

**A STUDY ON IMPACT OF YOGA IN IMPROVEMENT OF
PHYSICAL, PSYCHOLOGICAL, AND SOCIAL FITNESS
AMONG ADOLESCENTS**

THESIS

Submitted by

ASTHA CHOUKSE

(PhD/Cat/05/Jan12)

Towards the partial fulfilment of

DOCTOR OF PHILOSOPHY (YOGA)



SWAMI VIVEKANANDA YOGA ANUSANDHANA SAMSTHANA (S -VYASA)

(Declared as Deemed University under Section 3 of the UGC Act, 1956)

BENGALURU – 560019

INDIA

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By

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CERTIFICATE

This is to certify that **Mrs. Astha Choukse** who is a PhD Scholar bearing the University registration number of PhD/Cat2/05/Jan12 with effect from 6th January 2012 by Swami Vivekananda Yoga Anusandhana Samsthana, Deemed University under the Division of Yoga and Humanities. She has successfully completed the prescribed course work and all requirements for the submission of thesis. This thesis entitled – ‘**A STUDY ON IMPACT OF YOGA IN IMPROVEMENT OF PHYSICAL, PSYCHOLOGICAL, AND SOCIAL FITNESS AMONG ADOLESCENTS**’ is based on the work carried out by her as per regulations of the University. Further, it is declared that subject matter of this thesis has not previously formed the basis of the award of any degree, diploma, associate-ship, fellowship, or similar titles.

Dr. H R Nagendra

PhD Guide

Date

Place: Bengaluru

DECLARATION

I, hereby declare that this study was conducted by me at Swami Vivekananda Yoga Anusandhana Samsthana (S-VYASA), Bengaluru, under the guidance of Padmashree Dr. H R Nagendra, Chancellor of S-VYASA University, Bengaluru and Dr. Amritanshu Ram, Scientific Writer, HCG, Bengaluru.

I also declare that the subject matter of my thesis entitled “A Study on Impact of Yoga in Improvement of Physical, Psychological, and Social Fitness among Adolescents” has not previously formed the basis of the award of any degree, diploma, associate-ship, fellowship, or similar titles.

Date:

ASTHA CHOUKSE

Place: Bengaluru

(Candidate)

(PhD/Cat2/05/Jan12)

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Date:

Place: Bengaluru

Astha Choukse

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

a	=	अ	ṛa	=	ठ	pa	=	प
ā	=	आ	ca	=	च	pha	=	फ
l	=	इ	cha	=	छ	ba	=	ब
ī	=	ई	ja	=	ज	bha	=	भ
u	=	उ	jha	=	झ	ma	=	म
ū	=	ऊ	ñ	=	ञ	ya	=	य
ṛ	=	ठ	ṭa	=	ट	ra	=	र
ṝ	=	ठ	ṭha	=	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
m̄	=	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

Discovering and promoting ways to improve adolescents' overall fitness has been a recurrent concern and challenge in the field of health and psychology. Adolescence, as a period of transition, is highly prone to health risks and unhealthy behavior patterns. Decrease in physical activity, improper food habits, and sedentary lifestyle in adolescents are very prevalent today. These factors can constitute risks to physical, mental, and social health. Adolescence is the right time to promote healthy practices to prevent problems of health and behavior in adulthood.

Even though, fitness during adolescence is considered essential, there is a dearth for effective programs that promote overall fitness in adolescents. Available programs lack in holisticsity or integrative approach as they focus on either of the fitness domains such as physical, psychological, or social domains.

Indian classical texts provide immense conceptual resources and guidelines on different aspects of life. Texts like Bhagavad-Gita, Taittiriya Upanishad, Patanjali Yoga Sutras explain various components of fitness and techniques that promote fitness at different domains. Integrative approach Yoga is considered an important intervention that provides the right dose of activities to promote health and wellbeing at all five koshas. Research studies indicate that although yoga is being implemented in schools, little is done on studying its effect on overall fitness of adolescents.

While yoga in schools is a popular program, residential yoga camps for adolescents are less heard. Further, research studies on the effect of short-term residential yoga program has not

been cited. There is also a need to develop effective holistic yoga program that can be replicated in different adolescent populations and different setting other than school as well.

AIMS & OBJECTIVES

The aim of the present study is to evaluate the efficacy of a seven-day residential, integrated, holistic yoga intervention on certain physical, psychological, and social fitness parameters in adolescents.

The primary objective of the study is to examine the effect of yoga on

- a. Physical fitness, such as strength, speed, flexibility, and coordination
- b. Psychological, fitness such as Emotional Intelligence, anger, and self-concept
- c. Social fitness, such as empathy, social competence, altruism, and relationships

The secondary objectives are

- a) To develop an integrated yoga module for overall fitness among adolescents
- b) To understand the difference in the effects of yoga across genders and age groups.
- c) To explore the relationships between the changes across physical, psychological and social domains.
- d) To assess if parents' observations coincided with that of their children.

MATERIALS & METHODS

A pre-post yoga interventional study was carried out in three independent cohorts (batches 1, 2 and 3) with sample size of 148 (57.8% male), 167 (73.1% male), and 195 (62.1% male),

respectively. The participants of the study included healthy adolescent children (both girls and boys) aged between 9 and 16 years, studying in English-medium schools. The samples were drawn from the children who registered for the seven-day residential yoga camp. Ethical approval and consent from parents and participants were obtained.

A seven-day integrated yoga intervention was conducted in a residential setting. The intervention included Asana, Pranayama, Relaxation, Meditation, and also Jnana yoga (Yama-Niyama concepts) and Bhakti yoga. The intervention was spread over from morning 5.00 am till night 9.30 pm with intermittent breaks and free time. Food and lifestyle remained same for all the participants during the program.

Physical fitness tasks such as body mass index (BMI), plate-taping test (PLT), sit and reach (SAR), standing broad jump (SBJ), sit-ups (SUP), and 10x5m shuttle run (10x5mR) were assessed using Eurofit battery. Psychological assessments included emotional intelligence, emotional regulation strategies, clinical anger, and self-concept. Social assessments included social competence, empathy, altruism, parent relationship, and peer friendship. Authorized scales and software were used for assessments and relevant analyses were carried out. Data was collected from the participants and their parents using respective versions of the scales for psychosocial assessments.

RESULTS

Significant ($p < 0.05$) positive changes were observed in BMI, SBJ, SAR, and SUP in all the cohorts. Significant ($p < 0.05$) improvements in emotional intelligence, emotional regulation, and anger management were observed in all the three cohorts. However, no significant improvement was found in self-concept in either of the cohorts. Significant changes ($p < 0.05$)

were seen in social competence, empathy, and altruism in batches 2 and 3, whereas changes in batch 1 showed non-significant improvements. Analyses of the parental data indicated a significant improvement in parent relationship ($p=0.035$) and also non-significant improvement in all other social outcomes. Even though providing a targeted intervention for holistic development and assessing the same might be challenging for this age group, the tools used in the study have helped in detecting positive changes. The effects, as observed by parents three months after the intervention, could suggest a sustained change in parental relationship as a result of yoga.

CONCLUSION

Integrated yoga intervention in a residential set up can improve physical, psychological, and social fitness among adolescents. The pattern of changes is consistent across all three cohorts. It also helped to demonstrate that administering yoga was acceptable and feasible in a residential setting.

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CHAPTER 1

INTRODUCTION



1.0. INTRODUCTION

Adolescence, the age 10 to 19 years, is a critical period of distinctive biological and social transitions, as well as tremendous growth and neurocognitive maturation (Blakemore & Mills, 2014; Davidson, Grigorenko, Boivin, Rapa, & Stein, 2015; Sawyer et al., 2012). During this period, behavior patterns and personal lifestyle choices are established (B. Kumar, Robinson, & Till, 2015). Life stressors, such as peer pressure, social context, academic pressure, and the psycho-physiological changes within can have a major impact on adolescents' health (World Health Organization, 2009). Problems, such as mood swings, anxiety, obesity, bullying, sleeplessness, computer/smart phone addiction, drug abuse, and lack of academic motivation are common during the pubertal transition period (Hueston, Cryan, & Nolan, 2017; Melnyk et al., 2013). Heightened reactivity to emotions with reduced regulatory capacities contribute to risk-taking behaviour and susceptibility to peer influence (Pfeifer et al., 2011). Training in this area has often been neglected in school settings (Broderick & Metz, 2009). Adolescence is an age of opportunity and a pivotal time to help navigate risks and vulnerabilities and to set them on the path to fulfilling their potential (UNICEF, 2011).

Psychologist Erik Erikson (1959) emphasized adolescence as the fifth stage out of eight distinct stages in his theory of psychosocial development. Successful completion of each stage results in acquisition of basic virtues and a healthy personality. This stage plays an essential role in developing a sense of personal identity, which will continue to influence behavior and development for the rest of a person's life (Erikson, 1959). Hence physical, mental, and social development and fitness during adolescence can have a positive influence on adult health status (J R Ruiz et al., 2009) and show benefits on overall health throughout the life span and next generation.

Emotions, the subjective feelings such as happiness, joy, sadness, and anger often occur in our everyday lives and dictate mood. They are driving forces for human behaviors. Emotional reactions are particularly common in adolescents who are undergoing rapid physical, psychological, and social changes. Understanding emotions and knowing effective ways of expressing positive emotions and handling negative emotions plays a major role in establishing physical, psychological, and social fitness among adolescents.

1.1. PHYSICAL FITNESS

Physical fitness can be understood as a state of good physical health. According to Disease Control and Prevention, the United States, physical fitness should be a necessary element during adolescence as it affects daily life activities and sportive productivity of the individual (Erİkođlu, Güzel, & Pense, 2015; Houwen, Visscher, Hartman, & Lemmink, 2006). Physical activity, physical exercise, and physical fitness are sometimes used as interchangeable terms in literature, which is not always appropriate. Physical activity is any body movement that increases energy expenditure, whereas physical exercise refers to planned, systematic, and purposeful physical activity (Ortega, Ruiz, Castillo, & Sjöström, 2008). Physical fitness is a state that shows a person's ability to perform exercises and specific functions, which relate to present and future health outcomes (Pate, Oria, Pillsbury, & Youth), 2012).

Physical fitness encourages individuals to care for their body through physical activity, proper nutrition, and a strong mind. Physical fitness, achieved through regular exercise and/or spontaneous physical activity can protect against the development of chronic stress and inflammatory disease by optimizing physiological and neuroendocrine stress responsiveness,

promoting an anti-inflammatory state, and enhancing neuroplasticity and growth factor expression (Deuster & Silverman, 2014).

Development of a positive attitude towards the body and physical fitness may help children improve several psychological constructs. A test of physical fitness (EUROFIT) helps to measure and evaluate the physical fitness of children at school age to motivate them to enjoy regular exercise and to promote the importance of children's sport and fitness (Council of Europe. Committee for the Development of Sport.; Committee of Experts on Sports Research., 1988). Physical education in school has declined and curricular interventions have had limited effects. There is need to test alternative non-curricular approaches. (Güngör, Onurcerrah, Çobanoğlu, Kaçoğlu, & Yilmaz, 2010). Of the many components of physical fitness considered in the present study are strength, speed, flexibility, coordination, and agility.

1.1.1 Strength

Physical fitness is generally represented by muscular strength, which provides several health benefits. Improving muscular strength or strength training is important for adolescents in sports or recreational activity. Adolescents are physiologically and psychologically immature and the growth of organs continues till they attain adulthood, which is an essential consideration for strength training programs designed for them. Yogasanas, which are considered a safe and natural strength-building program, may help establishing physical fitness among adolescents.

1.1.2. Speed

Physical changes during adolescent growth spurts (AGS) may decrease coordination, speed, agility, and overall skills. In puberty, there is a sudden increase in testosterone levels in boys, as well as an ability to increase strength. This leads to improved running speed and movement time. During adolescence, with training, better nervous system adaptation results in enhanced coordination of arm and leg muscles. Practice of correct movement patterns, with a gradual increase of intensity, is the key to develop speed.

1.1.3. Flexibility

Flexibility refers to the range of motion and ability to move a single joint or group of joints at the widest possible angle. Flexibility provides optimal speed, strength, and development of sports techniques. Like musculoskeletal fitness, flexibility is specific. For example, a person can have a good range of motion around a shoulder joint, but lack range of motion in the hip. Flexibility is influenced by several factors including observed differences in the genetic structure, connective tissue elasticity, muscle viscosity, reciprocal muscle coordination, age, gender, and body type. Flexibility is a key component to prevent injury: stretching before athletic activity helps prepare the muscles for exercise and stretching after exercise has proven to be even more important in injury prevention.

1.1.4. Coordination

Growth spurts are common during adolescence and these accelerated changes in growth can alter the individual's control of the body and require some time to adapt. Younger athletes who learn to master the elements associated with good coordination (balance, rhythm, spatial awareness, reaction etc) are better off than athletes who are not exposed to this kind of exercise stimulation till they are older. The ability to optimally develop coordination ends at

around the age of 16. It is important to understand that coordination-based practices must be introduced during the preadolescent stage.

1.2. PSYCHOLOGICAL FITNESS

Psychological and emotional changes and challenges are part of an adolescent's journey to adulthood. Mood swings, strong feelings, and intense emotions are common during this period and often lead to increased conflict. The adolescent is still learning how to control and express emotions in a grown-up way. High levels of psychological stress amongst adolescents have been observed in research (Heneghan et al., 2013; Trentacosta & Fine, 2011; Weare, 2000) so it is important to enhance resistance to stress through improved emotional health at an early age.

Negative emotions lead to illness, depression, and stress, and anxiety, and may be associated with heart problems or increased blood pressure, sleep disturbance, changes in the immune system and so on. (Gulliksson et al., 2011; Shear, 2015). Emotions can facilitate or impede children's academic engagement, commitment, work ethic, and ultimate school success.

Some theorists explain the process of emotion as first identifying the objects or events, second appraisal, third physiological changes, fourth action or expression, and finally regulation (Gayathri, N & Meenakshi, 2015). The limbic system including thalamus, hypothalamus, cingulate gyrus, amygdala, and hippocampus, deals with emotions, memories and stimulations. The hypothalamus participates in the activation of the sympathetic nervous system. The thalamus acts as a sensory relay center; its neurons project signals to the amygdala as well as the higher cortical regions for further processing. The amygdala

processes emotional information and sends that information on to the cortical structures. The hippocampus integrates emotional experience with cognition.

The World Health Organization defines mental health as a state of well-being and effective functioning in which an individual realizes his or her own abilities. It is resilient to the stresses of life, and is able to make a positive contribution to his or her community. In order to achieve this, identification of factors that may protect from the negative impact of stress is essential. Appropriate strategies and interventions are needed to develop skills like emotion management, empathy, anger management, coping, and good judgment. Fitness skills help adolescents achieve overall wellbeing and positive mental health in adulthood. The psychological components relevant to this study are emotional intelligence, anger management, and self-concept.

1.2.1. Emotional Intelligence (EI)

The ability to identify and manage one's own emotions, as well as emotions of others is called emotional intelligence. Adolescents need to develop an emotional response strategy to be able to adapt to changing social, family, peer, and academic environments. Adolescents who are better able to perceive, manage, and understand their emotions are at an advantage when confronted with situations arising later in life.

The onset of adolescence is marked by increased hormonal activity. During this period, the amygdala is engaged in emotional situations more than the prefrontal cortex. Cognitive control is less mature during adolescence. Self-awareness is a key component of emotional intelligence as it helps control, manage and adapt mood, emotions and responses through self-

management. Changes in levels of neurotransmitters such as dopamine and serotonin influence the way adolescents experience emotions, making them more emotional and more sensitive to stress.

Assessment of emotional intelligence can provide new insights into how adolescents can fulfil their potential by working with their emotions and also helps health professionals develop suitable programs to improve skills. Educational programs focused explicitly on emotional intelligence, based on the capacity to perceive, use, understand, and regulate emotions, can enhance diverse dimensions of adolescents' psychosocial adjustment and well-being. Very few programs are available to strengthen EI in adolescents based on diverse theoretical models and their efficacy has not been thoroughly tested as yet.

1.2.2. Anger

Anger is a negative emotion both in terms of subjective experience and social evaluation. Anger is the most powerful and vital emotion, which has strong influence on adolescents' mental health. Evidence suggests that externalizing behaviors are associated with deficits in the regulation of anger. Anger is linked to hostility, oppositional behavior, aggression, and violence, especially in adolescents these are some of the main reasons for which they are referred for counseling or psychotherapy (Abikoff & Klein, 1992; Sukhodolsky, Kassinove, & Gorman, 2004). Childhood anger and aggressive behavior are considered risk factors for adult violence and criminal behavior (Huesmann, Eron, & Dubow, 2002). Adolescents' ability to modulate their emotional responses to anger is being increasingly recognized as an important skill for ensuring mental health, academic success and healthy transition into adulthood

(Eisenberg, Spinrad, & Eggum, 2010). Understanding one's own emotions can be a crucial aspect of learning how to deal with anger.

1.2.3. Self-Concept

Self-concept emerges as a more complex construct incorporating both cognitive and effective responses toward the self and is heavily influenced by social comparison (Bong & Clark, 1999). Self-concept can alternate rapidly between one's personal and social identity (Guimond, Chatard, Martinot, Crisp, & Redersdorff, 2006). Having a negative self-concept during adolescence has been associated with maladaptive behaviors and emotions. In contrast, having a positive self-concept has been linked to positive social and emotional development (Hadley, Hair, & Moore, 2008). The recognition of inconsistencies in the self-concept is a common source of distress during adolescence. However, this distress may benefit adolescents by encouraging further development and refinement of their self-concept.

1.3. SOCIAL FITNESS

Adolescence is a time of big social development, forming an independent identity and learning to be an adult. We observe changes in interactions with family, friends, and peers. Adolescence is also the stage where relationships are extended beyond parents and family and are intensely influenced by peers and the outside world. Adolescents are highly vulnerable to social risks, such as experimentation and risk-taking, giving in to negative peer pressure, taking uninformed decisions on crucial issues, especially those relating to their bodies and their sexuality. Adolescence is, thus, a turning point in one's life, a period of increased potential and at the same time, one of greater vulnerability.

Social fitness is demonstrated by how well one forms satisfying interpersonal relationships with others and adapts comfortably to different social situations. There are many components of social fitness. In the present study, the focus is on social competence, empathy, altruism, parent relationship, and peer friendships.

1.3.1. Empathy

The development of empathy is a crucial part of emotional and social development in childhood. Empathy is considered to be the ability to adopt the perspective of others in order to understand their feelings, thoughts, or actions (Hogan, 1969) or the capacity to understand another person's point of view. The ability to empathize, or identify with the feelings of another person, helps in the development of prosocial (socially positive) and altruistic (helpful, beneficent, or unselfish) behavior. Empathy is a key component of all social functioning and may be a central characteristic of emotionally intelligent behavior.

