down the mind and which can improve attention

Memory

Memory is the capacity to retain and recall information about past and present incidents. Memory capacity, is the ability to analyze and synthesise the assimilated information and not information storage alone. Memory power varies between individuals. While the Memory is latent capacity to retain and recall information, *yoga* assists in improving the memory power with yogic techniques of concentration and meditation.

Methods and materials:

Pre-post design with sample size of 35 male participants ,normal students who are in the age range of 17-30 years. Students who have any chronic illness and mental illness, and those Participants those who are not able to perform *ujjayi pranāyāmā* who are not willing to participate were excluded.

Result: Significant improvements are found in both attention and memory after 10 minutes of *ujjayi pranāyāmā* in male participants.

Conclusion: *Ujjayi pranāyāmā* found beneficial in both attention and memory in college curriculum may give good results in improving attention and memory.

Key words: Attention, Memory, *Ujjayi Pranāyāmā* ,, Sternberg memory task ,Mackworth clock test.

CONTENTS

Sl. No.	DETAILS	PAGE NO.
	CHAPTER 1	
1.0	INTRODUCTION	1
1.1	COGNITIVE FUNCTIONS	1
1.2	ATTENTION	1-2
1.3	MEMORY	2
1.4	<i>Pranāyāmā</i>	3-4
1.5	<i>Ujjayipranāyāmā</i>	4-5
	CHAPTER 2	
2.0	ANCIENT LITERATURE REVIEW	
2.1	CONCEPT OF <i>Ujjayi Pranāyāmā</i> ACCORDING TO INDIAN SCRIPTURES	6
2.1.1	ACCORDING TO <i>Praśnopaniṣada</i>	6
2.1.2	ACCORDING TO <i>haṭha yogā pradipikā</i>	6
2.1.3	ACCORDING TO <i>Patanjali Yoga Sutrāni</i>	7
2.1.4	ACCORDING TO <i>Bhagavadgītā</i>	7-8
2.1.5	ACCORDING TO <i>gheraṇḍa saṁhitāsahitaḥ</i>	8
2.2	THE CONCEPT OF <i>The ujjayi Prāṇāyāmā</i>	8-10
2.3	CONCEPT OF <i>Prāṇāyāmā</i> ACCORDING TO CONTEMPORARY TEXT	10-11

2.3.1	<i>Ujjayipranāyāmā</i>	11
2.4	SUMMARY TABLE :prāṇāyāmā	11-12
	CHAPTER 3	
3	REVIEW OF SCIENTIFIC LITERATURE	13-14
3.1	SUMMARY TABLE OF SCIENTIFIC REVIEW	14-15
	CHAPTER 4	
4.0	AIMS AND OBJECTIVES	
4.1	AIMS OF THE STUDY	16
4.2	OBJECTIVES OF THE STUDY	16
4.3	RESEARCH QUESTIONS	16
4.4	HYPOTHESIS	16
4.5	NULLHYPOTHESIS	16
	CHAPTER 5	
5.0	METHODS AND MATERIALS	
5.1	PARTICIPANTS	17
5.2	INCLUSION CRITERIA	17
5.3	EXCLUSION CRITERIA	17
5.4	ETHICAL CONSIDERATION	17
5.5	DESIGN OF THE STUDY	17
5.6	VARIABLE STUDIED	17
5.7	INTERVENTION	18-19
	CHAPTER 6	
6	DATA EXTRACTION AND ANALYSIS	20
	CHAPTER 7	
7	RESULT	21-23
	CHAPTER 8	
8	DISCUSSION	24

8.1	MECHANISM	25
8.2	STRENGTH OF THE STUDY	26
8.3	LIMITATIONS OF THE STUDY	26
8.5	SUGGESTIONS FOR FUTURE STUDY	26
	CHAPTER 9	
9	CONCLUSION	27
	CHAPTER 10	
10	REFERENCE	28-30
	APPENDIX :1	31
	APPENDIX :2	32-33

CHAPTER-1

INTRODUCTION

1.1 COGNITIVE FUNCTIONS

Cognitive performance refers to a person's mental processes, including memory, attention, producing and understanding language, learning, problem solving, reasoning, and decision making. Cognitive development starts in early adolescence and is influenced by many factors like psychosocial environment (Rabkin, 2018). Attention is one the most important aspect of cognition which is the behavioral and cognitive process of selectively concentrating on a discrete aspect of information, whether deemed subjective or objective, while ignoring other perceivable information. Heightened attention paves the way for memory processes. We are more likely to remember information to which we paid attention than information we ignored (Bahrami, Carmel, Walsh, Rees, & Lavie, 2008).

1.2 ATTENTION

Attention is a chronic condition starting in childhood that least to lack of awareness causing a disturbance in performance and activity. Attention is the behavioral and cognitive process of selectively concentrating on a discrete aspect of information, whether deemed subjective or objective, while ignoring other perceivable information. Attention has also been referred to as the allocation of limited processing resources(Anderson, 2010). A mechanistic understanding of attention is necessary for the education of the neurobiological basis of conscious experience(Knudsen, 2007). Attention consist of education,psychology,cognitive neuroscience. Areas of active investigation should be determining the source of the sensory cues and signals that generate attention(Chavajay& Rogoff, 1999).

The Nature of Attention and Consciousness

Attention is the way by which we actively take a limited amount of information from the huge amount of information available through our senses, stored memories, and other cognitive processes (De Weerd, 2003; Rao, 2003). It includes both unconscious and conscious processes (Jacoby, et.al, 1992; Merikle, 2000). By dimming the lights on many stimuli from outside (sensations) and inside (thoughts

and memories), we can highlight the stimuli that interest us. This high focus increases the ability to respond fastly and accurately to interesting stimuli. Heightened attention paves the way for memory processes. We are more likely to remember information to which we paid attention than information we ignored. Psychologists believe that attention and consciousness are the same. Now, however, they acknowledge that some active attentional processing of sensory and of remembered information proceeds without our conscious awareness (Bahrami, Carmel; 2008; Shear, 1997). Attention and consciousness form two partially overlapping sets (DiGirolamo, G. J. & Griffin, 2003; Srinivasan, 2008). Conscious attention has three purposes in playing a causal role for cognition. First, it helps in monitoring our interactions with the environment. Through such monitoring, we maintain our awareness of how well we are adapting to the situation in which we find ourselves. Secondly, it assists in connecting past memories and our present sensations to give us a sense of continuity of experience. Such continuity may even help as the base for personal identity. Third, it helps us in controlling and planning for our future actions. We can do it based on the information from monitoring and from the connection between past memories and present sensations.