Empathy helps develop positive peer relationships; it is affected by a child's temperament, as well as by parenting style. Children raised in loving homes with affectionate parents are more likely to develop a sense of empathy and altruism.

1.3.2. Social Competence

Social competence is defined as a set of positive social skills necessary to get along well with others and function constructively in groups, including, "a) respecting and expressing appreciation for others; b) being able to work and communicate well with others and listen to others' ideas; c) demonstrating context-appropriate behavior that is consistent with social norms; and d) using a range of skills or processes aimed at resolving conflict" (Lippman et al.,

2014). Feeling competent in social situations is also considered an important aspect of emotional intelligence (Kinman & Grant, 2011).

1.3.3. Altruism

Unselfish concern for the welfare of others is called Altruism. Altruistic behavior occurs when a person does something in order to benefit another person without expecting anything in return. Implications of practicing altruism towards building collective well-being of the society is very significant. Studies on adolescent altruism confirms tremendous impact of altruism on well-being of adolescents (Buragohain & Senapati, 2016). There is a need for research strategies examining altruism in natural settings (Savin-Williams, 1987).

1.3.4. Positive Relationships

The relationships that adolescents have with their peers, family, and members of their social sphere play a vital role in their development. Adolescence is a crucial period in social development, as adolescents can be easily swayed by their close relationships. Research shows there are four main types of relationships that influence an adolescent: parents, peer, community, and society. Positive relationships with parents and friends are necessary for mental and emotional strength. Some adolescents adopt the values and roles that their parents provide them; other teens develop identities that are in opposition to their parents but align with a peer group. Peer groups offer their members the opportunity to develop social skills, however, they can also be the source of negative influences, such as peer pressure. Adolescence is often a time of increased conflict between parents and their children. The quality of the parent–child relationship affects the adolescent's self-concept, which, in turn, affects the adolescent's integration into the world of peers (Deković & Meeus, 1997). Warm

and healthy parent-child relationships have been associated with positive outcomes, such as, better grades and fewer school-behavior problems.

1.4. INTEGRATED APPROACH TO HEALTH AND FITNESS

Health promotion strategies should necessarily involve the dynamic interaction of physical, psychological, and social domains, while at the same time understanding the role of culture that informs all three (Hatala, 2012). However, there are gaps to research providing evidence for integrated approaches to adolescent health.

George Engel, an American psychiatrist, introduced the bio-psycho-social (BPS) model of overall health, which provides an account of an interconnected biological, psychological, and sociological spectra, each as systems of the healthy body (Engel, 1977). The model provides an integrated approach to improve health (Engel, 1977; Suls & Rothman, 2004). For effective clinical implications, health and fitness interventions and research programs need to focus on “holistic” interaction between these domains rather than addressing them as separate aspects of the individual (Hatala, 2012).

Studies have shown that multidisciplinary interventions are essential to tackle the mental health issues of adolescents since they need a congenial atmosphere to develop better mental and physical health abilities (Davidson et al., 2015; Jackson et al., 2006). Gaining social and emotional skills during adolescence helps in the development of pleasant characteristics involving lifestyle, attitude and management of unpleasant characteristics like anxiety, violence, bullying, conflict, anger, and so on (Patton et al., 2016; Sancassiani et al., 2015).

The main function of the sympathetic nervous system is to activate the physiological changes, which occur during the fight-or-flight response. The main function of the parasympathetic nervous system is to activate the rest-and-digest response and return the body to homeostasis after the fight or flight response. Physical fitness appears to buffer against stress-related disease owing to its blunting/optimizing effects on hormonal stress responsive systems, such as the hypothalamic–pituitary–adrenal axis and the sympathetic nervous system. Such blunting appears to contribute to reduced emotional, physiological, and metabolic reactivity, as well as increased positive mood and well-being (Deuster & Silverman, 2014). Yogic science has an immense effect on balancing sympathetic and parasympathetic arousal. In particular, Patanjali Yoga or Ashtanga Yoga is the science of achieving mental mastery (Swami Satyananda Saraswati, 1976).

1.5. INTEGRATED APPROACH OF YOGA FOR OVERALL HEALTH

Yoga is a psychophysical, spiritual science that aims at total body and mind development; which influence personality, cognitive processes, psychophysiology, and human health and wellbeing (Cavallera, Gatto, & Boari, 2014). Yoga is one of the six systems of Indian philosophy and has been used through the ages to study, explain, and experience the complexities of the mind and human existence. Yoga techniques can be an efficient tool to maintain overall health and fitness.

Since ancient times, we understand the importance of sound mind that invariably necessitates a healthy body. Almost 2,500 years ago, the sage Patanjali explained the process of raising levels of awareness, gaining deeper wisdom, exploring the potential of the mind and, eventually going beyond the mind (Swami Satyananda Saraswati, 1976). Yoga sutra by Sage

Patanjali is an authoritative text to gain mastery over the mind. All the eight limbs (1) *Yama* (social discipline): a) *Ahimsa* (non-violence), b) *Satya* (truthfulness), c) *Asteya* (non-stealing), d) *Brahmacharya* (self-restraint) and e) *Aparigraha* (non-covetousness), (2) *Niyama* (individual adherences): a) *Shoucha* (cleanliness), b) *Santosha* (contentment), c) *Tapas* (penance), d) *Swadhyaya* (self-awareness), and e) *Iswara Pranidana* (Surrender to Supreme), (3) *Asana* (postures), (4) *Pranayama* (breathing exercises), (5) *Pratyahara* (regulation of senses), (6) *Dharana* (focusing), (7) *Dhyana* (meditation) and (8) *Samadhi* focuses on restraining the modifications of mind and channelizing thought processes.

Asana and pranayama practices make our body flexible and purify the subtle energy channels of our body (Swami Satyananda Saraswati, 1976). The yoga way of life encompasses the philosophy of Jnana yoga (knowledge of self), Bhakti yoga (trust in the supreme order), Raja yoga (a prescribed set of eight steps also known as Ashtanga yoga) and Karma yoga (path of detached action). The Yoga discipline concerns purification of the body, mind and soul, preparing them for the life mission. As human life depends on the nature of citta (mind-stuff), it is always within our reach to transform our nature by controlling citta (Predrag K. Nikić, 2010).

Yoga psychology conceives of the self in terms of different levels of being. The inner-most core (atman) is covered by five layers. These layers correspond to a step-wise ladder, leading inward to the atman. The basic tenet of yoga is a concept derived from Taittiriya Upanishad (Raina, 2016), an Indian Vedanta doctrine, and proposes that the inner-most core of an individual (atman or soul) is comprised of five layers of existence (Pancha Koshas). These layers correspond to progressive layers of subtler awareness, starting with the physical body,

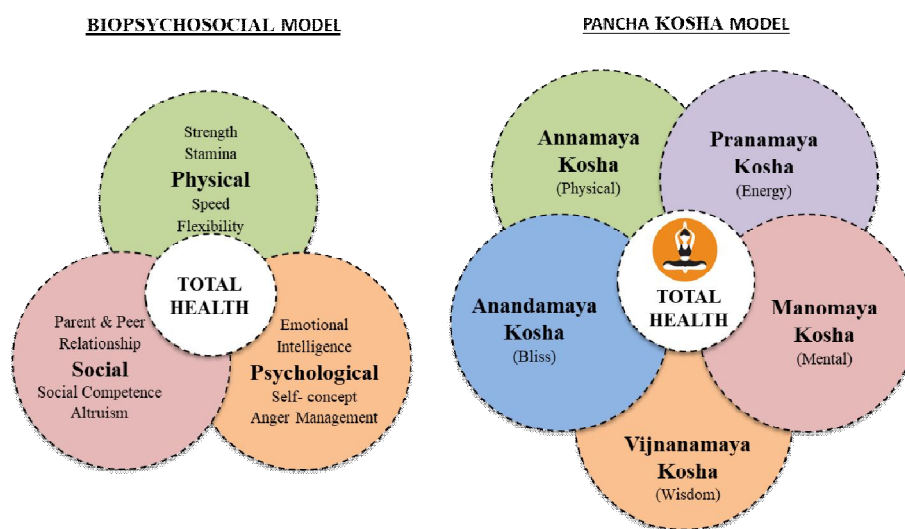
energetic body, psycho-emotional body, wisdom body, and bliss body (Joseph Le Page, 2002). Regular eating habits, right kind of food, postures and games facilitate the development of the physical body (Physical Sheath - Annamaya Kosha). Controlled breathing exercises (pranayama) and cleansing practices improve the quality of the energetic body (Vital Energy Sheath - Pranamaya Kosha). Study of literature, meditation, chanting, and devotional session for emotional culture and calming the mind for the development of the psycho-emotional body (Mental Sheath - Manomaya Kosha). All the activities that challenge one's intellect develop the wisdom body (Intellectual Sheath - Vijnanamaya Kosha) include debates, problem-solving, lectures and yogic counseling. All these activities help to go beyond oneself and give an opportunity to identify with the fact that the natural state of oneself is to exist in Bliss (Blissful Sheath - Anandamaya Kosha), which is a state of silence and wakeful awareness, undeterred by stress and fears (Jagannathan, Nagarathna, Ramakrishna, & Villacres, 2014). The evolution from one sheath to the next entails prescribed yogic techniques leading to improved calm and thereby, wellness (Joseph Le Page, 2002).

The Pancha Kosha model bears many similarities to the BPS model as used in present-day health psychology. Both these conceptual frameworks understand the interdependence of physical, emotional, psychological, social, and spiritual aspects, and its role in optimizing health (Georg Feuerstein, 1998). The biopsychosocial approach to yoga revisits the very old Kosha model in the Vedanta (the philosophical basis for yoga) while incorporating the insights of modern psychosomatic research. Also the BPS approach to understanding health is complemented by the rich ancient traditional concepts provided by various scriptural texts of yoga (Cynthia Cooper, 2013; Matthew J. Taylor, Ranay, & Cooper Cynthia, 2014). The old becomes the new and the new enhances the old practices for the next generation of yoga.

This present PhD study hence focuses on examining the fitness issues of adolescents at physical, psychological and social level with respect to yoga as intervention, based on the Pancha Kosha model. The purpose of this study is to describe a conceptual model of health promotion and prescribe a holistic intervention that adopts the biopsychosocial framework by acknowledging the inputs of physical, psychological and social parameters on adolescents' wellbeing.

It is hoped that this model with the proposed intervention will serve as a bridge between theory and practice and will enhance health among adolescents.

FIGURE 1. Biopsychosocial model of psychology and Pancha Kosha model of Yoga



1.6. YOGA IN RESIDENTIAL SETTING

Yoga in “residential setting” is a camp at which participants stay apart from their parents or legal guardians for a given duration. The intention is to provide a Gurukula environment. It's an opportunity for adolescents to learn life skills in a safe, holistic environment beyond the classroom. A residential setting provides a wealth of ways to help children grow and expand their horizons. The experience and intervention, with 24/7 access to teachers, is intense and builds meaningful values. A few benefits of children attending a residential yoga camp during the summer break are to learn self-responsibility and independent living; create a disciplined routine to get up, go to bed and attend scheduled events on time under trained supervision; have healthy satvic meals; learn to breathe calmly in every situation; to respond and not to react; to embrace the experience as their own; to show empathy toward others; to extend kindness; form bonds with children from other parts of the country; to understand giving and sharing; to develop a greater sense of responsibility, and so become and stay fit physically, psychologically, and socially. These are the qualities that will help children develop a strong personality and become responsible citizens of the future, building a better civil society and a successful nation.

CHAPTER 2
LITERARY REVIEW



2.0. LITERARY REVIEW

2.1. BACKGROUND

According to Sri Aurobindo, the education of the intellect divorced from the perfection of the moral and emotional nature, is injurious to human progress. Man's moral nature is composed of three things — emotions, *saṅskāra* (characteristics) and *svabhāva* (personality). These have to be transformed if man has to become moral. Moral education and emphasis on *yama-niyama* is very important for us to have success in life. So physical, psychological, social, and spiritual fitness is essential for overall health and fitness.

Indian scriptures are the store house of various knowledge and guidelines. In the spiritual lore, the concept of human existence is explained comprehensively by considering the multi-dimensional aspects of life that is physically, energetically, emotionally, intelligently, and blissfully. The Hindu scriptures provide the early documented history and origin of arts and sciences forms in India. They provide the good directions in all aspects of life. In this study, we have made an attempt to understand the concept of biopsychosocial health and fitness from the scriptural perspective referring various traditional scriptures and texts and this survey of traditional text become critical and considering essential for the deeper understanding of integrated Yoga program for adolescents. Indian Classical Scriptures provide enormous resources for developing concepts and module to manage biopsychosocial health and fitness.

2.2. SCOPE

The main goal during adolescence is to build a disciplined and values-based culture, development of his personality while seeking the knowledge. It is during this period, moral education should be imparted as a foundation for a sound social conduct and overall health and wellbeing of an individual. Yoga is very closely associated with Indian traditional philosophy. Yoga talks about overall health and fitness and focused on understanding the concept which is identified with physical, psychological, social, and spiritual health. World Health Organization (WHO) also talks about the physical, psychological, social, and spiritual health. Different scriptures discuss different aspects of health and fitness and their techniques. There is need to identify holistic techniques, strategies and practices to promote overall fitness and well-being and providing relevance for such techniques from scriptures would greatly help to present the integrated yoga program for adolescents in present scenario for the scientific community.

2.3. SUMMARY OF EARLIER WORKS ON FITNESS OF ADOLESCENTS

There are only a few papers on Indian scripture and psychological fitness and some of which talk of EI with concept of theory of ‘Karma’ in Bhagwat Gita. BG is not only identifying the nature of emotions but also is showing a way to come out of the state of emotional instability. It is in the form of a dialogue between the emotionally disturbed (Arjuna) and the universal master (Krishna) and provides answer to many a modern day man’s dilemma or confusion (Gayathri & Meenakshi, 2012). According to Indian scriptures, certain qualities of behavior, attitudes and values (courage, righteous living, ability to control own behavior etc.) promote health. “Righteousness” promotes maximum benefit to life in long run. What is righteous in any given situation depends on time, place, persons involved, and context (circumstances).

But, this wisdom of righteousness can be acquired by spiritual practice (Shamasundar, 2008). Curiosity for the methods of mental happiness, prayers for mental happiness, methods of increasing intelligence and power of mind in healing is detailed in the Rig Veda (Avasthi, Kate, & Grover, 2013).

2.4. AIM AND OBJECTIVES

2.4.1. Aim

To understand the concept of health and fitness from various classical texts that could be adopted in Yogic Science.

2.4.2. Objectives

- 1) IS to search and extract the concept of biopsychosocial fitness from the various texts.
- 2) And to extract the base for the holistic yoga program.

2.5. MATERIALS AND METHODS

In consultation with Vedic Scholars, it was understood that the concept of overall health and personality is widely embedded in the Indian texts. Accordingly, an attempt is made to understand the concept of biopsychosocial and spiritual fitness from the following scriptures.

- 1) Taaittiriya Upanishad (TU)
- 2) Manusmriti
- 3) Patanjali Yoga Sutras (PYS)
- 4) Bhagavad-Gita (BG)

These Vedic scriptures follow distinct type of literary composition. Words are well derived based on the *dātu pada* (root word), *prathyaya*, *vibhakti*, *chandas* and other grammatical characteristics. These scriptures are better understood by deriving the contextual meaning which is in harmony with the main purport of the text. An endeavor is made to compile all concepts of Biopsychosocial fitness.

Concept of physical, psychological, social and spiritual fitness is embedded in the form of duties, rights, laws, conduct, virtues and values. And while working on these practices we improve the different domains of fitness. Practicing *yama* and *niyama*, respect others, following code of conduct from the early age will make life disciplined, physically and mentally fit and give physical, mental, social and spiritual strength and stability. Concept of emotional Intelligence in Indian context is embedded in its highly valued morals and virtue practices. Social skills like respecting elders, helping others, concern for wellbeing of others constitute silent features of EI. Morality of caring and sharing determine emotional responsivity. *Ahimsa*, kindness, *kshama* etc. are emotional expressions. The Indian view of emotional Intelligence is context sensitive and focuses on the significant role of guru, parents, family and society.

The following section provides an overall concept, components, techniques and anecdotes from Indian scriptures.

2.5.1. Vedic Sources and Classical Yogic Texts

2.5.1.1. Taittiriya Upanishad

The Taittiriya Upanishad occupies a unique place in Indian Philosophy because it explains the Reality both in direct as well as indirect terms. The Taittiriya Upanishad which is a part of the Krishna Yajur Veda, comprises of three chapters: Siksha valli, Brahmananda Valli and Brugu Valli.

Second and third chapter Brahmananda Valli and Brugu Valli talk about the *Pancha Kosha concept*, the human existence and a step-by-step process of contemplation on Brahman leading ultimately to *moksha* through Pancha Koshas and their attributes. The five sheaths explained in detail are 1) Annamaya Kosha - the physical sheath, 2) Pranamaya Kosha – the vital energy sheath, 3) Manomaya Kosha – the mental sheath, 4) Vijnanamaya Kosha - the Intellectual sheath and 5) Anandamaya Kosha - the blissful sheath. Annamaya Kosha is also called ‘*Sthoola Shareera*’ (gross body). The Pranamaya, Manomaya and the Vijnanamaya Kosha together form the ‘*Sukshma Shareera*’ (Subtle Body) and Anandamaya Kosha is called ‘*Karana Shareera*’ (causal body) (Sethumadhavan, 2011; Swami, 1921).

AÚaÖÈàj a> àj ayNtè ya> kaí pñvli-ii ta>, AwæAÚnV j lviNt, Awñdip yNTyNtt>,

AÚ<ih Éltana<Jyóm!, tSmaTsva& xmCyte svjvteÚmaBvint, yeÚ<äÜapaste

AÚ<ih Éltana Jyóm!, tSmaTsva& xmCyte AÚaÑftain j ayNtè j ataNyÚn vxNtè

A*tè-iÄ c Éltain, tSmadÚ<tÉCyt #it, tSmaÖa @tSmadÚrsmyat!,

ANyæ=Ntr AaTma àa[my>, tñf pl[&, s va @; pè; ivx @v, tSy pè; ivxtam!,

ANvy<pé; ivx>, tSy àa[@v izr>, Vyanaedi] [> p] >, Apan %Är> p] > ,

Aakaz AaTma, pñvvl pñD<aitóa, tdPye ðakaÉvit. 2-2-1.

annādvai prajāu prajāyante| yāu kāçca pāthivēà çritāu| atho annenaiva jēvanti|
athainadapi yantyantatau| annaà hi bhütānāà jyeñōham|
tasmāsarvauñadhamucyate| sarvaà vaé te'nnamāpnuvanti| ye'nnaà brahmopāsate|
annaà hi bhütānāà jyeñōham| tasmāsarvauñadhamucyate| annādbhütāni jāyante|
jätānyannena vardhante|

adyate'tti ca bhütāni| tasmādannaà taducyata iti|

tasmādvā etasmādannarasamayāt| anyo'ntara ātmā präeamayaū| tenaiña pūrēau|
sa vā eña puruñavidha eva| tasya puruñavidhatām| anvayaà puruñavidhaū|
tasya präēa eva çiraū| vyāno dakñiēau pakñau| apāna uttaraū pakñau|
ākāça ātmā| pāthivé pucchaà pratiñōhā| tadapyēña çlokobhavati ||2-2-1||

Meaning: *All beings, whatever exist on earth, are born of food. And again, by food they are sustained and unto it again they go back at the end. So, verily food is the eldest of all creatures; and therefore it is called the medicament of all. Those who regard food as Brahman verily attain all food. Food is indeed the eldest of all the creatures. Therefore it is called the medicament of all. From food all beings are born: having born, by food they grow. It is called food because it is fed upon, or it feeds upon, creatures.*

And so apart from this, constituted of the essence of food, there is another separate self, made of Prana. By that this is filled. It is of the form of man. Its human form is according to the human form of the former. Prana, is its head; vyana is its right wing; apana is the left wing; sky is the body; the earth is the tail, the seat. About it also there is the following verse.

(Brhamananda Valli, Anuvaka 2; Thaittiriya Upanishad)

àa[<deva Anuàa[iNt, mnuya> pzví ye àa[æih Éltanamaya, tSmataTsvalyu mÛyte
 svñw t Ayyñt, yeàa[<äÜapaste àa[æih Éltanamaya, tSmataTsvalyu mÛyt #it,
 tSyé @v zrlr AaTma, y> pñSy, tSmaÖa @tSmaTaa[myat!,
 ANya=Ntr AaTma mnaeny>, tñé pl[R, s va @; pré; ivx @v, tSy pré; ivxtam!,
 ANvy<pré; ivx>, tSy yj ñw izr>, \Gdi] [> p]>, samaÄr> p]>, Aadz AaTma,
 Awvañrs> pÛD<aitóa, tdPye ÕakæÉvit, . 2-3-1.

präeaà deva anu präeanti| manuñyäu paçavaçca ye| präeo hi bhütänämäyuù|
 tasmätätsarvāyūñamucyate| sarvameva ta ayuryanti| ye präeaà brahmopāsate|
 präeo hi bhütänämäyuù| tasmätätsarvāyūñamucyata iti| tasyaiña eva çarera ätmä|
 yaù pürvasya| tasmädvä etasmätpräeamayät|
 anyo'ntara ätmä manomayaù| tenaiña pürëaù| sa vä eña puruñavidha eva|
 tasya puruñavidhatäm| anvayaà puruñavidhaù| tasya yajureva çiraù|
 ägdakñiëaù pakñäù| sämottaraù pakñäù| ädeça ätmä|
 atharvài girasaù pucchaà pratiñöhä| tadapyeña çloko bhavati| ||2-3-1||

Meaning: *Through Prana the gods live, and so also do men and beasts. Prana is verily the life of beings and hence it is called the Universal life. Those who worship Prana as Brahman assuredly attain the full span of life. Verily Prana is the life of beings and so it is called the Universal life. It is the embodied self of what has been described before. And so apart from the Pranamaya there is another separate self, consisting of the mind. This is filled by that. This is also of the form of man. . Its human form is according to that of the former. Yajus is its head; Rik is its right wing; Sama is the left wing; Scriptural injunction is the body; Atharva hymns is the tail, the seat. There is the following verse about it.*

(Brhmananda Valli, Anuvaka 3; Thaittiriya Upanishad)

ytaevacaeinvtn̄tē AāaPy mnsa sh, AanNd<äü [aeivÖan!, n ibÉit
 kdacn̄it, tSyē @v zrlr AaTma, y> p̄v̄Sy, tSmaÖa @tSmaNmnaemyat!,
 ANya=Ntr AaTma iv}anmy>, tn̄ē p̄[̄k, s va @; p̄ē; ivx @v,
 tSy p̄ē; ivxtam!, ANvy<p̄ē; ivx>, tSyi Īv izr>, \t<di] [> p]>,
 sTymÄr> p]>, yag AaTma, mh> p̄ÖD<aitóa, tdPyē ŌakaeÉvit, . 2-4-1.
 yato väco nivartante| aprāpya manasā saha| ānandaā brahmaēo vidvān|
 na bibheti kadācaneti| tasyaiña eva çaréra ātmā| yaù pūrvasya|
 tasmādvā etasmānmanomayāt| anyo'ntara ātmā vijī ānamayaù| tenaiña pūrēau|
 sa vä eña puruñavidha eva| tasya puruñavidhatām| anvayaā puruñavidhaù|
 tasyaçraddhaiva çiraù| ātaā dakñiēau pakñau| satyamuttaraù pakñau|
 yoga ātmā| mahaù pucchaā pratiñöhā| tadapyeña çloko bhavati ||2-4-1||

Meaning: Whence all speech turn with the mind without reaching; he who knows the bliss of Brahman fears not at any time. Of that, of the former, this one, verily, is the embodied self. Than that and different from this, which is formed of Manas, is the other, the inner self, formed of Vijnana. By that this is filled. It also has the shape of man. According to the human shape of that, is the human form of this. Faith is it head; Right is its right wing; truth is its left wing; yoga is the self and Mahat is the tail, the seat. On this there is also the following verse.

(Brhamananda Valli, Anuvaka 4; Thaittiriya Upanishad)

iv}an<y}<tn̄tē kmañn̄ tn̄tē=ip c, iv}an<dva> sv̄ē äü Jyōmpaste
 iv}an<äü cōel, tSma½Ü àma*it, zrlrepaPmnaeihTva, svañkamaNsmî t̄ #it,
 tSyē @v zrlr AaTma, y> p̄v̄Sy, tSmaÖa @tSmaiÖ}anmyat!,
 ANya=Ntr AaTmanNdmy>, tn̄ē p̄[̄k, s va @; p̄ē; ivx @v, tSy p̄ē; ivxtam!,

ANvy<pré; ivx>, tSy iàymw izr>, maedaedi] [> p]>, àmael %Är> p]> ,

Aanld Aāma, äü pCD<aitóa, tdPye ðakæÉvit, . 2-5-1.

viji ānaà yaji aà tanute| karmāni tanute'pi ca| viji ānaà devāu sarve|
 brahma jyeñōhamupāsate| viji ānaà brahma cedveda| tasmācenna pramādyati|
 çarēre pāpmano hitvā| sarvānkāmānsamaçnuta iti| tasyaiña eva çarēra ātmā|
 yaù pūrvasya| tasmādvā etasmādviji ānamayāt|
 anyo'ntara ātmānandamayaù| tenaiña pūrēaù| sa vā eña puruñavidha eva|
 tasya puruñavidhatām| anvayaà puruñavidhaù| tasya priyameva çiraù|
 modo dakñiēaù pakñāù| pramoda uttaraù pakñāù| ānanda ātmā|
 brahma pucchaà pratiñōhā| tadapyeña çloko bhavati| ||2-5-1||

Meaning: *Intelligence performs the sacrifice; it also accomplishes the sacred acts. All Devas worship intelligence as Brahman, the eldest. “If a man knows the intelligence as Brahman and if he does not swerve from it, he attains all his desires, having left behind all sins of the body. This is the embodied soul of the former. Verily, different from this, which consists of the essence of the intellect, but within it, is another self, which consists of bliss. By this the former is filled. This too has the shape of a man. According to the human shape of the former is the human shape of the latter. Love is its head, joy is its right wing, delight is its left, and bliss is its trunk. Brahman is its tail, the support. About that there is also the following verse.*

(Brhamananda Valli, Anuvaka 5; Thaittiriya Upanishad)

The concept of Pancha Kosha in Taittiriya Upanishad enumerates the concept of health and fitness at physical, energy, mental, intellectual and bliss level. This formed the basis of classifying fitness into three categories i.e. Physical, Psychological and Social domains. While working on these layers of existence, fitness at these domains can be improved.

- 1) Annamaya Kosha (The Physical Sheath): physical strength, agility, stamina, body awareness
- 2) Pranamaya Kosha (The Vital Energy Sheath): Breath Rate, perseverance, discipline, Self-regulation
- 3) Manomaya Kosha (The Mental Sheath): Emotions and feelings, a deep relationship between mind, intellect and body, Empathy. The Mind and the five sense organs of perception together form the mental sheath. The mind is the seat of emotions.
- 4) Vijnanmaya Kosha (The Intellectual Sheath): Intellect, Will power, guiding factor in man's actions, motivation. The five senses are common to both the mental and intellectual sheaths, as perception involves both the mind and the intellect.
- 5) Anandamaya Kosha (The Blissful sheath): Joy and bliss, eternal peace, Altruism, love and harmony between the inner self and the outer world. Spiritual growth results in a feeling of bliss (Ananda) which can be invoked at will and will not fade.

TABLE 1. Details of koshas

Kosha	Functional division	Five parts	Region	Structure	Features	Dominant medium	Identification with Kosha	Results of worship
Annamaya (Physical)	Anatomical	head, right hand, left hand, trunk, seat	All body parts	Food, matter	Creation of person Body sustenance	Sthoola shareera (gross body)	I am tall, fair, healthy, and so on.	Material prosperity, wealth, attain all food
Pranamaya is the soul embodied in the Annamaya								
Pranamaya (Vital energy)	Physiological	Prana, Vyana, Apana, sky, earth	Five Pranas	Vayu, Ayu	Life sustenance	Sookshma shareera (Subtle body)	I am hungry, thirsty, energetic, fatigue, and so on	Full life span, control over death
Manomaya is the self-having the Pranamaya for his body								
Manomaya (Mental)	Psychological	Yajus, Rik, Sama, scriptural learning, Atharva hymns	Mind (manas) + five Jnanendriya	Vrittis Likes – dislikes, love - hate	Memory, emotions, Passion, feelings	Sookshma shareera (Subtle body)	I am happy, sad, and so on	Fear ceases, attain all object desires
Vijnanmaya is the next inner-self embodied in Manomaya								
Vijnanmaya (Wisdom)	Cognitive	Faith, Right, truth, yoga, Mahat	Intellect (Buddhi) + five Jnanendriya	Values – vices	Analysis and discriminating, responsibility of actions	Sookshma shareera (Subtle body)	I am doer, I am finite Right – wrong, good-bad etc.	Free from commissions of the sins
Anandamaya is embodied self of the Vijnanmaya								
Anandamaya (bliss)	Consciousness	love, joy, delight, bliss, Brahman	Whole creation	Ignorance, bliss	Impressions and latent energy	Karana shareera (Causal body)	Attain Jnana	Union of all Koshas

First chapter of Taittiriya Upanishad called Siksha valli gives the essence of the karma kanda of the Veda in terms of disciplines, rituals, meditations, values, code of conduct for daily life. It mainly talks about the address by the teacher to the students returning home after the completion of their studies called “convocation address”. The guru imparts to them clear instructions to the aspirants on character building, rules of right conduct or right living. Eleventh anuvaka of Shiksha Valli is a list of golden rules which the Vedic era teacher imparted to the graduating students as the ethical way of life. The verses ask the graduate to take care of themselves and pursue Dharma, Artha and Kama to the best of their abilities (Sethumadhavan, 2011).

vedmñcya=cañya=ntvāisnmñzaiSt, sTym! vd, xmkñ! cr, SvaXyayaNma àmd>, Aacayañ<i>à<xnmayTy àaj tñtñma VyvCDñs>, sTyāÚ àmidtvym!, xmaÚ àmidtvym!, kzi aÚ àmidtvym!, ÉTykn àmidtvym!, SvaXyayàvcna_ya<n àmidtvym!. 1-11-1.
vedamanücyä"rcäyo'ntevāsinamanuçāsti | satyam vada | dharmam cara | svādhyāyānmā pramadaù | ācāryāyāà priyāà dhanamāhratya prājatantuà mā vyavacchetsēu| satyānna pramaditavyam| dharmānna pramaditavyam| kuçalānna pramaditavyam| bhūtyaiāià na pramaditavyam| svādhyāyapravacanābhyāà na pramaditavyam ||1-11-1||

Meaning: *Having taught the Vedas, the teacher thus instructs the pupil: Speak the truth. Practice dharma. Do not neglect the study of the Vedas. Having brought to the teacher the gift desired by him, enter the householder's life and see that the line of progeny is not cut off. Do not swerve from the truth. Do not swerve from dharma. Do not neglect personal welfare. Do not neglect prosperity. Do not neglect the study and teaching of the Vedas.*

(Shiksha Valli, Anuvaka 11; Thaittiriya Upanishad)

deviptkayaṅyaṅn āmidtvym!, matḍvæÉv, iptḍvæÉv,

AacayḍvæÉv, AitiwḍvæÉv, yāNynv*ain kmaḍ[, tain sēvtVyain,

nae#traī[, yāNySmak<scirtain, tain TvypaSyain, nae#traī[, . 1-11-2.

devapitākāryābhyaā na pramaditavyam| mātādevo bhava| pitādevo bhava|
ācāryadevo bhava| atithidevo bhava| yānyanavadyāni karmāēi| tāni sevīavyāni|
no itarāēi| yānyasmākaā sucaritāni| tāni tvayopāsyāni| no itarāēi| ||1-11-2||

Meaning: Do not neglect your duties to the gods and the Manes. Treat your mother as God. Treat your father as God. Treat your teacher as God. Treat your guest as God. Whatever deeds are faultless, these are to be performed-not others. Whatever good works have been performed by us, those should be performed by you-not others.

(Shiksha Valli, Anuvaka 11; Thaittiriya Upanishad)

ye ke ca Smāyasaēāū[>, te &Tvya==snt āñistvym!,

ī ī ya dym, Ai ī ya dym, ii ya dym!, iyya dym!, iÉya dym!,

sīvda dym!, Aw yid tekḍvicikTsa va, vāivicikTsa va Syat!. 1-11-3.

ye ke cāsmacchreyaā so brāhmaēāū| teñāā tvayā"sanena praçvasitavyam|
çraddhayā deyama| açraddhayā deyama| çriyā deyam| hriyā deyam| bhiyā deyam|
saā vidā deyam| atha yadi te karmavicikitsā vā| vāttavicikitsā vā syāt ||1-11-3||

Meaning: Those brahmins who are superior to us-you should comfort them by giving them seats. Whatever is to be given should be given with faith, it should never be given not without faith, it should be given in plenty, with modesty, with fear, with compassion.

(Shiksha Valli, Anuvaka 11; Thaittiriya Upanishad)

ye tÇ ääün> smizh>, yú a Ayu' a>, AI U a xmkama> Syu,
ywa te tÇ vtñn!, twa tÇ vtñva>, Awa_yaOyate u ye tÇ ääüna> sMmizh>,
yú a Ayu' a>, AI U a xmkama> Syu, ywa te tÇ vtñn!, twa tÇ vtñva>,
@; Aadz>, @; %pdz>, @; a vedapin; t!, @tdnzasnm!, @vmpaistVym!,
@vmucñtÉpaSym!. 1-11-4.

ye tatra brähmanaù sammarçinaù| yuktä ayuktäù| alükñä dharmakämäù syuù|
yathä te tatra varteran| tathä tatra vartethäù| athäbhyäkhyäteñu|
ye tatra brähmanäù sammarçinaù| yuktä äyuktäù| alükñä dharmakämäù syuù|
yathä te tatra varteran| tathä tatra vartethäù| eña ädeçaù| eña upadeçaù|
eña vedopaniñat| etadanuçäsanam| evamupäsitavyam|
evamu caitadupäsyam ||1-11-4||

Meaning: Now, if there arises in your mind any doubt concerning any act, or any doubt concerning conduct, you should conduct yourself in such matters as Brahmins would conduct themselves-brahmins who are competent to judge, who of their own accord are devoted to good deed and are not urged to their performance by others and who are not too severe, but are lovers of dharma. Now, with regards to persons spoken against, you should conduct yourself in such a way as brahmins would conduct themselves-brahmins who are competent to judge, who of their own accord are devoted to good deeds and are not urged to their performance by others and who are not too severe, but are lovers of dharma. This is the rule. This is the teaching. This is the secret wisdom of the Vedas. This is the command of God. This you should observe. This alone should be observed.

(Shiksha Valli, Anuvaka 11; Thaittiriya Upanishad)

2.5.1.2. Manusmriti

Manusmriti is also called the *Mānava-Dharmaśāstra* or Laws of Manu. It presents itself as a discourse given by Manu (Svayambhuva) and Bhrigu on dharma topics such as duties, rights, laws, conduct, virtues and others. The modern version of the text has been subdivided into twelve Adhyayas (chapters), but the original text had no such division. The text covers different topics, and is unique among ancient Indian texts in using “transitional verses” to mark the end of one subject and the start of the next. The text can be broadly divided into four, each of different length and each further divided into subsections: Creation of the world, source of dharma, the dharma of the four social classes and law of karma, rebirth and final liberation. The text is composed in metric Shlokas (verses), in the form of a dialogue between an exalted teacher and disciples who are eager to learn about the various aspects of dharma. The first 58 verses are attributed by the text to Manu, while the remaining more than two thousand verses are attributed to his student Bhrigu (Patrick Olivelle, 2005).

Attributes of a dharmic person come under biopsychosocial domain of fitness

॥ मा द्मा-स्त्य-अ-मि-न-यि-न-च, ॥ ६-९२ ॥

Meaning: Contentment, forgiveness, self-control, abstention from unrighteous, appropriating anything, (obedience to the rules of) purification, coercion of the organs, wisdom, knowledge (of the supreme Soul), truthfulness, and abstention from anger, (form) the tenfold law.

(Manusmriti 6.92)

Manusmriti is an indigenous source of information about Indian mental concepts of children. Manusmriti explained 16 “saṅskāras,” that is proper rituals, should be done for humans beings. The “saṅskāras” not only instill good qualities in a child but also remove bad habits. The term ‘brahmacarya’ in the traditional Indian scriptures (Manusmriti 2.173-249) covering the adolescence span of life. The concept of brahmacharya has been also defined in the “Chhandogya Upanishad”. The disciple of the brahmacharya ashrama is supposed to lead a life of utmost restraint, self-regulation and celibacy.