1.3 MEMORY

The Sanskrit term for memory is *Smiriti* or *smaraṇa*. Remembering is the function of the subconscious mind or *cittā*. The *sansakāra*, or habits of thinking and acting, are deeply impressed in the *cittā*, which is like the sensitive plate of a camera, where all impressions are deliberately recorded. Whenever, you attempt to remember past events or things, they come back to the surface of the mind through the trap door where, they come out, in the form of big waves of thought or as mental images. Memory is the capacity to retain and recall information about past and present incidents. Memory capacity, is the ability to analyze and synthesize the assimilated information and not information storage alone. Memory power varies between individuals. While the Memory is latent capacity to retain and recall information, *Yoga* assists in improving the memory power with yogic techniques of concentration and meditation. The Brain function of attention, cognition, processing of sensory information and visual perception are toned with yogic practices. Yogic practices help to calm the mind and enhance concentration skills by increasing the circulation of blood to the brain through *itsāna*, *prānāyāmā*, meditation and *om* chanting. Memory lapses can also be prevented, through yogic practices that enhance the power of recall. One can draw upon the immense power of the mind with consistent yogic endeavor. (Banerjee, 2014)

1.4 Prānāyāmā

Prānāyāmā is comprised of the words *prāṇā* and *ayama*, which means “pranic capacity or length” It is not merely breath control but a technique through which the quantity of *prāṇā* in the body is activated to a higher frequency. The breathing process is directly connected to the brain and central nervous system and it is one of the most vital processes in the body system. It also has some connection with the hypothalamus, the brain centre which controls the emotional responses. The hypothalamus is responsible for transforming perception into cognitive experience (Muktibodhananda, 2012). *Prānāyāmā* is an art of prolongation and control of breath, which helps to bring the conscious awareness in breathing; to reshape breathing habits and patterns. In the ancient Indian Vedic literature, it has been indicated that breathing with consciousness improves the mental and physical health (Singh, Wilczyńska-Kwiatek, Fedacko, Pella, & Meester, 2009). There are different types of *pranayama* that are specially advised for the treatment of various disorders. There are evidence that *pranayama* training produces a deep psychosomatic relaxation and an increase in the and the cognitive abilities and autonomic functions (Bhargava, Gogate, & Mascarenhas, 1988).

The actual *pranayama* is *kubhaṅka*, the period of breath retention. The guiding of inhalation (*pūraka*) and exhalation (*recaka*) aids in achieving *kubhaṅka*. *kubhaṅka* is difficult for a beginner, but it becomes easier, smoother and longer by systematic and regular practice. The first step in the *prānāyāma* is to tune with the rhythm of the breath. A smooth, slow rhythm usually indicates a relaxed state of body and mind. Irregular respiration usually means tension. During *kubhaṅka* the quantum of *prāṇā* increases as the body, breath and mind are brought into a state of stillness. The stillness allows *prāṇā* and consciousness to intensify as in a pressure cooker- the intensity of energy and heat go up because they are not released from the body. This pressure is sustained while *kubhaṅka* is maintained, allowing *prāṇā* and consciousness to flow unimpeded throughout *pranamayakosha*. The expansion of *prāṇā* also has a substantial effect on the mind. There is greater mental power and the awareness becomes acute. The capacity of mind increases due to the stillness, as there are no fluctuations or disturbances, mind become totally focused and one pointed (Niranjananda Saraswati, 2010).

The yogi’s life is not measured by the number of his days but the number of his breaths. Therefore, he

follows the proper rhythmic patterns of slow deep breathing. These rhythmic patterns strengthen the respiratory system, soothe the nervous system and reduce craving. As desires and cravings diminish, the mind is set free and becomes a fit vehicle for concentration (Iyengar, 2018).*ujjayi* is classified as a tranquilizing *prāṇāyāma*, but it has a heating effect, stimulating the process of oxidation. This practice soothes the nervous system, calms the mind and increases psychic sensitivity. It has a profoundly relaxing effect at psychic level(Niranjananda saraswati, 2010)

1.5 Ujjayi prāṇāyāmā

Ujjayi means “victorious”, *ujji* is the root which means to conquer “acquire by conquest”. In English *ujjayi* is known as the “psychic breath” because of its effect on the mind. It is used in meditation practices, *kriyā yoga* and *yoga nidrā* because it helps to relax the physical body and the mind, and develops awareness of the subtle body and psychic sensitivity. *ujjayi* promotes internalization of the senses and *pratyāhāra*(Muktibodhananda, 2012).

Simple *ujjayi prāṇāyāma* is done with *japa* or repetition of *so’ham*. As you breathe in and feel the breathe move up the spine , mentally repeat *so*, and as you exhale and feel the breathe move down the spine , mentally repeat *ham*(Muktibodhananda, 2012). It is found to be beneficial in *tridoshas* balancing and gastric fire is increased and removes heat from head (Sengupta, 2012). *ujjayi* is one of the most important *prāṇāyāmā* given in *yogā* scripture. *ujjayi* can be done while moving, standing, or walking. It can be done with *japā*, *jālandhara bandha*, or *khecarī mudrā* etc. Closing the mouth , inhale with control and concentration through *ida* and *pingla*, so that the breath is felt from the throat to the heart and produces a sonorous sound(Muktibodhananda, 2012). It is the key to *ujjayi prāṇāyāma*. It strengthens the muscles of epiglottis which help in reducing snoring and helps in voice culture. Patients with anxiety will find this *prāṇāyāma* is very useful. Pointed awareness or attention at the throat region is the beginning for spiritual growth (Nagendra, 2003).*Ujjayi prāṇāyāma* promoted mental clarity and focus. It enhances the memory and also rejuvenates the nervous system and give relaxation in the mind & body.

The study Group will be subjected to *ujjayi prāṇāyāma* for 15 minutes twice a day for 6 days a week

for 12 weeks. Men and women with hypothyroidism of age group between 18 - 55 years will participate in the study. Results of the pre and post measurements on T3, T4, TSH, Body weight and BMI among *ujjayi prāṇāyāma* along with standard drug group for a period of 90 days. This study showed that 90 days of *ujjayi prāṇāyāma* reduced Body mass index and Thyroid Stimulating Hormone (TSH), Triiodothyronine (T3) and no significant differences in Thyroxine (T4) hypothyroid patients. This revealed that *yoga* practice has significant role in improvement in the weight reduction (Vinudha, 2019).

CHAPTER - 2

REVIEW OF ANCIENT LITERATURE

2.1 The concept of *ujjayi prāṇāyāma* according to Indian Scriptures

Prāṇāyāma been assigned a very important role in the yogic system of practices. *Prāṇāyāma* presupposes adherence to the rule of cleanliness and purificatory rites. The association of *prāṇāyāma* with recitation of *praṇava* or *gāyatri mantra* is seen at later period of *smṛti* in the writings of “*Manu*” and “*Yajnavalkya*” (Ray Dutta, 1998).

2.1.1 ACCORDING TO *praśnopaniṣada*-

प्राणस्येदं वशे सर्वं त्रिदिवेयत्प्रतिष्ठितम् ।

मातेवपुत्रान् रक्षस्वश्रीश्च प्रज्ञां च विदेहि न इति ॥२-१३॥

prāṇasyedaṁ vaśesa sarvaṁ tridiveyatpratiṣṭhitam ।

mātevaputrān rakṣsvaśrīścāprajñāṁ cavidehinaiti ॥2-13॥

Meaning: All that exist in all the three worlds is under the control of *prāṇā*. Oh, *prāṇā* please protect us as mother protects her sons, give us affluence and intelligence.

2.1.2 ACCORDING TO *haṭhayogāpradipikā*-

चलेवातेचलेचित्तंनिश्चलेनिश्चलंभवेत् ।

योगीस्थाणुत्वमाप्नोतिततोवायुं निरोधयेत् ॥२ ॥

calevātecalecittamniścaleniscalambhavet |

yogīsthāṇutvamāpnotitatovāyumnirodhayet || 2 ||

Meaning: When *cittā* moves *prāṇā*, When *prāṇā* moves *cittā* moves. When *prāṇā* is without movement, *chitta* is without movemen. By this (steadiness of *prāṇā*) the yogi attains steadiness and should thus restrain *vāyu*(air)

2.1.3 ACCORDING TO *patanjali Yoga sutrāni*

तस्मिन् सतिश्वासप्रश्वास्योर्गतिविच्छेदः प्राणायामः ॥४९ ॥

tasmin sati śvāasapraśvāsyorgativicchedaḥpnāṇāyāmaḥ ||2|49 ||

Meaning: After mastering the posture one must practice control of *prāṇā*(*prāṇāyāma*) by stopping the motions of inhalations and exhalations.

2.1.4 ACCORDING TO *Bhagavadgitā*-

अपानेजुहतिप्राणंप्राणेऽपानंतथापरे ।

प्राणापानगतीरुद्द्वाप्राणायमापरायणाः ॥४-२९ ॥

अपरेनियताहाराः प्राणान्प्राणेषुजुहति ।

सर्वेऽप्येते यज्ञविदो यज्ञक्षपितकल्मषाः ॥४-३० ॥

apānejuhvatiprāṇamprāṇe'pānaṁtathāpare |
prāṇāpānagatīruddvāprāṇāyamāparāyaṇāḥ ||4|29||
apareniyatāhārāḥprāṇānprāṇeṣuajuhvati |
sarvedapyeteyajñavidoyajñakṣapitakalmaṣāḥ |4|30||

Meaning: Others offers as sacrifice the outgoing breath in the incoming, and the incoming in the outgoing, restraining the flow of the outgoing and incoming breaths, solely absorbed in the regulation of the life energy. Others, with well regulated diet, offer vital airs. All these are knowers of sacrifice, whose sins are destroyed by sacrifice.

According to *haṭha yogā pradīpikā* the eight *kumbhakā*

are— *suryabheda*, *ujjayi*, *śétkaré*, *çétalé*, *bhastrikā*, *bhrāmaré*, *moorcha* and *plāviané*.

In that *ujjayi* is deep breathing with contraction of epiglottis which can be done while moving, standing, sitting and walking. In this study sitting form of *ujjayi prāṇāyāma* has been taken. *ujjayi*, is performed through both the nostrils with natural inhalation and exhalation.

2.1.5 ACCORDING TO *gheraṇḍa saṁhitā* THE EIGHT *kumbhakā* ARE

—*sahitaḥsuryabhedaśaca*, *ujjayi*, *śítalī*, *bhastrikā*, *bhrāmarī*, *moorcha*, *kevalī*. In this book forms of *ujjayi prāṇāyāma* is not mentioned.

According to *haṭharatnāvalī*— The second chapter elaborate description of nine *kumbhakā* is provided, the additional ninth *kumbhakā* is *Bhujangikarana*.

2.2 The concept of *ujjayi prāṇāyāma*

Ujjayi prāṇāyāma is most beneficial to those who have been large tonsils and those who are very sensitive to cold and suffer from cough and those who often get attack of influenza or bronchitis. It is even beneficial for music aspirants yet at the same time this soothes the nervous system and calms down the mind and it has profoundly relaxing effect at psychic level (Saraswati, 1966).

Ujjayi prāṇāyāma according to haṭha yogā pradīpikā-

मुखम् सम्यम्य नादिभ्यमुख्य पवनम् शनैह् ।

यथा लगाति कन्धत्तु हृदयावधि सस्वनम् ॥ २-५१ ॥

*mukham samyamya nādibhyamukhadhya pavanam śanaiah |
yathā lagāti kanthattu hrudayāvadhī sasvanam || 2-51 ||*

Meaning: Closing the mouth, inhale with control and concentration through ida and pingala, so that the breath is felt from the throat to heart and produces a snorous sound.

पुर्ववत्कुम्बयत्प्रनम् रेचयेदिधया तथा ।

रलेसम्दोशहरम् कन्धे देहानलविवर्धनम् ॥२-५२ ॥

*purovatkumbayatpranam recayedidhayā tathā |
ralesamdośaharam kanthe dehānalavivardhanam || 2-52 ||*

Meaning: Do *kubhaṅkā* as before and exhale through ida. This removes phlegm from the throat and stimulates the digestive fire.