2.5.1.3. Patanjali Yoga Sutra

The preparatory stages along the path to yoga – yama and niyama – for the basis for the actual practice of yoga. The practice of aṣṭāṅga-yoga are āsana, prāṇāyāma, pratyāhāra and dhāraṇā, i.e. from the physical to the ethereal, as follows: āsana: harmony with the physical body; prāṇāyāma: harmony with the energetic body; pratyāhāra: emotional harmony. The three stages of meditation (samyaṅ) are dhāraṇā, dhyāna and samādhi, or concentration, contemplation and absolute knowledge, are the connecting link to the inner stages of aṣṭāṅga-yoga. The following yoga sutras describe the various stages and practice stages of ashtanga yoga.

yaminymasna[ayam àTyaharxar [XyanSmax ya=òv¼ain. 2-29.
 yamaniyamāsanaprāyāma pratyāhāradhāraēadhyānasamādha
 yo'ñōavaì gāni || 2-29||

Meaning: *The limbs of the eight-fold path are as follows: respect for others (yama) and yourself (niyama); harmony with your body (asana), your energy (pranayama), your thoughts (dharana), and your emotions (pratyahara); contemplation (dhyana); ecstasy (samadhi).*

(2.29, Patanjali Yoga Sutra)

AihsasTyā=Sty äücyāpīrḥa ymā. 2-30.

ahià säsatyā'steya brahmacaryāparigrahā yamāu ||2-30||

Meaning: *Respect for others is based on non-violence; truthfulness; not stealing; non-covetousness; and acting with an awareness of higher ideals.*

(2.30, Patanjali Yoga Sutra)

zācstāe tp>SvaXyayñr ài[xanain inymā. 2-32.

çaucasantoñatapaùsvādhyāyeçvara praëidhānāni niyamāu ||2-32||

Meaning: *Cleanliness, contentment, self-discipline, learning from yourself and accepting your fate automatically translate into the practice of respect.*

(2.32, Patanjali Yoga Sutra)

Although the physical practice of the *āsana-vinyāsa* system forms the basis for *aṣṭāṅga yoga*, this system should not be confused with *āsana*, for the practice of *āsana-vinyāsa* begins with the physical sphere and evolves organically to the mental sphere via energy and the emotions in such a way that a new person emerges. The consequent changes are not confined to the exercises you do on a yoga mat, for they alter the shape of your entire life.

2.5.1.4. Bhagavad Gīta

Bhagavad Gīta is the essence of Vedas. It provides a comprehensive and easy-to-understand summary of the Vedic philosophy. Bhagavad means “of God” and Gīta means “song.” Hence, the Bhagavad Gīta literally means “Song of God.” It is a dialogue that took place between the

Supreme Lord Shree Krishna and His devotee Arjun, on the verge of the Mahabharata war. The setting of Bhagavad Gita in the battlefield has been interpreted as an allegory for the ethical and moral struggles of life. The Bhagavad Gita is providing a philosophical understanding as well as clear-cut techniques for implementing its spiritual precepts for everyday life. These techniques of applying the science of spirituality in our lives are termed “Yoga.” Hence, the Bhagavad Gita is also called “Yoga Shastra,” meaning, the scripture that teaches the practice of Yoga. All eighteen chapters are designated to deal with methodologies for the application of spiritual knowledge to practical life.

Lord Krishna has talked about many values which a person should have to accomplish his life journey peacefully. These come under the fitness domains.

AmanTvmdimÉTvmihsa] INtraj Rm!, AacayaPasn<zaC<SwTyMaTmivinvCh>. 13-8.

#iNÔyaw# uvraGymnhkar @v c, j NmmTyj raVyaixÉ>odæzandzkm!. 13-9.

Asi ´rniÉ:vg> pÇdarghaid; u inTy<c smicÄTvimòainòappiÄ; u 13-10.

miy canNyayagn Éi ´rVyiÉcari[, iviv ´dzsivTvmritj hssid. 13-11.

AXyaTm} aninTyTv<tÁv} anawdzkm!, @tJ} animit àæ´m} an<ydtæ=Nyw. 13-12.

amānitvamadambhitvamahià sā kñantirārjavam |

ācāryopāsanaà çaucaà sthairyamātmavinigrahaù ||13-8||

indriyārtheñu vairāgyamanahaì kàra eva ca |

janmamātyujarāvyādhiduùkhadoçānudarçanam ||13-9||

asaktiranabhiñvaì gaù putradāragāhādiñu |

nityaà ca samacittatvamiññāniññoopapattiñu ||13-10||

mayi cānanyayogena bhaktiravyabhicāriëi |

viviktadeçasevitvamaratirjanasaà sadi ||13-11||

adhyātmajī ānānityatvaḥ tattvajī ānārthadarśanam |
 etajjī ānamiti proktamajī ānāḥ yadato'nyatha ||13-12||

Meaning: Humbleness; freedom from hypocrisy; non-violence; forgiveness; simplicity; service of the Guru; cleanliness of body and mind; steadfastness; and self-control; dispassion toward the objects of the senses; absence of egotism; keeping in mind the evils of birth, disease, old age, and death; non-attachment; absence of clinging to spouse, children, home, and so on; even-mindedness amidst desired and undesired events in life; constant and exclusive devotion toward me; an inclination for solitary places and an aversion for mundane society; constancy in spiritual knowledge; and philosophical pursuit of the Absolute Truth—all these I declare to be knowledge, and what is contrary to it, I call ignorance

(Bhagavad - Gita, Ch.13. Shlokas 8-12)

Shree Krishna describes the two kinds of nature amongst human beings—the saintly and the demoniac. The saintly nature develops by following the instructions of the scriptures, cultivating the mode of goodness, and purifying the mind through spiritual practices. It leads to the enhancement of daivī sampatti (godly qualities), eventually culminating in God-realization. In contrast, there is also the demoniac nature that develops from associating with the modes of passion and ignorance, and embracing materialistic views. Lord Krishna describes twenty-six virtues of a saintly nature. These should be cultivated as a part of our spiritual practice for elevating ourselves to the supreme goal.

ī lĒgvanwac

AĒy<sĀvsziī } ahyaḡlyviSwit>, dan<dmī y} ī SvaXyayStp Aaj Rm!. 16-1.

Aihsa sTym³axSTyag> ziNtrpĒzm!, dya Ēltevl ad pV<madR<iyrcapl m!. 16-2.

tj >] ma xlt> zaCmŌaḥnaitmainta, ĒviNt sMpd<dVImiĒj atSy Ēart. 16-3.

çrébhagavānuvāca

abhayaà sattvasaà çuddhirji ānayoavyavasthitiù |
 dānaà damaçca yaji açca svādhyāyastapa ārjavam ||16-1||
 ahià sā satyamakrodhastyāgaù çantirapaiçunam |
 dayā bhūteñvaloluptvaà mārdayaà hriracāpalam ||16-2||
 tejaù kñamā dhātiù çaucamadroho nātimānitā |
 bhavanti sampadaà daivémabhijātasya bhārata ||16-3||

Meaning: *The Supreme Divine Personality said: O scion of Bharat, these are the saintly virtues of those endowed with a divine nature—fearlessness, purity of mind, steadfastness in spiritual knowledge, charity, control of the senses, performance of sacrifice, study of the sacred books, austerity, and straightforwardness; non-violence, truthfulness, absence of anger, renunciation, peacefulness, restraint from fault-finding, compassion toward all living beings, absence of covetousness, gentleness, modesty, and lack of fickleness; vigor, forgiveness, fortitude, cleanliness, bearing enmity toward none, and absence of vanity.*

(Bhagavad - Gita, Ch.16. Shlokas 1-3)

Shree Krishna now expounds upon the six traits of those who possess demoniac natures. If even one of the demoniac qualities, such as arrogance, hypocrisy, and so on, remains in the personality, it can become the cause of failure.

dMÉædpæiÉmaní ³æx> paé:ymv c, A}an<caiÉj atSy pavRSpdmasrIm!. 16-4.

dVl sMpiÖmae] ay inbNxayasrIm mta, ma zic> sMpd<dVImiÉj atæis pa{fv. 16-5.

dambho darpo'bhimānaçca krodhaù pāruñyameva ca |
 aji ānaà cābhijātasya pārtha sampadamāsurém ||16-4||
 daivé sampadvimokñāya nibandhāyāsuré matā |
 mā çucaù sampadaà daivémabhijāto'si pāèòava ||16-5||

Meaning: *O Parth, the qualities of those who possess a demoniac nature are hypocrisy, arrogance, conceit, anger, harshness, and ignorance. The divine qualities lead to liberation, while the demoniac qualities are the cause for a continuing destiny of bondage. Grieve not, O Arjun, as you were born with saintly virtues.*

(Bhagavad - Gita, Ch.16. Shlokas 4-5)

Thus, developing good qualities and eliminating the bad ones is an integral part of spiritual practice. Useful technique that help us work on removing our weaknesses and developing virtues should be part of daily rituals. Texts mentioned above like Bhagavad-Gita, Yoga Sutras, Taittiriya Upanishad, Manusmriti, and so on. explains various virtues that promote fitness at these three domains. These virtues can be broadly classified into physical, psychological and social domains as given below. Also a number of techniques that promote fitness are also stated in these texts. An attempt is made to segregate and compile these information in a tabular form as detailed below (Table 2). The table only contains the reference of the verse and the virtues that promote fitness parameters it refers.

TABLE 2. Virtues mentioned in different Indian text that promote overall fitness

Reference	Physical	Psychological	Social
BG, Ch.13, Shlokas 8-12	simplicity; service of the guru; cleanliness; dispassion senses objects; inclination for solitude;	Freedom from hypocrisy; steadfastness; self-control; absence of egotism; Keeping in mind the evils of birth, disease, old-age and death; even mindedness; devotion; constancy in spiritual	Humbleness; non-attachment; absence of clinging to spouse, children, home and so on; forgiveness; Non-violence;

		knowledge; Absolute Truth	
BG, Ch.16, Shlokas 1-3	Fearlessness; charity; study of the sacred books; austerity; restraint from fault-finding; absence of covetousness; gentleness; modesty; lack of fickleness; vigor; fortitude; cleanliness; absence of vanity	Purity of mind; steadfastness in spiritual knowledge; control of the senses; straightforwardness; truthfulness; absence of anger; renunciation; peacefulness;	Performance of sacrifice; compassion toward all living beings; forgiveness; bearing enmity toward none; non-violence
Manusmriti, Shloka 6.92	Purification; freedom from sensual craving; knowledge of the supreme soul	Contentment; self-control; Patience; abstention from unrighteous; truthfulness; abstention from anger; wisdom	Forgiveness; temperance; appropriating anything (reason); non-stealing
PYS, Ch 2, Shloka 30	Non-violence (ahimsa); celibacy (brahmacharya); Cleanliness (shaucha); learning from yourself (svadhyaya)	Truthfulness (satya); non-covetousness (aparigraha); contentment (santosh), self-discipline (tapas),	Not stealing (asteya); accepting your fate (iishvara-pranidhana)
Taittraiya Upanishad, <i>Shiksha Valli, Anuvaka 11</i>	Study of the Vedas, practice dharma (righteousness), share the knowledge	Truthfulness, personal welfare, prosperity, follow the laws of land/situation	Respect parents, guests, teachers and others; righteous conduct, empathy, help others, treat everyone equal

2.5.2. Techniques and Approaches to Fitness

Adolescence (brahmacharya) is the right age for developing positive virtues and parameters under physical, psychological, social and spiritual fitness. Scriptures have suggested many techniques and specific approaches that can be adopted in the form of interventions towards the goal to achieve overall fitness.

The entire Gita may be condensed into four types of yoga – The Karma Yoga (the yoga of action), The Bhakti Yoga (the yoga of devotion), The Raja Yoga (the yoga of meditation) and the Jnana Yoga (the yoga of knowledge). Karma yoga unfolds one's hidden potential. Bhakti Yoga cultures the feelings and brings emotional intelligence. Raja Yoga helps to develop strong will and control the mind. Jnana Yoga renders the intellect to the subtle and beyond. Harmony could be achieved by integrating these four major yogas. Parables are time tested technique to impart knowledge to adolescents (Yoga Vashishta). Pratyahara and Satsang are the concepts emphasized in Yoga Vasista to ensure emotional stability and self-discipline (Yoga Vashishta). Yama Niyama concepts are emphasized in almost all scriptures to establish health and wellbeing (BG, PYS).

yogaśānānānādzīḥ] ye } anidiYraivvKoyate. 2-28.

yogaḥ gānuṅhānādaḥuddhikāyā jī ānādiptirāvivekakhyāte ||2-28||

Meaning: *By the practice of the different parts of Yoga, the impurities being destroyed, knowledge becomes effulgent up to discrimination.*

(Patanjali Yoga Sutra, Ch. 1, verse 28)

ivtkÉavneàitp] Éavnml. 2-33.

vitarkabhāvane pratipakñabhāvanam ||2-33||

Meaning: *Uncertainty concerning implementation can be overcome via orientation with the reverse.*

(Patanjali Yoga Sutra, Ch. 2, verse 33)

yū aharivharSy yū còSy kmḥṣu

yū SvBavbaxSy yagaeÉvit Ê>Oha. 6-17.

yuktāhāravihārasya yuktaceñōasya karmasu |

yuktasvapnāvabodhasya yogo bhavati duḥkhaḥ ||6-17||

Meaning: *He who is temperate in his habits of eating, sleeping, working and recreation can mitigate all material pains by practicing the yoga system.*

(Bhagavad - Gita, Ch.6. Shlokas 17)

A_yasvraGya_ya<tiÚra>. 1-12.

abhyāsavairāgyābhyāḥ tannirodhaḥ ||1-12||

Meaning: *The state of yoga is attained via a balance between assiduousness (abhyasa) and imperturbability (vairagya).*

(Patanjali Yoga Sutra, Ch. 1, verse 12)

tSy vac> à[v>. 1-27. t¾pStdwÉavnml. 1-28.

tasya vācakaḥ praēavaḥ ||1-27| tajjapastadarthabhāvanam ||1-28||

Meaning: *OM is a symbol for Ishvara. Repetition of OM (with this meaning) leads to contemplation.*

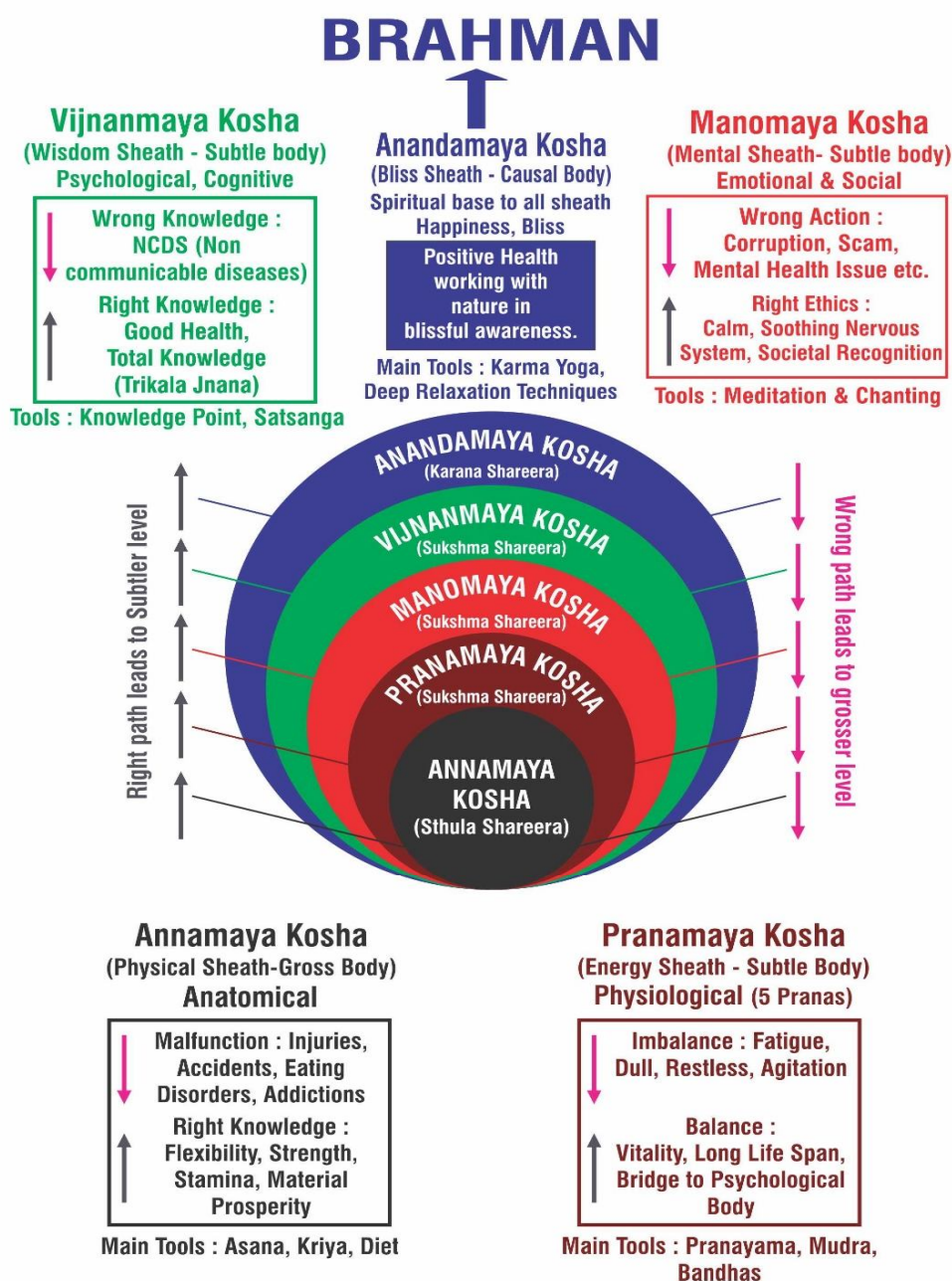
TABLE 3. Techniques and Approaches to Fitness from Yogic texts

Text	Techniques and Approaches to Fitness
(PYS)	Yama- Niyama
(PYS)	Asana & pranayama
(PYS)	Relaxation & meditation
(BG)	<p>Abhyasa & Vairagya (practice & dispassion) Practice of virtues and disassociate from vices helps in establishing fitness at all levels. Practice of Dharma (Righteous acts) enhances especially social fitness</p> <p>Moderation Temperate in his habits of eating, sleeping, working and recreation can mitigate all imbalances and conflicts and establish fitness</p> <p>Equanimity In opposing situations, maintaining equanimity (emotional intelligence) leads mental fitness in particular.</p>
(PYS)	<p>Chittaprasadana (tranquillity of mind) By developing friendship, compassion, indifference towards privileged, unprivileged, virtuous and non-virtuous people respectively.</p> <p>Pratipaksha Bhavana (Distraction) Mind can be trained to shift the attention to the opposite feeling or emotion or concept.</p> <p>Iswara Pranidana (surrendering) Totally surrendering to the supreme, good or bad not taking the pride of ownership of doing.</p> <p>Om Chanting</p>
(YV)	<p>Manaprashamana (Sublimation) Sublimation is positive way of reducing the speed of thoughts. Calming down the mind is considered as yoga</p> <p>Satsanga (Company of wise) Life in the company of sages, scholars and good people enlarges intelligence, destroys psychological distress and ignorance.</p>

2.5.3. Theoretical Model

The literatures provide a theoretical model of five layers of existence with time tested solutions, which were adopted in ancient India (Figure 2). This model could be considered as the base for overall fitness of adolescents.