नाधिजलोदराधातुगतदोशविनाशनम् ।

गचथ तिश्तथा कर्यमुज्जथारव्यम् थु कुम्बकम् ॥२-५३ ॥

*nādhijalodarādhātugatadośavināśanam |
gacatha tiśtathā karyamujjathākhyam thu kumbakam || 2-53 ||*

Meaning: This *prāṇāyāma* is called *ujjayi*, can be done while moving, standing, sitting or walking. it removes dropsy and disorders of the *nāḍī* and *dhātu*.

ujjayi prāṇāyāma according to gheraṇḍasaṃhitā-

उज्जयी कुम्भकम् कृत्वासर्वकार्याणिसाधयेत् ।

नभवेत्कफरोगश्च क्रूरवायुरजीर्णकम् ॥७२ ॥

आमवातः क्षयःकासोज्वरःप्लीहा न विद्यते ।

जरामृत्युविनाशाय चोज्जयीं साधयेन्नरः ॥७३ ॥

ujjāyīkumbhakamkṛtvāsarvākāryāṇisādhayet |

nabhavetkapharogaścakrūravāyurajirṇakam ||5|72||

āmavātaḥkṣayaḥkāsojvarahṭhānavidyate |

jarāmṛtyuvinaśāyacojjāyīmsādhayennarah ||5|73||

Meaning: All works are accomplished by *ujjayīkubhāṅkā*. He is never attacked by phlegm diseases, or nervous diseases, or indigestion, or dysentery, or cough; or fever or (enlarged)spleen. Let a man perform Ujjayi to destroy decay and death.

2.3 Concept of *prāṇāyāma* according to contemporary texts:

The word *prāṇāyāma* comprise of two words *prāṇā-* vital energy or life force and *-āyāma* extension and hence is extension *prāṇāyāma* or expansion of dimension of breath. There are four aspects of *prāṇāyāma* namely *pūraka* or inhalation, *recakā* or exhalation, *antarkumbaka* or internal breath retention and *bahirkumbaka* or external breath retention (Saraswati, 1996).

prāṇāyāma is an art and has techniques to make respiratory organs to move and expand intensionally, rhythmically and intensively. The disciplined breathing helps the mind to concentrate and enables the sadhaka to attain robust health and longevity (Iyengar, 1981).

Through the practice of *prāṇāyāma*, the imbalances in the pranamaya kosa can be corrected.

Subtle types of *prāṇāyāma* and breathing helps to remove the random agitation in pranic flow in the pranamaya kosa. Thus the ailments are handled at pranamaya kosa level through *prāṇāyāma* practices (Nagarathna, 1998).

2.3.1 Ujjayi *prāṇāyāma*

Ujjayi is classified as a tranquilizing *prāṇāyāma* and it has a heating effect on body. This practice helps to relief insomnia and may be practiced in shavasana just before sleep, slows down the heart rate and is useful for people suffering from hypertension (Saraswati, 1996)

ujjayi prāṇāyāma is most beneficial to those who have been large tonsils and those who are very sensitive to cold and suffer from cough and those who often get attack of influenza or bronchitis. It is even beneficial for music aspirants yet at the same time this soothes the nervous system and calms down the mind and it has profoundly relaxing effect at psychic level (Saraswati, 1966)

2.4 Summary Table: *prāṇāyāmā*

Texts	Process	Benefits
<i>haṭha yogā pradīpikā</i>	When <i>cittā</i> moves <i>prāṇā</i> moves, When <i>prāṇā</i> moves <i>cittā</i> moves. When <i>prāṇā</i> is without movement, <i>cittā</i> is without movemen. By this (steadiness of <i>prāṇā</i>) the yogi attains steadiness and should thus restrain <i>vāyu</i> (air)	Mind will become quiet by itself. When the nervous impulses are steady and rhythmic the brain functions are regulated and the brain waves become rhythmic.
<i>patanjali yoga sūtrāni</i>	After mastering the posture, one must practice control of <i>prāṇā</i> (<i>prāṇāyāmā</i>) by stopping the motions of inhalations and exhalations.	Cleans the channels of pranic flow. It prepares a yogi for <i>dhāraṇā</i> , <i>dhyānā</i> and <i>samādhi</i> .

<i>bhagavadgītā</i>	Others offers as sacrifice the outgoing breath in the incoming, and the incoming in the outgoing, restraining the flow of the outgoing and incoming breaths, solely absorbed in the regulation of the life energy. Others, with well regulated diet, offer vital airs. All these are knowers of sacrifice, whose sins are destroyed by sacrifice	Helps to tame the senses and bring the mind into focus. then they offer the controlled mind in the spirit of <i>yajña</i> to the supreme lord.
Texts	Process	Benefits
<i>gheraṇḍa saṁhitā</i>	Inhaling external air through both the nostrils, suck the internal air through the heart and throat and hold it by means of <i>kumbhaṅkā</i> then emptying the mouth apply <i>jalandharabandha</i> , hold the breath to capacity in a manner which does not cause any obstruction.	All works are accomplished by <i>Ujjayikubhaṅkā</i> . He is never attacked by phlegm diseases, or nervous diseases, or indigestion, or dysentery, or cough; or fever or (enlarged) spleen. Let a man perform <i>Ujjayi</i> to destroy decay and death.
<i>haṭha yogā pradīpikā</i>	Closing the mouth, inhale with control and concentration through <i>ida</i> and <i>pingala</i> , so that the breath is felt from the throat to heart and produces a snorous sound. Do as before and exhale through <i>ida</i> .	This removes phlegm from the throat and stimulates the digestive fire. it removes dropsy and disorders of the <i>nāḍī</i> and <i>dhātu</i>

CHAPTER- 3

Review of scientific literature

3. SUMMARY OF MODERN LITRATURE

ujjayi prāṇāyāma had shown its beneficiary effect on Respiratory Rate, Blood Pressure, Maximum Breath Holding Time, Peak Flow Rate and Cardio Vascular Endurance where it is practiced *ujjayi prāṇāyāma* daily for 30 min for 8 weeks long by 30 healthy volunteers (Mazumdar & Suryavanshi, 2011).

Effect of *ujjayi prāṇāyāma* on cardiovascular autonomic function tests had concluded *ujjayi prāṇāyāma* can significantly decreases the stress induced changes in cardiovascular parameters because this leads to cardiovascular autonomic balance toward parasympathetic side and cortico-hypothalamo-medullary inhibition (Mahour & Verma, 2017).

A breath-based meditation sequence such as *sudarśan kriyā* that contains *ujjayi* as a part of practice is found to be potential to help develop an individual's self-awareness and support better integration of the brain (*i.e.*, mind) with other organ systems (*i.e.*, body) for enhanced human performance (Carter, Kirtigandha Salwe, 2016).

Results of study done to compare the effects of *yoḡā* and aerobic exercise has showed that cognitive performance after the yoga exercise bout was significantly superior (ie, shorter reaction times, increased accuracy) as compared with the aerobic and baseline conditions for both inhibition and working memory tasks. The aerobic and baseline performance was not significantly different, contradicting some of the previous findings in the acute aerobic exercise and cognition literature (Gothe, Pontifex, Hillman, & McAuley, 2013).

Comparative study on effects of fast and slow *prāṇāyāmā* had concluded that percentage reduction in reaction time was significantly more in the fast *prāṇāyāmā* group as compared to that in slow *prāṇāyāmā* group. Both types of *prāṇāyāmā* are beneficial for cognitive functions, but fast *prāṇāyāmā* has additional effects on executive function of manipulation in auditory working memory, central neural processing and sensory-motor performance. Fast *prāṇāyāmā* included

kapālabhāti, *bhastrikā* and *kukkuriya*. Slow *prāṇāyāmā*-nadishodhana, *praṇava* and *Savitri*. Respective *prāṇāyāmā* training was given for 35 minutes, 3 times per week, for a duration of 12 weeks (Sharma et al., 2014)

3.1 Summary table of scientific review of literature

Sl. no.	Author & year	Sample size	Intervention	Outcome measures	Results/ Conclusion
1	(Mazumdar & Suryavanshi, 2011)	n = 30	<i>ujjayi prāṇāyāmā</i> daily for 30 min 8 weeks	Respiratory Rate, Blood Pressure, Maximum Breath Holding Time, Peak Flow Rate and Cardio Vascular Endurance	<i>ujjayi prāṇāyāmā</i> was found to be effective heart rate and pulse rate where as it was not effective in respiratory rate, Blood Pressure, Breath Holding Time, Peak Flow Rate and Cardio Vascular endurance
2	(Mahour & Verma, 2017)	n =60	3 months of <i>ujjayi</i> practice	Cardiovascular hyper-reactivity in basal blood pressure (BP), rise in BP after 1 min of cold stress, pulse rate, and rate of respiration.	<i>ujjayi prāṇāyāmā</i> can significantly decreases the stress induced changes in cardiovascular parameters because this leads to cardiovascular autonomic balance toward parasympathetic side and cortico-hypothalamo-medullary inhibition.
3	(Sharma et al., 2014)	n = 84	Fast <i>prāṇāyāmā</i> and Slow. <i>prāṇāyāmā</i> 35	Cancellation test, trail making tests A and B, forward and reverse digit	percentage reduction in reaction time was significantly more in the fast <i>prāṇāyāmā</i> group as

			minutes, three times per week, for a duration of 12 weeks	spans and auditory and visual reaction times for red light and green light.	compared to that in slow pranayama group. Both types of <i>prāṇāyāmā</i> are beneficial for cognitive functions, but fast <i>prāṇāyāmā</i> has additional effects on executive function of manipulation in auditory working memory, central neural processing and sensory-motor performance.
4	(Gothe et al., 2013)	n =30	yogā and aerobic exercise session	Cognitive performance n back test & flanker tasks	Results showed that cognitive performance after theyogā was significantly superior (ie, shorter reaction times, increased accuracy) as compared with the aerobic and baseline conditions for both inhibition and working memory tasks. The aerobic and baseline performance was not significantly different,

CHAPTER -4

AIM AND OBJECTIVES

4.1 AIM OF THESTUDY

- Immediate effect of ujjayi *prāṇāyāmā* on memory and attention.

4.2 OBJECTIVES OF THESTUDY

- To find out the effect of *ujjayi prāṇāyāmā* on attention of male volunteers.
- To find out the effect of *ujjayi prāṇāyāmā* on memory of male volunteers.

4.3 RESEARCH QUESTION

Is there any immediate effect of practicing *ujjayi prāṇāyāmā* on attention, memory in male volunteers?

4.4 HYPOTHESIS

Ujjayi prāṇāyāmā will affect on attention, memory in male participants.

4.5 NULL-HYPOTHESIS

Ujjayi prāṇāyāmā will not affect on attention, memory in male participants.

CHAPTER 5

METHODS AND MATERIALS

5.1 PARTICIPANTS

Sample were collected from Svyasa Deemed to be university, Jigani, Bangalore. Male participants were taken from B.SC(YT) and M.SC(YT), the age range between 17 -30 years. Total sample size was 35.

5.2 INCLUSION CRITERIA

- Healthy volunteers who are interested to participate in study.
- Male of age group 17- 30 will be selected.
- Subjects with hypothyroidism also will be chosen.

5.3 EXCLUSION CRITERIA

- Participants those who are not able to perform *ujjayi prāṇāyāmā*.
- People with any chronic physical or mental illness.

5.4 ETHICAL CONSIDERATION

The trail of research is be explained clearly to the participant and written informed consent is taken from each participant.

5.5 DESIGN OF THE STUDY

PRE-POST DESIGN- Within group

It is a design in which same group is taken for pre and post data collection. In a **one-group** pretest-posttest design, the dependent variable is measured once before the experiment is implemented and once after it is implemented.

5.6 VARIABLES STUDIED

- **Attention**

- Is the behavioral and cognitive process of selectively concentrating on a discrete aspect of information, whether deemed subjective or objective, while ignoring other perceivable information. *ujjayi pranāyāmā* is the process through which one can calm down the mind and which can improve attention.

- **Memory**

- Memory is the capacity to retain and recall information about past and present incidents. Memory capacity, is the ability to analyze and synthesise the assimilated information and not information storage alone. Memory power varies between individuals. While the Memory is latent capacity to retain and recall information, *yoga* assists in improving the memory power with yogic techniques of concentration and meditation.
- **Sternberg Memory Task** – To measure short term memory. The task is designed to assess how individuals store and retrieve random information from short memory. To do this task participants are given a series of digits (2-7 digits long) before being prompted with a digit that was either part of the series (IN) Or not (OUT). Participants have to decide whether the probe was IN or OUT by pressing two different keys on the keyboard. This task takes 5 minutes to complete.
- **Mackworth Clock Test** – From one circle position to next position in a clockwise at constant speed. Occasionally the red dot skips a position. Participant were asked to press the space bar whenever they notice such a skipped event. This task takes approx. 1.5 min to complete.

5.7 INTERVENTION

Participants were received the training of *ujjayi pranāyāmā* for 15 days. They were asked to sit in a comfortable, relax position. The instruction was as follows: gently close your eyes and relax your mouth and jawline. Practice deep sessions on inhalations and exhalations. Feel the air

passing through your wind pipe as you practice the process. During exhalation try to softly utter the sound “ahh” from your mouth, Once you become comfortable with the exhalations, maintain a contraction at the back of your throat on inhalation Once you get comfortable with this practice, use only the nose for breathing, keeping your mouth shut and maintaining a contract. Concentrate on the sound of your breath, which should be audible by now.