FIGURE 2. Theoretical Model



2.6. SUMMARY & CONCLUSION OF LITERARY REVIEW

The yogic concepts of koshas classify and prescribe the several techniques and practices. A total health and fitness development involves practices at all five layers and is targeted at improving physical, mental, social and spiritual. The World Health Organization (WHO) definition of health 'State of complete physical, mental, social and spiritual wellbeing and not merely the absence of disease or infirmity' endorses the Pancha Kosha concept. It integrates physical and mental health into a holistic scheme. But, this integration in definition has not yet percolated sufficiently into teaching and clinical practice. Yogic lifestyle, yogic diet, yogic attitudes and various yogic practices help man to strengthen his physical, mental, social, and spiritual abilities and develop positive health.

CHAPTER 3
REVIEW OF
SCIENTIFIC
LITERATURE



3.0. REVIEW OF SCIENTIFIC LITERATURE

This study of scientific literature is aimed to understand the goal, importance and concept of overall fitness from the modern psychology which is broadly classified into physical fitness, psychological fitness and social fitness and also to study the literature of different interventions especially the yogic interventions for improving the fitness parameters in adolescents.

This review of scientific literature is carried out by reviewing the different aspects of fitness, adolescents and yoga separately.

3.1. JUSTIFICATION FOR THE STUDY

Research with yoga and overall fitness, especially in adolescents in compact multi-level holistic approach is in a primitive state. Initial literature review indicates that an overall fitness can be improved through holistic yogic techniques, which can be integrated strategically with psychology to provide effective short-term holistic program. This demands a critical in depth inter-disciplinary literature review. In depth review of scientific literature, hence, became critical for this study.

3.2 CRITERIA

Studies cited in PubMed Central, Science Direct and Google Scholars were searched. Mostly, studies related to adolescents and fitness (physical, psychological, and social) were included.

3.3. METHODOLOGY

This review of scientific literature is carried out by reviewing different aspects of fitness, adolescents and yoga separately. At the end, a consolidation of all the sub sections will be made to provide the rationale for the proposed research work. This section directly focuses on the research studies on the concepts explained in the 'Introduction' section.

The terms "fitness" and "health" are typically used interchangeably even though these two terms mean very different things, and are, in reality, separate states of wellbeing. Health being a state and fitness being more of an ability to perform, express, and behave. Both these concepts are interconnected and interdependent. Therefore, it is difficult to distinguish between studies on adolescent health and adolescent fitness. Hence, in this study, literatures of both adolescent health and fitness are considered.

Further, the fitness at physical, psychological and social levels are interconnected and interdependent. For the sake of better understanding, an attempt is made to discuss each of them separately. Studies that predominantly discuss physical aspects are placed in physical and that of psychological aspects are placed in psychological and so on.

3.3.1. Physical Fitness

Nowadays, there is a steady decline in physical activity, classroom time is more focused on (i.e. indoor) than the outdoor activity (i.e. physical education) (Ahn & Fedewa, 2011; Brodersen, Steptoe, Boniface, Wardle, & Hillsdon, 2007). The amount of physical activity is further reduced by limited use of active means of transport (i.e., biking, walking) and outdoor play is reduced due to perceived safety risks, distance, child's age, and parents' travel mode (Merom, Tudor- Locke, Bauman, & Rissel, 2006; Stevens, To, Stenvenson, & Lochbaum, 2008). Easily available technologies give opportunities to watch TV, play video games, or

browse the Internet during and after school hours resulting in more sedentary lifestyle (Atkin, Gorely, Biddle, Marshall, & Cameron, 2008). It is very well evident that sedentary lifestyle results in poorer mental health, while physical activity enhances mental health (Biddle & Asare, 2011). Physical inactivity is a leading cause of public health burden at all ages (Erİkođlu et al., 2015) and current trends in juvenile obesity (Leech, McNaughton, & Timperio, 2014). Reduced physical activity among adolescence not only affects their health but also their academic performance (Stevens et al., 2008) and mental health (Ahn & Fedewa, 2011). Cardiovascular disease (CVD) risk factors were relatively low in adults who had engaged themselves in physical activities during adolescence (Andersen, 2009).

Physical fitness is one of the important factors that influences daily life activities and sportive productivity of an individual (Erİkođlu et al., 2015; Houwen et al., 2006). Muscular strength, flexibility, coordination, speed, agility, and cardiorespiratory fitness (Jonatan R. Ruiz et al., 2006) are important aspects of physical fitness. Measuring physical fitness helps children in assessing their physical status (Erİkođlu et al., 2015). Developing a positive attitude toward their bodies and physical fitness may help children to improve on their positivity, and thereby, several psychological constructs.

Effective intervention programs along with nutritional education are helpful in promoting physical fitness among children and adolescents (Poitras et al., 2016). Physical fitness can be achieved through right nourishment, exercise, and rest (de Groot & Fagerström, 2011; Malina, 2010). Physical fitness is very closely related to mental state and health (Lang et al., 2018; University of Tsukuba, 2015). To improve physical fitness among children and adolescents, studies recommend multi-component intervention programs (Camacho-Minano, LaVoi, &

Barr-Anderson, 2011; Kriemler et al., 2011). There is increasing academic and policy interest in interventions aiming to promote young people's health by ensuring that the school environment supports healthy behaviors' (Morton, Atkin, Corder, Suhrcke, & van Sluijs, 2016). The guidelines in several countries recommend, that children and adolescents aged 5 to 17 years should get engaged in 60 minutes of moderate-to-vigorous physical activity each day (Janssen & LeBlanc, 2010). One group RCT performed in 1518 girls, reported significant decline in total physical activity from baseline to 18-month follow-up with no significant difference between girls in the intervention and control schools from a multi-component school-based intervention (girls involved in sports), which focused on promoting physical activity among adolescent girls (Okely et al., 2017).

One 25 year follow-up study was done with 520 males and 605 females, who participated in a sit and reach test (flexibility) and a 30 second sit-up test (endurance strength) with baseline in 1976, and a self-reported follow-up was performed in 2001. According to this study, adolescent flexibility predicted low occurrence of tension neck in men. In women, high endurance strength predicted low occurrence of tension neck, whereas in men it was a predictor of knee injury. Participation in leisure physical activity in adolescence predicted low occurrence of recurrent low back pain in men (Mikkelsen et al., 2006). In another study, co-creational approach was used to develop, implement, and evaluate intervention given to three set of lowly educated adolescent girls (n = 91) in the form of sport sessions, a fitness activity, and a lunch walk respectively with 3 control groups (n = 105). However, effects were limited or undetectable but seemed a feasible approach that deserved further attention in health promotion research (Verloigne et al., 2017). In one study done on 460 (248 boys and 212 girls) Spanish adolescents aged 13-18.5 years, showed that low physical fitness is

associated with a less healthy lipid-metabolic profile in terms of cardiovascular risk, regardless of the level of physical activity performed (García-Artero et al., 2007). Another study included 66 high-school students, divided into experimental group (EG=39) and control group (CG=27). The Pilate intervention was carried out two times a week for six weeks. Significant Hamstring flexibility was seen in the experimental group using the toe-touch test (González-Gálvez, Poyatos, Pardo, Vale, & Feito, 2015). Another study was conducted in the summer holiday, 19 adolescent children participated in soccer training and 11 adolescent children participated in the multi-purpose physical education program for three weeks, both training programs had positive effects on the performance with respect to standing-broad jump, 10 x 5 m speed shuttle run, flamingo balance test, abdominal sit-ups, and medicine ball (Güngör et al., 2010). Summer camps offered platform to increase youth activity but research is required to determine how best to convert a camp activity into increased post-camp habitual activity (Jago & Baranowski, 2004).

3.3.2. Psychological Fitness

According to the World Health Organization, 1.2 billion of the world population, is between the age of 10 and 19 years (Patton et al., 2016). According to the National Survey on Child and Adolescent Well-being (NSCAW II) in the United States, high rates of mental and physical health issues are seen in teens (Heneghan et al., 2013), and also among young adults (Merikangas et al., 2011). Especially, in under-developed and developing nations, psychological and substance-use disorders reach a peak among adolescents (Davidson et al., 2015). Academic pressures, peer pressure, problems with bullying, and addiction to social media have serious implications on the mental and physical well-being of adolescents, which may lead poor performance and can affect the overall growth (Cooper, Wood, Orcutt, &

Albino, 2003; Hair, Park, Ling, & Moore, 2009; Melnyk et al., 2013). Focusing on improving the transition during adolescence is one of the priority area which needs attention. (Stroud, Walker, Davis, & Irwin, 2015).

Strategies on self-control and self-regulation are best imbibed during adolescence (Davidson et al., 2015). It is also a phase that is more amenable to learning and more receptive to corrective changes if provided through intervention programs. Meta-analysis was done on the literature supporting the effectiveness of Socio-Emotional Learning (SEL) interventions that promote and offer promising benefits for emotional abilities among youths (J. A. Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011). However, meta-analysis raises several questions in the literature, such as lack of results for the adolescent population (only 13% of studies are on secondary students). Second, there is a lack of SEL evidence outside the United States (83% of the existing literature are American studies), which makes it difficult to test their generality worldwide.

In a study, 479 Spanish adolescents (47.4% male, mean age of 13 years) from different Spanish cities, were given 24 sessions on EI program, one hour per week for 6 months between 2009 and 2010. Experimental group has shown improvement in psychological adjustment, mental health, negative affect, and reported fewer clinical symptoms compared with students in the control group (Ruiz-Aranda et al., 2012).

3.3.3. Social Fitness

Social contexts exert powerful influences during adolescence (World Health Organization, 2009). It is a crucial period for socialization and demands greater attention to the mental wellbeing, failing which might lead to mental health consequences, that may remain throughout life and reduces the capacity of society's socioeconomic productivity (Arumugam, Rajendran, & Nagalingam, 2013). Psycho-social fitness among adolescents plays an important role considering the need for social integration and a search for self-assertion and independence (Caballo V. E., 2003). It is marked by a set of learnt behaviors displayed by them in an interpersonal context and also by their performance level in a demanding social situation. Appropriate psychosocial development of adolescent is an indicator of sound academic performance, physical health, and adequate social, emotional, and psychological health. Psychosocial fitness ultimately contributes in reducing the risk of psychosocial and behavioral problems, violence, crime, teenage pregnancy, and misuse of drugs and alcohol (NICE, 2009).

Weak social competencies limit an adolescent's ability to establish and maintain friendships. Low levels of perceived social competence and negative parental interactions are associated with depressive symptoms (Lee, Hankin, & Mermelstein, 2010). During the adolescent period, the relationships with family and peers undergo dramatic changes and shifts. Strong relationships with both family and friends are vital for healthy social and emotional development. Empathy, a key component of all social functioning, is an effective cognitive ability that adopts the perspective of others to understand their feelings, thoughts or actions (Hogan, 1969).

Positive relationship with parents, friends and neighbors are also crucial in being able to emotionally connect with the society as an individual and contributes greatly to his/her well-being and gives mental and emotional strength (Salovey & Mayer, 1990). The quality of parent–child relationship affects the adolescent's self-concept, which, in turn, affects the adolescent's integration into the world of peers (Deković & Meeus, 1997). Altruism is a motivational state, where thought and action have the ultimate goal of increasing another's welfare without regard to one's own well-being (Batson, 2014). Empathy can be considered as a possible source of altruistic motivation.

Interventions promoting psychosocial fitness need a great start, targeting adolescents, their caregivers, and community stakeholders, with a special emphasis on the school setting (Kessler, Berglund, Demler, Jin, & Walters, 2005; NICE, 2009). An Overview of Systematic Reviews suggests that a multimodal and multidisciplinary group-based intervention approach can be most effective (Das et al., 2016). A study suggests psychosocial assets and well-being can be improved among adolescent girls through a brief school-day program (Leventhal et al., 2015).

3.3.4. Yoga and Adolescents

Proficiency in fundamental movement skills contribute to physical, mental and social development and provide the foundation for an active lifestyle (Lubans, Morgan, Cliff, Barnett, & Okely, 2010). Competence in motor patterns related to 'lifelong' physical activities like yoga, resistance training etc. may be required to engage adolescents in ongoing physical activity (Smith, Morgan, Plotnikoff, Stodden, & Lubans, 2016).

3.3.5. Yoga and Physical Fitness

Yoga, which includes asana, pranayama, yogic diet and relaxation, is considered as an effective intervention that provides perfect combination of activities for promoting physical fitness. Several studies suggest that yoga is generally effective in improving physical and mental health among children and adolescents (Birdee et al., 2009; Greenberg & Harris, 2012; J. Davidson et al., 2012). Yoga promotes cardiopulmonary fitness (Bhutkar, Bhutkar, Taware, & Surdi, 2011; Chen, Mao, Lai, Li, & Kuo, 2009) and weight loss in obese children (Benavides & Caballero, 2009). Yoga is also found effective in improving posture among children with physical malformations way back in 1990 (Savić, Pfau, Skorić, Pfau, & Spasojević, 1990) and many behavioral issues (Harrison, Manocha, & Rubia, 2004). Yoga is beneficial for improving the fitness among children with visual impairment (Telles & Srinivas, 1998) and increase the exercise capacity (Jain et al., 1991).

Ashtanga yoga may be beneficial as a weight loss strategy in a predominately Hispanic population shown by a pilot study done with 14 predominately Hispanic children (ages 8-15 years) having a 12-week prospective Ashtanga yoga program (González-Gálvez et al., 2015). Strength, flexibility and balance in healthy adolescent girls also showed improvement with yoga intervention (Donahoe-Fillmore, Brahler, Fisher, & Beasley, 2010a). According to one qualitative study, student athletes benefitted from practicing yoga postures and breathing techniques, before, during, and after athletic events to enhance their performance and yoga helps to loosen tight muscles, remove soreness, avoids injury, regulates respiration, and calms a fast heartbeat after exercise (L. A. Conboy, Noggle, Frey, Kudesia, & Khalsa, 2013).

TABLE 4. Yoga Intervention studies assessing physical measures in adolescents

Author(year)	Age range / Grade Samples Size (total and group wise)	Yoga Intervention and Control group Intervention	Outcome Measures	Results	Limitations
(Dash & Telles, 2001)	12-15 years N = 172 Yoga n=86 Control n=86	Yoga: 10 days Control: Routine Activities	Hand grip strength	Improved hand grip strength in yoga group	Not a RCT
(Mandanmohan, Jatiya, Udupa, & Bhavanani, 2003)	12-15 years N=40 Yoga n=20 Control n=20	Yoga: 45 mins for 6 months Control: No Intervention	Pulmonary function tests; Hand grip strength	Significant improvement in all pulmonary function tests and hand grip strength in yoga group No improvement in control group	Small sample size
(Chen et al., 2009)	7-12 years with asthmatic issues N=31 Yoga n= 16 Control n=15	Yoga: 60 mins for 7 weeks PE: 60 mins for 7 weeks	BMI; Muscular strength; Flexibility; Endurance and Cardiopulmonary fitness	Improved BMI, muscular strength, flexibility, and cardiopulmonary fitness compared in yoga group in compared to control group	Small sample size, Not a RCT
(Benavides & Caballero, 2009)	8-15 years at risk for developing type 2 diabetes	Ashtanga yoga: 75mins, 3 days / week for 12 weeks	BMI; Self-esteem; Anxiety; and Other parameters	Average weight loss 2 kg; Four of five children with low self- esteem improved, Two had	No control group, Small sample size, Drop out

	14 out of 20 completed the study			decreased in self-esteem. Anxiety symptoms improved	
(Donahoe-Fillmore, Brahler, Fisher, & Beasley, 2010b)	14 -18 years (girls) N = 33 Instructor-led yoga n= 14 Video-led yoga n=19	Yoga: 2 days / week for 7 weeks and walking 3 days / week for 7weeks	Body fat; Strength; Hamstring flexibility; and Balance	Little improvement in strength; Hamstring flexibility in both groups but not significant; No change in balance scores and body fat in both the groups	Only girls
(Bhavanani, Udupa, Madanmohan, & Ravindra, 2011)	12-16 years N =42 SSN n=21 FSN n=21	SSN: 5 rounds 30-40 mins for 6 months. FSN: 15 rounds for 30-40 mins for 6 months. No control	Hand grip strength; Hand grip endurance; Pulmonary functions; and Systolic pressure	Significant improvement in systolic pressure in FSN group; Significant improvement in hand grip endurance in FSN compared with SSN group; Improved pulmonary function in both the groups	No control group
(Maniazhagu, Soundrya, & Revathi, 2012)	15-17 years boys N = 60 Yoga 1 n=15 Yoga 2 n=15 Yoga 3 n=15 Control n=15	Y1:Pranayama Y2:SN Y3: Pranayama & SN Control: no specific intervention	Muscular endurance; Cardio- respiratory endurance	Improvement in Muscular endurance and cardio- respiratory endurance in all 3 yoga groups No change in control group	Only boys

(Hagins, Haden, & Daly, 2013)	6th grade students N=30 Yoga n = 15 Control n= 15	Yoga: 50 mins/session, 3 days / week, 15weeks PE: same	Heart rate; Blood pressure; Mental arithmetic; Mirror tracing tasks	No significant differences in stress reactivity in yoga group when compared with control group	Yoga intervention failed to focus on stress management
(Telles, Singh, Bhardwaj, Kumar, & Balkrishna, 2013)	8 to 13 years N=98 Yoga n = 49 PE n = 49	Yoga: 45mins, 5 days / week for 3 months PE: 45 mins, 5 days / week for 3 months	Eurofit physical fitness test battery	BMI became high in both groups; Increase in no. of Sit-ups in both groups; Plate tapping improved in yoga group; Balance worsened in PE group	Participants geographically localized to one place; No diverse population; No true control group;
(D'souza & Avadhany, 2014)	7-9 years (school children) N=91 Yoga n=46 PE n=45	Yoga: 45 mins daily for 3 months PE: 45 mins daily for 3 months	Muscle strength; Endurance; and Aerobic capacity	Significant improvement in all other variables except forearm muscles strength in both the group; Steep drop in the calf muscle endurance in both the groups after the detraining period (after 3 months)	Detraining effect of yoga was unexplored No true control group