On the day of data collection, all participants were practiced *ujjayi pranāyāmā* for 10 min. where after practicing 10 mins participants were asked to take rest of 1 min. Pre- data was collected without giving the intervention and after collecting the pre-data,*ujjayi pranāyāmā* was given for 10 min after performing *ujjayi pranāyāmā* for 10 minutes post data was collected.

CHAPTER 6

DATA EXTRACTION AND ANALYSIS

Data were analyzed by using R-software. We checked normality by using Shapiro Wilk test. Equivalence of variance were found using Levene's test. Depending on the distribution of data parametric or non-parametric test was used to perform within and between group comparisons. Pre and post intervention scores were compared using Independent sample test in case of parametric test. If the data is skewed, non-parametric analysis through Wilcoxon's test for within group Paired t test.

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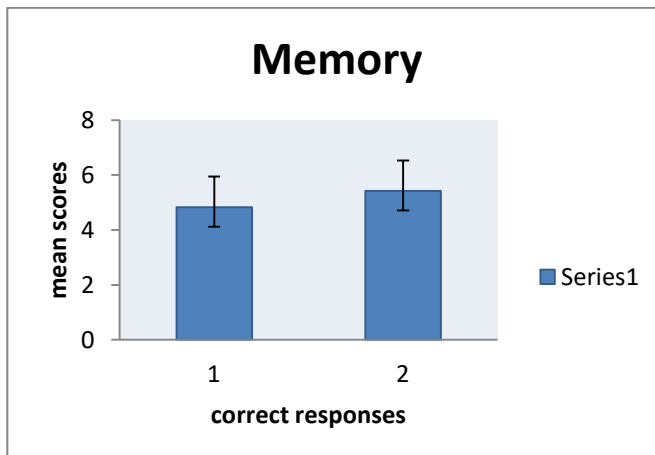
CHAPTER 7

RESULT

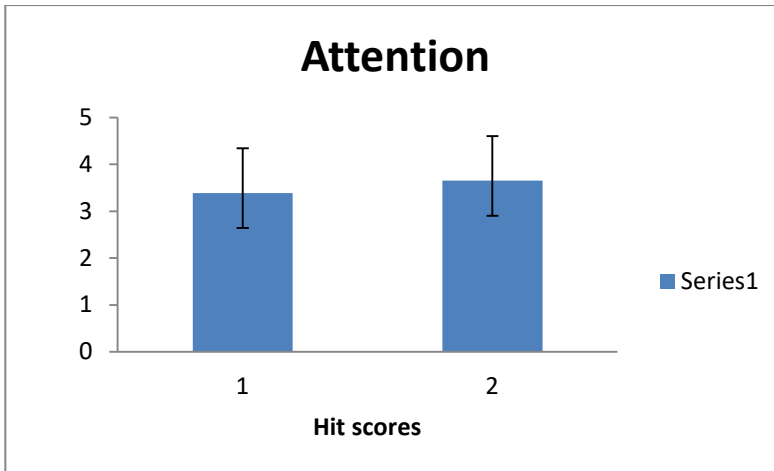
The Paired sample t-test was performed, and result that was a significant effect of *ujjayi pranāyāmā* on cognition, as shown in Table 1. There is highly significant in proportion correct responses (0.00), which is responsible for memory and significant improvement in Hit (0.01) which showed improvement in attention power but result did not show any significant changes in FALSE and MISSED.

Table 1:

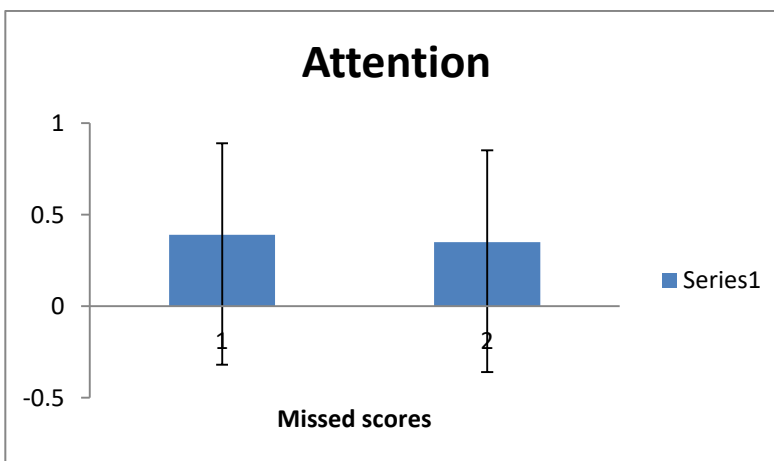
Variables	Pre	Post	p. values
Prop	4.83±1.11	5.42±0.71	0.000
Hit	3.39±0.95	3.65±0.71	0.013
Missed	0.39±0.50	0.35±0.71	0.240
FALSE	1.87±5.30	1.42±7.54	0.130



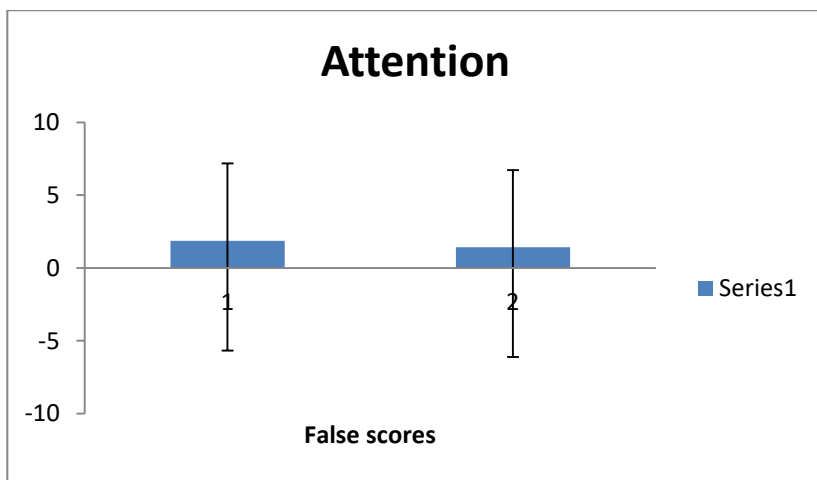
The above bar graph shows memory scores. 1 represents the pre score and 2 represents the post score. The mean pre score is 4.83 and post mean score is 5.42 and hence it seen that there is an increase in memory indicated by increase in proportion of correct responses



The above bar graph shows attention scores. 1 represents the pre score and 2 represent the post score. The mean pre score is 3.39 and post mean score is 3.65 and hence it seen that there is an increase in attention scores indicated by increase in ht scores