(Anita, Shete Sanjay, Ghanshyam Singh, Kulkarni Dattatraya, & Bhogal, 2014)	11-15 years Rural residential school boys N=82 Yoga n=41 PE n=41	Yoga: 45 mins, 5 days / week for 12 weeks PE: same	Physical fitness; Micro nutrients absorption	Significant increase in the abdominal strength; Flexibility; Grip strength in yoga group	Girls were excluded; High drop out
(Rawat, Rajesh, & Nagarathna, 2014)	Yoga practitioner children n = 110 Non-yoga practitioner children n = 110	No intervention	Anthropometric measurements; Spinal flexibility; Hand grip strength; and Ventilatory function	Significantly higher on all domains of Physical fitness except on Left-hand grip strength	Only comparison
(Sahu & Samanta, 2016)	12-14 years boys N = 45 Yoga 1 n=15 Yoga 2 n=15 Control 1 n=15	Y1: Yogasana, Y2: Pranayama 20mins/day for 6 weeks Control: Routine activity	Cardiovascular; Endurance; and BMI	No significant difference on physiological variables among yoga group, pranayama group, and control group	No girls Very short (only 20 min) session
Abbreviations: BMI, Body Mass Index; FSN, Fast Suryanamaskar; PE, Physical Exercise; RCT, Randomized Control Trial; SN, Suryanamaskar; SSN, Slow Suryanamaskar; Y, yoga					

3.3.6. Yoga and Psychological Fitness

Yoga is a holistic intervention in which each pupil can find his/her unique trajectory of change and improvement (L. a. Conboy, Noggle, Frey, Kudesia, & Khalsa, 2013), which is now considered as an important intervention for promoting psychological health. Yoga shows a reduction in anxiety, depression, and psychological distress in high-risk adolescents (Frank, Bose, & Schrobenauser-Clonan, 2014a). Studies also report positive correlation of yoga with self-concept (Benavides & Caballero, 2009) and well-being (Khalsa, Hickey-Schultz, Cohen, Steiner, & Cope, 2012). Residential yoga program for young adults has shown positive effects on perceived stress and quality of life. Many reviews suggest that yoga is generally effective at improving physical and mental health in children and adolescents (Birdee et al., 2009; Greenberg & Harris, 2012; J. Davidson et al., 2012; Kaley-Isley, Peterson, Fischer, & Peterson, 2010). Previous research indicates improved EI through 20 minutes of mindfulness meditation over eight weekly sessions in graduate students (Chu, 2010). Specific inhalation-exhalation rhythmic patterns, as in pranayama and slow diaphragmatic breathing practices in yoga and meditation may be of benefit to calm and balance the mind and enhance coping abilities, manage behavior, thinking, and emotions; and these improvements will enhance relationships (Wisner, Jones, & Gwin, 2010). Studies have shown that yoga in schoolchildren improves resilience, mood and self-regulation skills pertaining to emotions and stress by positively impacting (Büssing, Michalsen, Khalsa, Telles, & Sherman, 2012a; Hagen & Nayar, 2014). Likewise, students practicing meditation in schools have shown beneficial effects across physiological, psychosocial, and behavioral outcomes (Black, Milam, & Sussman, 2009a) indicating a benefit finding of yoga for children and youth (Greenberg & Harris, 2012). A recent survey in the United States showed that several yoga programs are implemented in more than 940 schools across the country and are implemented for teaching a variety of additional educational, social-emotional, and didactic techniques to enhance

students' mental and physical health and behavior (Butzer, Ebert, Telles, & Khalsa, 2015). A study also showed significant decrease in anger, depression, and fatigue in high school students after participating in a single yoga class when compared with physical exercise (Felver, Butzer, Olson, Smith, & Khalsa, 2015). Many recent studies involving yoga claim that yoga reduced risk factors of substance use during early adolescence (Butzer, LoRusso, Shin, & Khalsa, 2017). Another study demonstrated a substantial weight loss and improvement in psychiatric inventories in children and adolescence with an Ashtanga yoga intervention (Benavides & Caballero, 2009). Integrated approach to Yoga has also shown effective in managing anger in adolescents (Mani, Sharma, Marimuttu, Omkar, & Nagendra, 2016).

TABLE 5. Yoga studies assessing psychological measures in adolescents

Author(year) & Title	Age range / Grade Samples Size (total and group wise)	Yoga & Control group Intervention	Outcome measures	Results	Limitations
(Barnes, Treiber, & Davis, 2004)	15-18 years with high normal systolic BP N = 45 Yoga n=25 Control n=20	Transcendental Meditation: 15 min group session and 15 min home practice for 4 months Control: 15-min sessions of health education / each day for 4 months	Anger, Rule infractions, suspension rate such as physical fighting, weapon carrying and drug post- session	No significant change in anger control and anger out. Anger in – girls doing yoga exhibited decrease and control group slight increase. Boys no change.	Less sample size
(Mendelson et al., 2010)	4 th and 5 th grade students N =97 (59 female) Yoga n=51 WLC n=46	Yoga & mindfulness: 45 mins, 4 days / week for 12 weeks	Stress response, Positive and Negative Emotions	Positive impact on problematic responses to stress including rumination, intrusive thoughts, and emotional arousal in yoga group	Recruitment methods likely biased sample toward more highly motivated students and/or those with more engaged parents

(Khalsa et al., 2012)	11 th & 12 th grade students N = 121 Yoga n=74 (34F, 40M) Control n=47 (17F, 30M)	Yoga Ed Program: 30 mins, 2-3 days /week for 11weeks PE: 11weeks	mood, anxiety, perceived stress, resilience	Significant decrease of anger control and fatigue in yoga. Worsened in control group Insignificant change in other parameter	Drop outs Missed sessions
(Noggle, Steiner, Minami, & Khalsa, 2012)	11 th and 12 th grade students N = 51 Yoga n=36 PE n=15	Kripalu yoga: 28 sessions, 2-3 days / week for 10 weeks PE : 30-40 mins, 2- 3 days / week for 10 weeks	Mood state, Perceived Stress, Resilience Scale, Trait Anger	Mood state improved in yoga group and significantly worsened in PE group No changes observed in any anger parameter and resilience	No passive control No. of participants not equal in both group
(White, 2012)	4 th & 5 th grade girls N = 155 Yoga n=70 WLC n=85	Yoga: MBSR 1 hr/ week for 8 weeks and 10mins of daily homework WLC: daily activity	Perceived stress, Coping abilities, Self-esteem, and Self-regulation	Increase in self-esteem and self-regulation in both Mindful Yoga and wait list control group Increased stress in yoga group	Homogenous sample of primarily white school-age girls Mindfulness in children may differ from mindfulness in adults

(Telles et al., 2013)	8-13 years N = 98 Yoga n=49 (15 girls) PE n=49 (23 girls)	Yoga: 45 mins, 5 days / week for 3 months PE: 45 mins, 5 days / week for 3 months	Battle's self-esteem inventory and teachers' rating	Total, general, and parental self-esteem improved in the yoga group social self-esteem higher in control group compared to yoga group	Participants geographically localized to one place, No diverse population No true control group
(Khalsa, Butzer, Shorter, Reinhardt, & Cope, 2013)	Adolescent musicians (residential) N= 135 Yoga n=84 Control n=51	Kripalu Yoga: in summer break, 60 mins, 3 days / week for 6 weeks Control: No intervention	Performance anxiety, Performance-related musculoskeletal disorders	Significant reduction in musical performance anxiety in yoga group Inconsistent results for performance-related musculoskeletal disorders	Self-selected participants in yoga group Non RCT
(Haden, Daly, & Hagins, 2014)	10-11Years N = 30 Yoga n=15 Control n=15	Yoga: 90 mins, 3 days /week for 12 weeks PE: same	Self-reported positive effect, global self-worth, aggression	No significant changes between groups in self-reported positive effect, global self-worth, aggression Increased negative emotions in yoga group compared to PE group	Less sample size

(Felver et al., 2015)	11 th & 12 th grade students N = 47 Same sample used for Yoga (one day) and PE (other day)	Yoga: 35 min Single session to see immediate effect PE: 35 min Single session	Mood, Negative and positive effect anger, depression, and fatigue	Significant decrease in anger, depression, and fatigue in yoga group compared to control group Significant reductions in negative effect in yoga group	Limited sample size Specific day could have influenced the results
(Daly, Haden, Hagins, Papouchis, & Ramirez, 2015)	15–17 years N = 37 Yoga n=19 PE n=18	Yoga: 40 mins, 3 days / week for 16 weeks PE: same time duration	Emotion Regulation Index, Attention awareness, Self-compassion	Emotion regulation increased significantly in yoga group when compared with PE group	
(Mani et al., 2016)	8 th grade students N =187 (88 boys and 99 girls) Yoga n=114 WLC n=73	Yoga: 35 mins, 2 days /week for 4 months WLC: Regular routine	Anger, Anger Expression Inventory	Significant reduction in state and trait anger scores in yoga group while a significant increase in state of anger scores in control group. There is no significant change observed in anger out, anger in and anger control scores in yoga and control group.	Randomization not done at subject level

(Richter, Tietjens, Ziereis, Querfurth, & Jansen, 2016)	6 – 11 years N = 24 Yoga n=7-10 Control n=6-8	Yoga: 45mins, 2 days / week for 6 weeks Sports: 45mins, 2 days / week for 6 weeks	Physical self-concept and anxiety	Increase in avoidance behaviour and increase use of divergent coping strategies in yoga group Decrease in use of divergent coping strategies. No difference in physical concept	Small sample size, drop out
(Butzer et al., 2017)	Adolescents N = 211 (63.2% female) Yoga n=117 Control n=94	Yoga: 32 sessions PE: 32 sessions	Emotional self-regulation, perceived stress, mood impairment, impulsivity, substance use willingness, and actual substance use.	No immediate Improved self-control in female May prevent willingness for substance use in yoga group Control group willingness to substance use	
Abbreviations: MBSR, Mindfulness-based Stress Reduction; PE, Physical Exercise; RCT, Randomized Control Trial; WLC, Wait List Control					

3.3.7. Yoga and Social Fitness

Self-awareness is the first step towards self-control and empathy for others. Almost all yoga techniques encourage the development of self-awareness and, therefore, enhance the capacity of self-control (Jakovljevic, 2011). Yoga practices evoke a calming effect, that helps students get into a frame of mind conducive to learning, which is distinct from the effects of physical exercise alone (Frank, Bose, & Schrobenhauser-Clonan, 2014b). A number of studies are done on yoga and mental health among adolescents and yoga is found as a very effective intervention program in improving mental health of adolescents (Büssing, Michalsen, Khalsa, Telles, & Sherman, 2012b; Frank et al., 2014b; Frank, Kohler, Peal, & Bose, 2017). However, no studies are found in examining the effect of yoga on psychosocial fitness among adolescents. Furthermore, adolescents being in a crucial developmental state, are highly vulnerable to biological, psychological, social, and environmental factors and is also in a period where they are more receptive to corrective measures. This warrants considering their physical and psychological aspects while developing intervention programs/strategies to improve social health among adolescents.

TABLE 6. Yoga studies assessing Social measures in adolescents

Author(year)	Age range / Grade Samples Size (total and group wise)	Yoga & Control group Intervention	Outcome measures	Results	Limitations
(Mendelson et al., 2010)	4 th and 5 th grade students N = 97 (59 female) Yoga n=51 WLC n=46	Yoga & mindfulness: 45 mins, 4 days / week for 12 weeks	Relations with Peers and school People	No significant difference with respect to changes in positive affect or in relationships with peers and teachers Trend for control group members to report more trust in friends than intervention group members	Recruitment methods likely biased sample toward more highly motivated students and/or those with more engaged parents
(Schonert-Reichl & Lawlor, 2010)	4th–7th grade students N = 246 ME program n=139 (70 boys, 69 girls); WLC n=107 (57 boys, 50 girls)	ME program: daily 3 sessions 3min each and weekly once 40 min session for 10 weeks	Optimism, positive and negative effect, self-concept, Social competence	Significant increases in optimism Similar improvements on dimensions of teacher-rated classroom social competent behaviors in ME Program group	Non RCT Absence of an extended follow-up assessment
(Velásquez, López, Quiñonez, & Paba, 2015a)	5 th to 9 th grade students N = 125 Yoga n=63 Control n=62	Yoga after school workshop: 2 days /week for 12 weeks	Anxiety, depression, aggression, socioemotional competencies like empathy, anger management, and pro-sociality	Reduce children's anxiety problems in yoga group No difference in other parameters	No quantitative assessment done
Abbreviations: ME, Mindfulness-Based Education; RCT, Randomized Control Trial; WLC, Wait List Control					

3.4. SUMMARY & CONCLUSION OF SCIENTIFIC LITERATURE

Majority of studies provide indicative results to assess efficacy of yoga for different parameters in children compared with adolescents. Almost no study has been done with biopsychosocial parameters on overall fitness in adolescents especially in India. Earlier findings suggested that yoga is related to a host of positive outcomes but interpretation of these findings is limited by methodological weakness. Although yoga is making its way into schools and curriculum, there is little research on the impact of yoga on adolescents' emotional and social functioning like EI, self-concept, empathy, altruistic behavior, social competence, relationship handling and so on. Many SEL programs of children and adolescents were conducted in different parts of the world (not in India) with an aim to support the development of healthy functioning by encouraging self-awareness, social awareness, and self and relationship management. These SEL programs included similar practices like yoga and its concepts. But in India there is no specific yoga program to help adolescents through transition. Currently, there has been increasing interest among scholars in understanding yoga's effects. Adolescents face numerous biological, emotional, and cognitive changes and yoga may support young people's transition through the potentially rocky adolescent years. No studies have been carried out on yoga as a holistic integrated fitness program in adolescent population in India. Lack of conceptual clarity, inadequate measurement tools and dearth for holistic programs for biopsychosocial health has become an impediment for progress of research work in the field. Research on Yoga in residential setting for promoting physical, psychological, and social health is in its primitive stage. There is a need to develop a standardized yoga program that can be implicated with different populations. Hence, this study was planned on this rationale to look at biopsychosocial

parameters and make evident the effect of residential-holistic-integrated yoga program on physical, psychological, and social fitness aspects.

CHAPTER 4
AIM AND
OBJECTIVES



4. AIM AND OBJECTIVES

4.1. AIM OF THE STUDY

The aim of the study is to evaluate the efficacy of a 7 day residential-holistic-integrated yoga Module on overall fitness among adolescents.

4.2. OBJECTIVES OF THE STUDY

The primary objective of the study is to examine the effect of short term residential yoga on

4.2.1. Physical Fitness, such as

- a. Speed
- b. Strength
- c. Flexibility
- d. Coordination

4.2.2. Psychological Fitness, such as

- a. Emotional Intelligence
- b. Cognitive emotional regulation
- c. Anger
- d. Self-concept

4.2.3. Social Fitness, such as

- a. Empathy
- b. Social competence
- c. Altruism
- d. Relationships

The secondary objectives are

- a. To develop an integrated yoga module for overall fitness among adolescents
- b. To understand the difference in the effects of yoga across genders and age groups.
- c. To explore the relationships between the changes across physical, psychological and social domains.
- d. To assess if parents' observations coincided with that of their children.

4.3. RESEARCH QUESTIONS

1. Is the holistic integrated yoga intervention in residential setting able to bring about changes in physical, psychological and social fitness in adolescents?
2. Is there a pattern of the changes brought?
3. Can we identify a mechanism of action for these changes?
4. Are these effects also seen by the parents?

4.4. JUSTIFICATIONS FOR THE STUDY

- Adolescents have tremendous psycho-physio-social changes. Adolescents need attention to develop fitness based on their unique personalities and achieve the balance between their own strengths and societal expectations.
- Reduced physical activity, improper diet, unhealthy life style and psychophysiological changes are the key challenges.
- Adolescents need a holistic approach to establish fitness at physical, psychological and social level.
- Current literature is still looking at a linear cause and effect model and hence lack holistic approaches to interventions / assessments.

- Yoga philosophy and practices provide a multidimensional approach to deal with these changes.
- Current study is planned with keeping these in mind.

4.5. HYPOTHESIS

Short term residential integrated yoga program will bring changes in physical, psychological and psycho-social fitness in adolescents.

Residential Yoga camp during summer holidays is feasible and accepted.

4.6. NULL HYPOTHESIS

Short term residential integrated yoga intervention fails to bring changes in physical, psychological and social fitness among adolescents.

Residential yoga camp during summer holidays is not feasible and accepted.

CHAPTER 5

METHODS



5.0. METHODS

This methods section comprises of two parts with A and B as Integrated Yoga module development and Pre-post intervention study respectively.

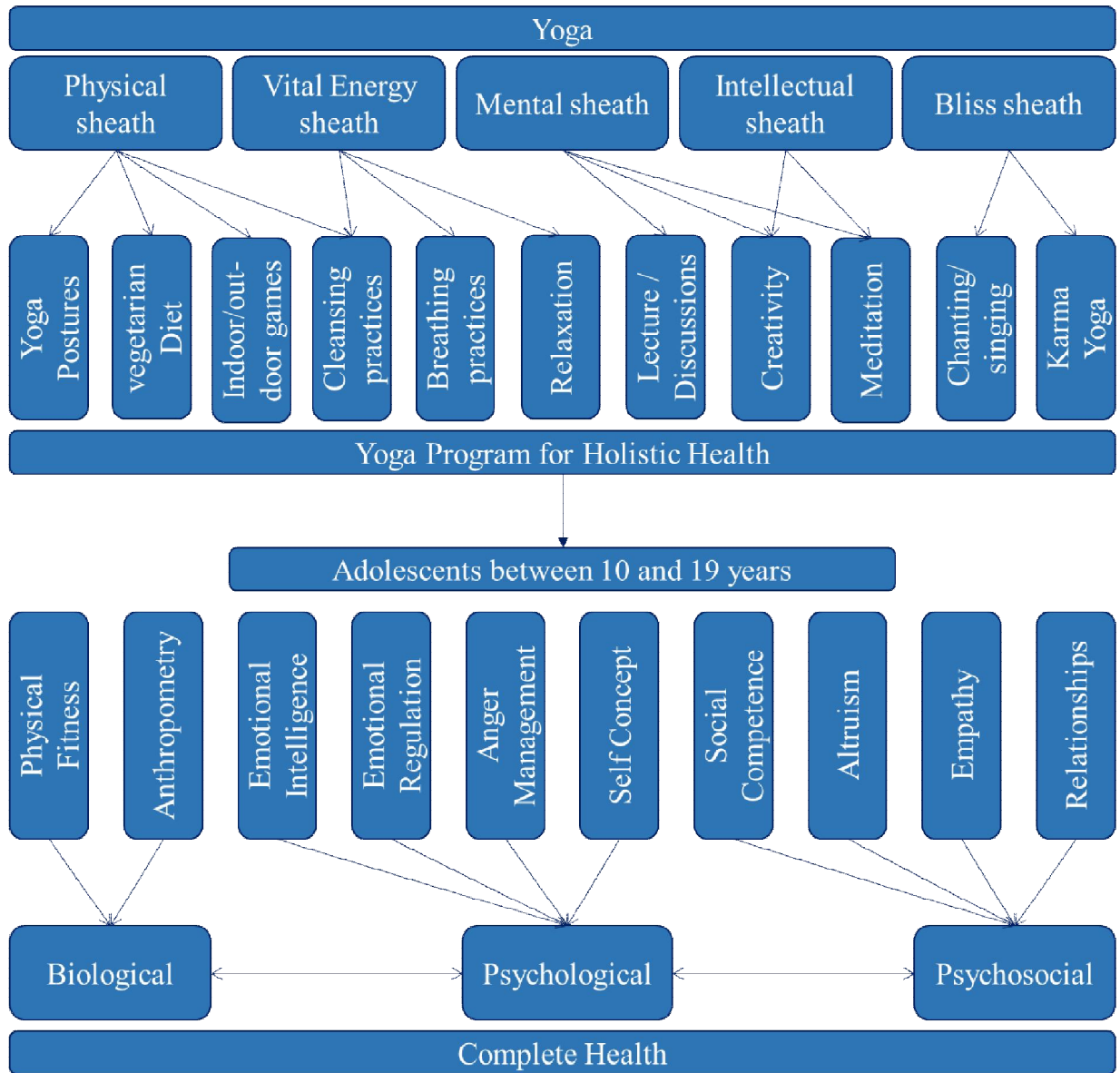
5A. DEVELOPMENT OF INTEGRATED YOGA MODULE

Yoga may bring about moderation and balance in the expression and activities of various emotional aspects. Yoga offers several techniques to restore the normalcy by introspection and self-knowledge. Different schools use different set of these practices, some using more of physical practices and many using meditation and/or breathing. All these practices can be classified and compiled as need-based modules.