The above bar graph shows attention scores. 1 represents the pre score and 2 represents the post score. The mean pre score is 0.39 and post mean score is 0.35 and hence it seen that there is an increase in attention indicated by reduction in missed values



The above bar graph shows attention scores. 1 represents the pre score and 2 represent the post score. The mean pre score is 1.87 and post mean score is 1.42 and hence it seen that there is an increase in attention indicated by reduction in false score

CHAPTER 8

DISCUSSION

According to the traditional wisdom of yoga, pranayama is the key to bringing about psychosomatic integration and harmony. This is the novel study to present results of attention and memory related changes in normal healthy population. The results show that *ujjayi prāṇāyāmā* is more beneficial for people to enhance memory and attention. It was demonstrated that immediate effect of *ujjayi prāṇāyāmā* has a positive impact on working memory, which is responsible for retrieval and storage of information from/to prefrontal cortex. However, there was no evidence of attention and memory improvement by *ujjayi prāṇāyāmā* on normal healthy population. Therefore, this study is unique in assessing memory and attention suggesting the effectiveness of *ujjayi prāṇāyāmā* intervention.

Study that is done on children to find the effect of relaxation practices on attention had showed the similar results with present study saying that yogic relaxation (cyclic meditation) can increase attention levels compared to supine rest Both Cyclic Meditation and Supine Rest led to improvement in performance, as assessed by six letter cancellation task, but the change caused by Cyclic Meditation was larger than Supine Rest (Pradhan & Nagendra, 2010).

Study done on *prāṇāyāmā* and memory concludes that executive functions, Perceived stress scale and reaction time improved significantly in both fast and slow pranayama groups, except reverse digit span, which showed an improvement only in fast *ujjayi prāṇāyāmā* group. In addition, percentage reduction in reaction time was significantly more in the fast *prāṇāyāmā* group as compared to that in slow *prāṇāyāmā* group. Both types of *prāṇāyāmā* are beneficial for cognitive functions, but fast *prāṇāyāmā* has additional effects on executive function of manipulation in auditory working memory, central neural processing and sensory-motor performance (Sharma et al., 2014).

8.1 Mechanism

However, there is no direct mechanism available to justify the result but probably the *ujjayai pranāyāmā* might have responsible for retrieval and storage of information from/to prefrontal cortex which showed positive result in our study. According to the *haṭha yogā pradīpikā*

चलेवातेचलेचित्तनिश्चलेनिश्चलंभवेत् ।

योगीस्थाणुत्वमाप्नोतिततोवायुं निरोधयेत् ॥२॥

prāṇā and mind are intricately linked. Fluctuation of one means fluctuation of the other. When either the mind or *prāṇā* becomes balanced the other is steadied. *haṭha yogā* says, control the *prāṇā* and the mind is automatically controlled, whereas *rāja yogā* says control the mind and *prāṇā* becomes controlled.

haṭha yogā says let the mind be concentrate on the autonomic body functions and vital energy and the mind will become quiet by itself. When the nervous impulses are steady and rhythmic, the brain functions are regulated and the brain waves becomes rhythmic.

The breathing process is directly connected to the brain and central nervous system and it is the one of the most vital processes in the body system. It also has some connection with the hypothalamus, the brain centre which controls emotional responses. The hypothalamus is responsible for transforming perception into cognitive experiences.

So performing *ujjayipranāyāmā*. makes aware of the nature of the breath and by restraining it the mind becomes controlled. *ujjayipranāyāmā* harmonize the brain wave patterns. It helps to relax the physical body and the mind, and develops attention and memory.

So, this might be a possible underlined mechanism to increase the memory and attention in our study.

8.2 Strength of study

- This is first study to measure the immediate effect of *ujjayi pranāyāmā* on cognitive abilities of male participants.
- The participants were practicing yoga regularly so they understood the procedure and practiced the *ujjayi pranayama* perfectly. So, it could have influenced the result of our study.

8.3 Limitations of study

- Single Group
- Lack of control group
- Small sample size
- Only male participated in this study
- Immediate effect was measured
- Only short instruction was given about the task and there was no trial
- Only one college students were taken for study

8.4 Suggestions for Future work

- Future studies should be considered with.
- Two groups with Randomization trail.
- Larger sample size and long-term intervention.
- Further studies can be done by giving *ujjayi pranāyāmā* as mode of Intervention before the examination.

CHAPTER 9

Conclusion

Based on our findings, *ujjayi pranāyāmā* appears an effective and simple way to improve cognitive abilities; attention and memory among male participants. Future long-term prospective studies should be done to provide confirmatory evidence about the study.

References

- Anderson, J. R. (2010). Cognitive psychology and its implications. *Cognitive Psychology and Its Implications*, Vol. 6, p. 519. <https://doi.org/San Francisco>
- Bahrami, B., Carmel, E. a. (2008). Unconscious orientation processing depends on perceptual load. *Journal of Vision*, 8(3), 1–10.
- Bahrami, B., Carmel, D., Walsh, V., Rees, G., & Lavie, N. (2008). Unconscious orientation processing depends on perceptual load. *Journal of Vision*.
<https://doi.org/10.1167/8.3.12>
- Banerjee, D. S. (2014). Effect of Yoga on the Memory of Middle School Level Students. *IOSR Journal of Research & Method in Education (IOSRJRME)*, 4(1), 49–52. <https://doi.org/10.9790/7388-04144952>
- Bhargava, R., Gogate, M. G., & Mascarenhas, J. F. (1988). Autonomic responses to breath holding and its variations following pranayama. *Indian Journal of Physiology and Pharmacology*.
- BKS Iyengar. (2018). *Light On Yoga*.
- Carter, Kirtigandha Salwe, R. C. (2016). Breath-based meditation: A mechanism to restore the physiological and cognitive reserves for optimal human performance. *World Journal of Clinical Cases*, 4(4), 99.
<https://doi.org/10.12998/wjcc.v4.i4.99>
- Chavajay, P., & Rogoff, B. (1999). Cultural variation in management of attention by children and their caregivers. *Developmental Psychology*, 35(4), 1079–1090.
<https://doi.org/10.1016/j.concog.2008.12.008>
- DiGirolamo, G. J., & Griffin, H. J. (2003). Encyclopedia of cognitive science. In *Consciousness and attention*. In L. Nadel (Ed.), (Vol. 1). London: Nature Publishing Group.
- Gothe, N., Pontifex, M. B., Hillman, C., & McAuley, E. (2013). The acute effects of yoga on executive function. *Journal of Physical Activity & Health*, 10(4),

488–495.