The aim of this section is to summarize the developmental process of a holistic integrated yoga module for management of overall fitness among adolescents. Thus, the objective of this effort was to present the theoretical basis, and details of integrated yoga module and its implementation details for enhancing the physical, psychological and social fitness of adolescents.

The major sources of references for the development of this module are a) Integrated Approach to Yoga Therapy (IAYT); b) Several texts on yoga for children also formed basis for this module development (AYUSH, 2011; SVYASA, 2009; Swami Niranjana Saraswati, 2009; Swami Satyananda Saraswati, 1985); c) Expert guidance by distinguished scholars of SVYASA; d) Scientific evidence has been taken into consideration while selecting different activities for the module.

FIGURE 3. Yoga-based intervention plan for adolescent’s health and tools of assessment



5A.1. Integrated Approach to Yoga Therapy (IAYT)

According to yoga based understanding, the self, is conceived as a combination of different layers of existence. These layers are described in the *Taittiriya Upanishad*, which gives the concept of five layers of existence (*Pancha Koshas*) as Annamaya (gross), Pranamaya (energy), Manomaya (emotion), Vijnanamaya (intellect) and Anandamaya (bliss) Kosha.

Further texts like ‘Yoga Vasista’ provide evidence for mind-body inter-connectedness in defining, diagnosing, and treating illnesses of all kinds. Integrated approach to yoga (IAYT) is employing specific yogic techniques to address all the layers of existence to get holistic and overall health.

Yogic techniques in IAYT include eight components of Astanga Yoga, Karma Yoga, Bhakti Yoga, Jnana Yoga, Kriyas (cleansing techniques) and Yogic Diet (Jagannathan et al., 2014). On the basis of the understanding of Pancha Kosha concept, yogic practices that can be prescribed for different koshas are as follows. A total personality development involves practices at all five layers, which is targeted at improving physical, mental, social and spiritual levels.

- 1) Annamaya Kosha – Asanas, Yogic Diet, Loosening Exercise, Kriyas. A stable and comfortable posture engages musculo-skeletal system in a systematic way. This provides stimulation and deep relaxation to internal organs by thoroughly massaging them. Asanas promote functioning of all organs and systems in a harmonious manner. The mind becomes elated and expanded in a natural and effortless way. The dualities of the mind cease to exist (PYS-2-47). Loosening exercises strengthens the muscles, reduces joint stiffness and increases physical stamina. Balanced diet (or Satvic diet) helps to maintain internal harmony of the body and mind. Kriyas not only purify the body but also has many hidden benefits (HYP 2-23).
- 2) Pranamaya Kosha – Breathing Exercises, Pranayama. Breathing exercises increases awareness about breathing, corrects the breathing pattern, clears the lungs and

increases the lung capacity. Pranayamas help to slow down breathing rate and restore autonomic balance, thereby, calming the mind. It promotes free flow of energy in the body and makes the mind ready for higher practices.

- 3) Manomaya Kosha – Meditations and Devotional Sessions, Bhakti Yoga. Guided meditations engage the mind to promote emotional regulation. Devotional sessions or Bhakti yoga promotes emotional culture. This technique promotes emotional intelligence and regulation. Regular practice of meditation helps in thinning down negative emotions and culturing positive emotions there by leading to bliss, peace and good health. It is possible to increase the strength of the mind by regular prayer, making resolutions, and keeping them up. There is a deep relationship between the mind, intellect, and body.
- 4) Vijnanamaya Kosha – Lectures, Counselling, Satsang, creativity and Jnana Yoga. All these provide right knowledge. The intellect (Buddhi) is the discriminating and discerning process which examines and judges the stimuli received. All the activities that challenge one's intellect develop Vijnanamaya Kosha. It also communicates to the mind its decision about the type of responses to be executed. It eradicates ignorance and helps to understand realities of life.
- 5) Anandamaya Kosha – The Bliss Sheath controls the Intellectual Sheath, since the intellect functions under the control and guidance of one's vasanas. Karma Yoga leads to a state of blissful silence with awareness, perfect poise, and freedom of choice where the mind is not troubled by stressful thoughts and fears.

The layout of our Integrated Yoga intervention module is based on the Pancha Kosha concept and the components and practices included are given in table 7.

TABLE 7. Practices included in the Integrated Yoga intervention based on the Pancha Kosha concept

Kosha	Components	Intervention
Annamaya (Physical)	Fitness, agility, stamina, body awareness	Satvik diet Asanas, Games
Pranamaya (Vital Energy)	Breath Rate, perseverance, discipline, Self-regulation	Breathing Practices Pranayama, Kriyas
Manomaya (Mind)	Emotions and feelings, a deep relationship between mind, intellect and body. Empathy	Bhajan, Chanting, Meditation, Creativity
Vijananamaya (Intellect)	Intellect, Will power, guiding factor in man's actions, motivation	Lectures, Diary entry
Anandamaya (Peace)	Joy and bliss, eternal peace, Altruism, love and harmony between the inner self and the outer world.	Karma Yoga, Happy assembly, Games

5A.2. Integrated Yoga Module Design

A general outline and schedule layout of the intervention module is taken from a series of Personality development camps happening in SVYASA for past 25 years. The components are specially modified according to the need and plan of the study. Since the module is being used for improving the overall fitness of adolescents, utmost care is taken to include various yogic components of physical, psychological and social development.

5A.3. Development Process

The module comprises of nine broad components

- 1) Prayer
- 2) Sithili-karna-vyayama and Asana
- 3) Breathing practices and Pranayama
- 4) Meditation and Relaxations
- 5) Jnana Yoga (Knowledge Points)
- 6) Bhakti Yoga (chanting and spiritual singing)
- 7) Karma Yoga (altruistic behaviour/ selfless service)
- 8) Krida Yoga
- 9) Happy Assembly

TABLE 8. Justification of components

Components	Justification
Prayer	<ul style="list-style-type: none"> • good health and healing (Tanya Marie Luhrmann, 2013) • associated with changes in cognitive processing (T M Luhrmann, Nusbaum, & Thiste, 2013)
Loosening practices & Asana	<ul style="list-style-type: none"> • play an important role in healthy development • improvement in physical activity • cardiorespiratory fitness • metabolic parameters • coordination, • sport competence, • flexibility, • muscular strength, balance, speed/agility and static strength (Felver et al., 2015; Seo et al., 2012)
Surya Namaskara	<ul style="list-style-type: none"> • complete mind-body yogic program (Bhutkar et al., 2011) • Musculoskeletal system activation

(Sun Salutation)	<ul style="list-style-type: none"> • Enhance executive function • Promotes well-being
Breathing practices & Pranayama	<ul style="list-style-type: none"> • improve respiratory function • develop mind-body awareness • Expansion of awareness • balancing of the autonomic nervous system, • mental focus and attention (Felver et al., 2015; Kaley-Isley et al., 2010). • Calming down the mind • Harmonizes the hypothalamic functions
Meditation & Relaxation	<ul style="list-style-type: none"> • develop mind-body awareness • reduce sympathetic activity and activated the parasympathetic nervous system • enhance attention (van de Weijer-Bergsma, Formsma, de Bruin, & Bögels, 2012) • cognitive control (Moore & Malinowski, 2009) • emotion regulation (Tang, Yang, Leve, & Harold, 2012) • reduce psychological distress (Robins, Keng, Ekblad, & Brantley, 2012) • evoke a calming effect (Frank et al., 2014b)
Jnana Yoga	<p>Yama, Niyama concepts</p> <ul style="list-style-type: none"> • refer to behaviour and beliefs that support healthy functioning • relevant to physiology • psychology of physical, psychological and social domains • Cultivate self-awareness • Self-discipline • Learn to response not to react <p>Yogic concept of food</p> <ul style="list-style-type: none"> • Mindful eating • Food types (rajasic, tamasic and satavic) <p>Lectures on different topics from experts and daily journal</p> <ul style="list-style-type: none"> • promotes critical self-reflection • enhance ability at self-discovery (Hiemstra, 2001) <p>Story-telling sessions, making story strings and other activities</p> <ul style="list-style-type: none"> • promote expression

	<ul style="list-style-type: none"> • communication • focus helping to shape creative talent (Hartzell & Hong, 2016) <p>Creativity session (role-plays)</p> <ul style="list-style-type: none"> • encourage social learning experience (Russell & Shepherd, 2010) • leadership • Remove stage fear • improve confidence
Bhakti Yoga	<p>Mantra chanting</p> <ul style="list-style-type: none"> • calming and focusing of the mind and body • deep relaxation (Tomasino, Fregona, Skrap, & Fabbro, 2012) <p>Singing songs</p> <ul style="list-style-type: none"> • improves mood • reduces anxiety • helpful in interaction and communication (Preyde, Berends, Parehk, & Heintzman, 2017)
Karma Yoga	<ul style="list-style-type: none"> • aid in the treatment of stress disorders (A. Kumar & Kumar, 2013) • was helpful in developing altruistic (pro-social) behavior (Mulla & Krishnan, 2008) • related to high dutifulness (Mulla, Krishnan, & Gita, 2006) • emotional intelligence (Mulla, Zubin R.; Krishnan, 2007) • understand the value of doing a service that helps their surroundings • learn practical aspects of positive psychology to improve one's lifestyle
Krida Yoga	<ul style="list-style-type: none"> • encourage participation • team building • can be an outlet for the child's everyday stress and boredom (Rhonda Clements, 2004) • Keep away from the addiction of electronic gadgets • sportsmanship
Happy Assembly	<ul style="list-style-type: none"> • social skills • Learn to enjoy together • Learn friendly bonding

TABLE 9. List of practices of the Integrated Yoga module

Component	Content	Detail Activities	Target Area
Prayer	Morning prayer	àat> Smraim c Étt's'>. 1. àatÉj aim mnsa vcsam!..... dvdvmj mCytma=rGyrm! 2. àatnñaim tms> àitÉaist<v! 3. (composed by Sri Adi Shankaracharya)	Mental, spiritual and Intellectual level
	Opening prayer	` sh navvt!..... ma iviÖ; avhē ` zaiNt> zaiNt> zaiNt>. (Taitt. Upanishad 2.1 Shanti Mantra)	
	Closing prayer	svÉvNtusion> ÊoÉag Évt! ` zaiNt> zaiNt> zaiNt>.	
	Bhojan mantra	Ah<vñanraeÉTva ctiv&km! AÚpl[Bsdapl[B..... dēh c pavt!. äüapl[m! äühiv>..... äükmbmaixna. (Bhagwat Gita 15.14 & 4.24)	
Warm up and loosening practices	Warm up	Jogging, jumping, forward & backward bending, Side bends, Twisting	Physical and Vital energy level
	Anga-sanchalana	Loosening for toes, ankle, knee, hips, fingers, wrist, elbow and neck	
	Stretching with breathing	Hands stretch, Ankle stretch, Back stretch, Tiger stretch, Lumber stretch	
	Shakti-chalana	Cycling, Rowing, Rocking and rolling	

Asana	Standing postures	Foot palm posture (<i>Pādahastāsana</i>) Half waist rotation posture (<i>Ardhakaṭi cakrāsana</i>) Half wheel posture (<i>Ardha cakrāsana</i>) Triangle posture (<i>Trikoṇāsana</i>) Tree posture (<i>Vṛkṣāsana</i>)	Physical, mental, and vital energy level
	Sitting postures	Diamond (<i>Vajrāsana</i>) Rabbit posture (<i>Śaśaṅkāsana</i>) Camel posture (<i>Uṣṭrāsana</i>) Posterior stretch (<i>Paścimottānāsana</i>) Spinal twist posture (<i>Ardhamatsyendrāsana</i>)	
	Prone postures	Cobra posture (<i>Bhujāṅgāsana</i>) Grasshopper posture (<i>Salabhāsana</i>) Bow posture (<i>Dhanurāsana</i>) Shoulder stand (<i>Sarvāṅgāsana</i>)	
	Supine postures	Fish posture (<i>Matsyāsana</i>) Boat posture (<i>Naukāsana</i>)	
Surya Namaskara	Each round of 12 Steps	1 st round with mantra, rest 11 rounds without mantra	Physical, psychological, and vital energy level
Breathing practices	Conscious breathing	Awareness of natural breathing pattern	
	Sectional breathing	Separately Abdominal, Thoracic, and Clavicular breathing	
	full yogic breathing	Combination of Abdominal, Thoracic, and Clavicular breathing	

Pranayama	Dynamic pranayama	Bhastrika (Breathing with rapid inhalation and exhalation)	Physiological, vital, and psychological levels
	Balancing pranayama	Anulom-vilom (Slow and rhythmic alternate nostril breathing)	
	Cooling pranayama	Shitli (Inhalation through mouth - beak of the tongue)	
	Tranquilising pranayama	Bhramari (Exhalation making a honey-bee sound)	
	Mudra	Jnana mudra	
Relaxation	DRT (Deep Relaxation Technique)	Toes to head guided relaxation	
	IRT (Instant Relaxation Technique)	By tightening body parts sequentially	
	QRT (Quick Relaxation Technique).	Awareness of breath simultaneously belly movement	
Meditation	OM meditation	Chanting OM mentally – fast/slow	
	CM (Cyclic meditation)	Based on alternate stimulation and relaxation	
Jnana Yoga	Lectures	Topics indirectly related to yama niyama concepts (Table 10)	Intellectual, mental, psychological, and psychosocial level
	Creativity session (Individual activity)	Emotion wheel Goal setting (what is my goal) Face mask for your friend Traffic light (concept of anger) Turtle (be composed) Motivation collage	

	Creativity session (Group activity)	Don't get mad Story string Parables and moral stories Role play Best from the waste Screening short film on leadership	
	Diary writing	Scan of the day	
Bhakti Yoga	Chanting	Bhagwat Gita bhakti Yoga from Vyasa Pushpanjali (SVYASA)	Spiritual, psychological, and social level
	Spiritual song	Har desh main tu.....	
	Motivational song	Galat mat kadam uthao....	
	Patriotic songs	Bane hum Rashtra ke yogi..... Chandan hai is desh ki mati....	
Karma Yoga	Altruistic selfless activities	Kitchen help Cleaning the surrounding Serving food Arranging the library	Spiritual, psychological, and social level
Krida Yoga	Indoor or Outdoor games	Self help Follow the leader All tied up (human pretzel) Passing the parcel and perform Eagle race Fish in the net Kabaddi Dog and bone	Social, physical, and mental level
Happy Assembly	Cultural events	Performance done by trainers for children	Mental and social level

TABLE 10. Topics of lectures and themes of creativity sessions

Day of holistic program	Lectures and themes of creativity sessions
1	Yoga and self-awareness - <i>Iswara Pranidana</i> (Surrender to Supreme)
2	Emotions, management and regulation strategies - <i>Santosha</i> (contentment), <i>Brahmacharya</i> (self-restraint), <i>Shoucha</i> (cleanliness)
3	Self-motivation - <i>Swadhyaya</i> (self-awareness)
4	Morality and Prosocial behaviour - <i>Satya</i> (truthfulness), <i>Asteya</i> (non-stealing)
5	Anger management - <i>Ahimsa</i> (non-violence)
6	Leadership, team building - <i>Tapas</i> (penance)
7	Social skills, communication - <i>Aparigraha</i> (non-covetousness)

5A.4. Module Validation

Frame-work and content of yoga module was prepared providing justification for each technique selected. This framework was validated with yoga experts of SVYASA.

The Integrated Yoga module for adolescents was in a residential camp format. The ability to implement in the camp settings, the redundancy of the activity and the relevance to the Indian settings was taken into consideration in deciding the importance of the activity before integrating them into the daily schedule of the camp. The compilation of the activities in every aspect results in identifying the practical model underpinning the yoga intervention enhancement in physical, psychological, and social fitness.

Yogic lifestyle, yogic diet, yogic attitudes and various yogic practices help children to strengthen the body and mind and develop positive health, enabling adolescents to withstand stress by normalizing the perception of stress, optimizing the reaction to it and by effectively releasing the pent-up stress through various yogic practices.

5B. METHODS FOR PRE-POST INTERVENTIONAL STUDY

The seven-day program was tested for its efficacy in changing the overall fitness in young adolescents by conducting a residential camp. The methodology of the study is described below.

5B.1. SAMPLE (Participants)

The participants of the study included healthy adolescents of both genders, aged between 9 and 16 years, studying in English-medium schools.

5B.1.1. Selection and Source of Sample

Participants were selected from children who had registered to attend the 10-day residential summer yoga programs, conducted in three camps, at SVYASA University campus, Prashanti Kutiram, Bengaluru. These three camps, conducted between 1st and 10th, 11th and 20th, 21st and 30th of April, in year 2016, naturally formed the three cohorts for the study. Since, the selection of participants was from a summer yoga camp (during the summer break) as they came from different parts of south India, there was good heterogeneity of the sample with respect to family backgrounds, socio-economic strata, cultures, traditions, faiths, and academic backgrounds.

5B.1.2. Sample Size and Sampling Technique

This study employed a convenient method of sampling. Based on the previous published article (Telles et al., 2013) the standard deviation in pre-test was 28.18 and the standard deviation in post-test was 20.95 with the mean difference of 3.7, yielding an effect size of 0.151. Considering a (type I error) to be 5%, the power (1- β) of the study to be 90%, and a

desired 95% confidence interval with 2 tailed test, the required sample size would be 465. Considering a dropout rate of 10%, the recruited 510 individual in the study. A total of 640 students enrolled for the program. All children who had registered for camp participated in the processes. After screening considering inclusion exclusion criteria, the actual sample size was 510. Since, the age range 9-16 is wide considering the rapid changes during adolescence, the participants were divided into juniors (9-12years) and seniors (13-16years). All details of registered and recruited sample are shown in table 11.