Iyengar, B. (2016). *Light on Pranayama*.

Knudsen, E. I. (2007). Fundamental components of attention. *Annual Review of Neuroscience*, 30, 57–78.

<https://doi.org/10.1146/annurev.neuro.30.051606.094256>

Mahour, J., & Verma, P. (2017). Effect of Ujjayi Pranayama on cardiovascular autonomic function tests. *National Journal of Physiology, Pharmacy and Pharmacology*. <https://doi.org/10.5455/njppp.2017.7.1029809122016>

Mazumdar, I., & Suryavanshi, A. (2011). Effect of Ujjayi and Bhastrika Pranayama on selected physiological variables of physically challenged students. *British Journal of Sports Medicine*, 44(Suppl_1), i69–i69.

<https://doi.org/10.1136/bjism.2010.078725.229>

Muktibodhananda. (2012). *Hatha Yoga Pradipika*.

Nagarathna R, N. H. (1998). *Yoga for Bronchial Asthma*.

nagendra, H. R. (2003). *PRANAYAMA-The Art and Science (SECOND)*. bangalore: SWAMI VIVEKANANDA YOGA PRAKASHANA.

Niranjananda saraswati. (2010). *Prana and Pranayama*.

Pradhan, B., & Nagendra, H. (2010). Immediate effect of two yoga-based relaxation techniques on attention in children. *International Journal of Yoga*, 3(2), 67–69.

<https://doi.org/10.4103/0973-6131.72632>

Rabkin, L. Y. (2018). Cognitive Psychology and Its Implications. *American Journal of Psychotherapy*. <https://doi.org/10.1176/appi.psychotherapy.1987.41.1.146>

Ray Dutta. (1998). *Yogic Exercises*.

S.vinudha. (2019). *Efficiency of ujjayi pranayama on hypothyroidism in adults-A randomized controlled trial*.

Saraswati. (1996). *Asana pranayama mudra bandha*. Bihar Yoga Bharati.

Saraswati, S. (1966). *Dynamics of Yoga*.

- Sengupta, P. (2012). Health Impacts of Yoga and Pranayama: A State-of-the-Art Review. *International Journal of Preventive Medicine*.
- Sharma, V. K., Rajajeyakumar, M., Velkumary, S., Subramanian, S. K., Bhavanani, A. B., Madanmohan, ... Thangavel, D. (2014). Effect of fast and slow pranayama practice on cognitive functions in healthy volunteers. *Journal of Clinical and Diagnostic Research*.
<https://doi.org/10.7860/JCDR/2014/7256.3668>
- Singh, R. B., Wilczyńska-Kwiatek, A., Fedacko, J., Pella, D., & Meester, F. De. (2009). Pranayama: The power of breath. *International Journal on Disability and Human Development*. <https://doi.org/10.1515/IJDHD.2009.8.2.141>
- Srinivasan. (2008). Interdependence of attention and consciousness. *Progress in Brain Research*, 168, 65 –75.

APPENDIX :1

CONSENT FORM

Immediate effect of Ujjayi Pranayama on cognitive abilities of male young adults

Description of the research and your participation

You are invited to participate in a research study conducted by Ms. Pooja Singh. The purpose of this research is to see the immediate effect of ujjayi pranayama on cognitive abilities of male young adults.

Voluntary participation

Your participation in the research study is voluntary. You may choose not to participate and you may withdraw your consent to participate at any time. You will not be penalized in any way even if you decide not to participate or to withdraw from this study.

Contact information- 9611641839

Consent

I have read this consent form and have been given the opportunity to ask questions. I give my consent to participate in this study.

Participant's signature _____.

Date: - _____.

APPENDIX:2



Sl.no.	Gender	tprop_correct	tpostprop_correct	pre_script.elapsed_time	pre_values.total_hits	pre_values.total_misses	pre_values.total_false_alarms	post_script.elapsed_time	post_values.total_hits	post_values.total_misses	post_values.total_false_alarms
1	Male	6	6	64112	4	0	0	63129	4	0	0
2	Male	4	3	67421	3	1	0	64487	4	0	0
3	Male	4.33	5.33	88803	4	0	0	65466	4	0	0
4	Male	5	5	120191	4	0	24	131651	4	0	42
5	Male	4	5	68278	4	0	1	63683	4	0	0
6	Male	5.33	6	63604	4	0	0	63219	4	0	0
7	Male	6	6	63232	4	0	0	62255	4	0	0
8	Male	5.67	6	67790	3	1	0	64150	4	0	0
9	Male	5.67	6	62854	4	0	1	63440	4	0	0
10	Male	6	5.67	64263	4	0	0	62360	4	0	0
11	Male	5.67	5.67	64005	4	0	1	71762	4	0	0
12	Male	4.67	5	64276	0	1	2	62900	1	3	0
13	Male	4.67	5.33	75460	4	0	1	78131	4	0	0
14	Male	4	6	67211	3	1	0	75393	3	1	0
15	Male	5.67	4.67	69503	3	1	0	76203	4	0	0
16	Male	4.33	5.67	63533	3	1	18	65442	4	0	1
17	Male	5.67	6	70741	4	0	0	63728	4	0	0
18	Male	5	6	85950	3	0	0	86714	4	0	0
19	Male	5.33	6	62829	4	0	0	63187	3	1	0
20	Male	3.67	5.33	80741	4	0	0	65700	4	0	0
21	Male	4.67	5.67	63944	2	1	0	63052	4	0	0
22	Male	5.67	5.67	68329	4	0	0	65289	4	0	0
23	Male	3	4	66356	4	0	0	68294	4	0	0
24	Male	2	5	69433	1	1	0	64436	2	2	0
25	Male	5	5.67	63442	3	1	5	62835	4	0	1
26	Male	5.33	6	63312	4	0	0	65500	4	0	0
27	Male	5.67	5.67	64321	4	0	0	63764	3	1	0
28	Male	5	5.67	68317	3	1	0	63184	3	1	0
29	Male	6	4.67	64543	3	1	1	64521	3	1	0
30	Male	1.67	4.33	88024	3	1	0	209972	3	1	0
31	Male	5	6	63921	4	0	4	75861	4	0	0
32	Male	5.33	5.67	62922	3	1	2	64587	4	0	2
33	Male	5	5.67	67480	2	1	2	65202	4	0	0
34	Male	5	6	63350	4	0	0	63308	4	0	0
35	Male	5	5	63750	4	0	0	62940	2	2	0