TABLE 11. Details of the total sample

Batch	Gender	Senior		Junior		Total	
		Registered	Selected	Registered	Selected	Registered	Selected
1	Boys	35	30	73	57	108	87
	Girls	28	25	42	36	70	61
	Total	63	55	115	93	178	148
2	Boys	58	50	96	72	154	122
	Girls	29	27	35	18	64	45
	Total	87	77	131	90	218	167
3	Boys	66	54	94	67	160	121
	Girls	30	29	54	45	84	74
	Total	96	83	148	112	244	195

They were further randomly subdivided into smaller groups of 14-24 participants, which made it easier to implement the intervention. Each smaller group was supervised by two or three teachers for better monitoring. All teachers were undergraduates in yoga and trained on the implementation of the intervention to ensure uniformity.

TABLE 12. Sub-group allocation

Age group	Sub-group name	Batch 1 (April 1 st to April 10 th)	Batch 2 (April 11 th to April 20 th)	Batch 3 (April 21 st to April 30 th)
Seniors (13 – 16)	Bhakti	16	22	24
	Jnana	16	22	24
	Karma	15	22	24
	Raja	16	21	24
Juniors (9 – 12)	Abhimanyu	14	16	18
	Arjun	14	16	19
	Hanuman	14	17	18
	Meera	15	17	18
	Parth	14	16	19
	Prahlad	14	16	19
	Radha	15	16	18
	Sudama	15	17	19
Total		178	218	244

5B.1.3. Criteria

5B.1.3.1. Inclusion Criteria

1. Adolescent children of both genders aged between 9 and 16 years.
2. Studying in English-medium schools.
3. Normal health based on their self-report and report by parent/guardian.
4. Not reported having fallen sick in past two months.

5B.1.3.2. Exclusion Criteria

1. Subjects from single parent or no parent.
2. Those with history of chronic health problems or on medication.
3. Those having attended any residential yoga in the last three months.
4. Parents not consenting for their children to participate in the study.

5B.1.4. Ethical Considerations

5B.1.4.1. Ethical Clearance

Ethical approval was obtained from the Institutional Ethical Committee of S-VYASA with reference number RES/IEC-SVYASA/64/2015 prior to the screening and recruitment of the study subjects.

5B.1.4.2. Informed consent Process

Parents / legal guardians of the children were contacted over the telephone or personally by the researcher, prior to the start of the camp and informed of the study plan. A signed informed consent from parents was obtained for their children to participate in the study. On the first day of the camp, signed informed assent from all the participants whose parents have consented was obtained after explaining the study in detail prior to screening. Templates of all these documents are placed as annexure to this report. Once both these forms were obtained, the process of screening and recruitment was done.

The study is registered in the Clinical Trials Registry of India bearing the trail number CTRI/2018/02/011709.

5B.2. DESIGN OF THE STUDY

It is a single arm pre-post experimental study carried out in a residential setting (Residential Yoga Camp for adolescents). Three independent 10-day residential camps for personality development were organized during the summer by VYASA organization. While the duration of the camp was 10 days, the yoga intervention schedule was followed from day 2 to day 8 across the three camps. Eligible adolescents underwent the same yoga intervention program

with the same instructors, living conditions, daily routine, and dietary plan. Data was collected from both children as well as parents using the respective questionnaires.

TABLE 13. Plan of the 10 day camp

Day 1	Pre-data collection
Day 2 – Day 8	Full day formal intervention
Day 9	Post-data collection
Day 10	Valedictory function and see off / departure to their homes

5B.3. PARAMETERS AND ASSESSMENT TOOLS

Parameters (Dependent variables) and assessment tools and tests are provided in the table 14 below.

TABLE 14. Overview of parameters (measures) and assessment tools (instruments)

Domain	Measures	Instrument	
Physical	Strength	EUROFIT Physical Fitness Test Battery	Standing board jump (SBJ), Sit-Ups Test (SUP)
	Flexibility		Sit-and-Reach Test (SAR)
	Speed		10x5m Shuttle run (10x5mR)
	Coordination		Plate-Tapping Test (PLT)
	Anthropometry	Height, Weight, BMI (Wt in kg)/(Ht in m) ²	
Psychological	Emotional Intelligence	SEIS (Schutte Emotional Intelligence Scale)	
	Emotion regulation	CERQ-kids (Cognitive Emotion Regulation Questionnaire)	
	Self-concept	Self-concept scale	
	Anger	CAS (Clinical anger scale)	

Psychosocial	Empathy	Teen Empathy
	Altruism	Teen Altruism
	Social Competence	Teen social competence
	Relationships	Positive parent relationship Peer relationships
Demographic	Socio-demography	Age, gender, Handedness, Family type, family background, sibling hierarchy, father's age, mother's age etc.

5B.3.1. Details of Assessment Tools

5B.3.1.1. Socio-demographic measures

Children and parents completed a short demographic questionnaire to obtain descriptive data for the sample. Screening sheet were filled by parents and children. Variables included age, gender, handedness, family type, family background, sibling hierarchy, father's age, mother's age, and so on.

5B.3.1.2. Physical Fitness

The assessments for physical fitness measures were done using Eurofit physical fitness testing battery. This battery of tests, designed by the European Council (Council of Europe. Committee for the Development of Sport.; Committee of Experts on Sports Research., 1988), is a standardized set of tasks evaluating physical speed, strength, flexibility, balance, and agility. Participants were instructed and familiarized with each of the tests prior to administration. The tests selected from the battery are detailed below.

- Anthropometry: Height and weight was measured using standard measuring device. Body mass index (BMI) was calculated by using formula $BMI = (\text{Weight in kg}) / (\text{height in m})^2$.

- Plate-Tapping Test (PLT): On the table two discs were placed 60 cm apart with a rectangle in the centre. Keeping the non-preferred hand on the rectangle, participants moved the preferred hand back and forth between the discs as quickly as possible. The time taken to complete 25 cycles ((50 taps) was recorded using a stopwatch. The process was done twice and the best result was recorded.
- Sit-and-Reach Test (SAR): Trunk flexibility was measured with participant seated on the floor with legs extended to front with knee locked. The soles of the feet were placed flat against the sit and reach box. Participants were asked to reach forward along the measuring line as far as possible by keeping hands side by side with palms facing downwards. After some practice reaches, the maximum distance was recorded to the nearest centimeter.
- Standing board jump (SBJ): The starting line was marked on a sturdy mat. The participants were told to stand behind the starting line and to jump forward by swinging arms and slightly bending their knees and land on both feet. The distance from the starting line to the back of their heels was measured. This process was done three times and the best attempt was recorded.
- Sit-Ups Test (SUP): This test was done by lying down in supine position with bent knees at right angle, feet on the floor held down by the trainer and hand crossed over chest with palms on opposite shoulders. Lifting the upper body to a vertical position and then back to the supine position was counted as one sit-up. Number of sit-ups in 30 seconds was recorded.
- 10x5m Shuttle run (10x5mR): Two lines were made 10 meters apart and the participant was told to stand behind the starting line with preferred leg forward. After the whistle, the participant started running to the other line, crossed it, and

then ran back to the starting line. Time taken to complete five round-trips at maximum speed between the two lines was recorded in seconds.

5B.3.1.3. Psychological Fitness

The participants were assessed for psychological fitness like emotional intelligence, emotion regulation strategies, anger, and self-concept and assessment of the psychological fitness parameters was done using following psychometric tools:

- SEIS (Schutte Emotional Intelligence Scale): This self-reported scale is based on the Salovey and Mayer's (1990) original model of emotional intelligence. It is a reliable and valid measure of EI developed by Schutte et al through principal component, orthogonal-rotation and factor analysis (Schutte et al., 1998) and reported a two-week test-retest reliability of .78 for total scale scores (Schutte, Malouff, & Bhullar, 2009). This is a 33-item scale with test-retest reliability of 0.78 for total scale scores. Overall total EI score has been shown to be durable and reliable across validation studies (Thomas, Cassady, & Heller, 2017). Each item has a 5-point Likert rating from 1 (strongly disagree) to 5 (strongly agree). Some item has reverse coding. The total score ranges between 33 to 165, high score indicates more characteristic EI (Schutte et al., 2009). Respondents require on average five minutes to complete the scale.
- CERQ-short (Cognitive Emotion Regulation Questionnaire): The 9-factor measurement model for the CERQ-short is a self-report questionnaire measuring cognitive coping strategies of adults and adolescents. This 18-item self-reported questionnaire comprises of nine domains (Self-blame, Other-blame, Rumination, Catastrophizing, Positive refocusing, Refocus on planning, Positive reappraisal,

Putting into perspective and Acceptance) independent of one another. Each item has a 5-point Likert rating from 1 (almost never) to 5 (almost always). Each domain has different scoring, high score represents often-used cognitive coping strategy. Cronbach's alpha reliability coefficient ranged from 0.73 to 0.81 (Garnefski & Kraaij, 2006).

- CAS (Clinical anger Scale): This 21-item self-reported scale is designed to measure different symptoms of clinical anger (Snell, Gum, Shuck, Mosley, & Kite, 1995). Preliminary evidence for the validity of the CAS was demonstrated in a series of analyses showing that clinical anger can be related in a systematic and interpretable manner with measures of state anger, trait anger, anger control, and anger expressed inwardly and outwardly and yielded reliability coefficients of 0.94 (males and females together) (Snell et al., 1995). According to the recent study CAS evidenced good internal consistency ($\alpha = 0.92$) (Hawkins et al., 2014). Each item has a 4-point Likert rating from 0 (I feel fine) to 3 (I feel completely miserable). The total score ranges between 0 to 63, high score represents high clinical anger. This scale has reliability coefficients of 0.94 (males and females together) (Snell et al., 1995).
- Self-Concept: This 30 item self-report scale comprises of five domains that make up an adolescent's self-concept: 1. Athletic Competence, 2. Conduct/Morality, 3. Peer Acceptance, 4. Physical Appearance, 5. Scholastic Competence. Each item has a 5-point rating from 1 (strongly disagree) to 5 (strongly agree). Some item has reverse coding. An adolescent can make targeted self-evaluations in a number of different domains. High score indicates positive self-concept (Hadley et al., 2008).

5B.3.1.4. Social Fitness:

The participants were assessed for psychosocial fitness and outcome measures are Social competence, Teen empathy, Teen altruism, Positive parent relationship and Peer friendships. The psychometrics of the questionnaires below have been established by Child Trends (Laura Lippman, Kristin Anderson Moore, Lina Guzman, Renee Ryberg, Hugh McIntosh, Manica Ramos, Salma Caal, Adam Carle, Megan Kuhfeld, Laura Lippman, Kristin Anderson Moore, Lina Guzman, Renee Ryberg, Hugh McIntosh, Manica Ramos, Salma Caal, Adam Carle, 2014; Lippman, Moore, & McIntosh, 2011). Confirmatory factor analyses supported the unidimensionality of the scale.

- Social Competence Questionnaire: This is a self-reported questionnaire to measure the social competence. In this study, 9-item scale was used. Each item has a 5-point Likert rating from 1 (None of the time) to 5 (All of the time). The total score ranges between 9 to 45, high score represents high social competence. This scale has a sound psychometric properties, good internal validity, and reported Cronbach's alpha as 0.79.
- Teen Empathy: This is a short, self-reported questionnaire to measure empathy. This scale consists of 4 items and is very sensitive to change in empathetic behavior. Each item has a 5-point Likert rating from 1 (Not at all like me) to 5 (Exactly like me). The total score ranges between 5 to 20, high score represents high empathy. This scale has a sound psychometric properties and reported Cronbach's alpha as 0.84.
- Teen Altruism: This is a short, self-reported questionnaire to measure altruistic behavior. This scale consists of 4 items and is very sensitive to change. Each item has a 5-point Likert rating from 1 (Not at all like me) to 5 (Exactly like me). The

total score ranges between 5 to 20, high score represents high altruism. This scale has a sound psychometric properties and reported Cronbach's alpha as 0.80.

- Positive Relationship with Parents: This is a self-reported questionnaire to measure teen-parent relationship. This scale consists of 6 items. Each item has a 5-point Likert rating from 1 (None of the time) to 5 (All of the time). The total score ranges between 6 to 30, high score represents better relationship. This scale has a sound psychometric properties, a good internal validity and reported Cronbach's alpha as 0.92.
- Peer friendships: This is a self-reported questionnaire to measure peer relationship. This scale consists of 5 items and is very sensitive to change. Each item has a 5-point Likert rating from 1 (Not at all like me) to 5 (Exactly like me). The total score ranges between 5 to 25, high score represents better friendships. This scale had a good internal validity (Cronbach's Alpha=0.91).

5B.3.2.Detailed Procedure

On the first day of the camp, during registration, parents were briefed about the study and handed over an information leaflet about the study. Signed consent was obtained from them.

Parents were requested to fill the parent version of four questionnaires within social domain.

After registration, participants (children) were greeted in a traditional style and led into their respective halls. Division was done based on the age groups and they were further randomly divided into 12 smaller groups (4 senior and 8 junior groups) of 14-24, depending on the total number of participants in the batch. All the trainers were introduced to the participants. Two trainers were assigned to each group. Enough time was given to them to get familiar with each

other. Later, the study was briefly explained to them and Information leaflet of the study was handed over for their record. Following points were clearly conveyed to them:

- Informed about the data collection
- About the confidentiality of study
- Their full right to withdraw their participation at any point of the study
- Participation depend on their choice and no compulsion
- Their responses in data collection will not affect their participation in the program
- Their opinions will be kept highly confidential

Further, assent forms were given to them to sign and the screening was done. Demographic data was collected using a demographic information form. All the participants were requested to fill up the questionnaires honestly. Templates of all these documents are placed as annexure to this report.

Trail Profile

Day 1 Pre Data	7 days Yoga-based holistic program	Day 9 Post Data
Batch 1(n=148)		Batch 1(n=148)
Batch 2(n=167)		Batch 2(n=167)
Batch 3(n=195)		Batch 3(n=195)

Data collection was done for the children on the first day (pre-data) and ninth day (post-data) of the camp, in small group settings by trained researchers. The test sheets (questionnaires) were distributed among the participants and instructed to mark their response in the test sheet. A brief explanation of each questionnaire was orally made to facilitate the children in filling up the same. Designated time was provided to fill and the trained staffs

were present to assist them for any query. All the filled sheets were checked by respective group staff for completion of sheets and got signed and dropped in the data collection box. In the case of any confusion, the investigator and two teachers were available to clear doubts and provide unbiased guidance during the data collection.

Eurofit battery tests were performed accordingly. Small station set ups were done for each performance test by the investigators. Three trained researchers were available on each station for data collection. Out of them, one was supervising the test process, one with measuring instrument, and another one was recording the result and signing the sheets for confirmation of the test completion. Each participant was provided with individual excel sheet table with all the details. When the participant came to the station, he/she handed over the sheet to the researcher (who filled the result column). Subjects finished the test and took the signature on his/her sheet and move on to the next station. After finishing of all the tests, the participant handed over the sheet to the senior researchers who checked the sheet and signed it and put it in the collection box. Calibrated stop watches, standard measurements, and test materials were used to conduct the tests and record the data.

5B.3.3. Parental Follow Up

Data collection from the parents was done on the first day (pre-data), when they came to drop their wards to the camp, and after three months (post-data) as a follow-up data by sending the questionnaire through email. Parental data collection was done by using Parent version of Empathy, Altruism, Parent relationships and Peer relationship scales respectively. For parental post data collection, google forms were sent to all the parents through email whose complete pre data was available. Telephonic consent was taken before sending the forms to

them. Parent data of other parameters was not collected as parent version of the scales were not available.

All recruited students completed their questionnaire prior and after the intervention. A total of 340 parental responses were collected before the intervention and 43 parental responses could be obtained as the follow-up data (post-data). There was huge drop out in parent's data in both pre data (340) and post data (43). The possible reasons for this dip in pre data of parents were because a) some parents did not come to drop the wards; b) some parents were not interested to participate in the study; and c) some parents were not conversant in English. In spite of repeated follow up, most of the parents did not respond to post data collection due to pre-occupation or paucity of time. Hence, analyses that involved data from adolescents and their parents was only possible for 43 subjects. Post three months data obtained from parents served to evaluate and analyze if the yoga intervention had long-term and sustained effects on social behavior.

5B.3.4. Blinding and Masking

Since this was a yoga interventional study there was no scope for double blinding. However the masking was ensured by coding the answer sheets that were kept away for scoring only after the completion of the study. Also it was ensured that the researcher who did the scoring was blinded to the intervention. The data was analyzed only after the completion of all three trials of the study.

5B.4. YOGA INTERVENTION

The modified version of Integrated Yoga Module (IYM), based on Pancha kosha model (five layers of existence) as explained in Taitairiya Upanishad, comprised of yogic techniques that benefit each of the koshas (Gross body – Annamaya Kosha, Energy body – Pranamaya Kosha, Emotional Body – Manomaya Kosha, Intellectual Body – Vijnanamaya Kosha, and Bliss Body – Anandamaya Kosha). The module was designed referring to various yogic texts on yoga for children and was modified in consultation with the subject experts with more than 25 years of experience in conducting these camps. The module was specially designed with suitably modified yogic techniques to address the needs of physical, psychological, and social health development.

The yoga module included Asana, Pranayama, Relaxation, Meditation and also Jnana Yoga (yama niyama concepts) and Bhakti Yoga (prayers and chantings). The Bhakti yoga sessions included chanting and singing while Jnana yoga sessions included lectures and creative displays, such as role-playing, story-telling, parables, journaling-diary entry and so on. The yamas and niyamas come under the heading ‘philosophical teachings’ that refers to the content of lessons and the messages that accompany the physical and meditative practices. In addition, the experts delivered special lectures on how to achieve healthier and happier lifestyle. Lecture and counseling session on adolescence sexual health was also arranged by specialist medical professionals separately for boys and girls. Few friendly competitions were organized between the groups to encourage participation and team building. The summary of the integrated yoga intervention program is provided in (table 16).

5B.4.1. Time Duration and Implementation

The total duration of intervention is 7 days, with a daily schedule elucidated in the Table 15. Different yoga practices targeted physical, psychological and social health development for adolescents for 7 days, starting from 5 am to 9.30 pm every day. The sessions were administered in a manner that kept the program engaging and interesting to the selected age group. Skits, cultural programs, and yoga sessions were mixed for diversity to encourage students not to get bored. The participants were provided many sessions in small groups in the supervision of two trained teachers to implement the yoga intervention uniformly. Yoga sessions were conducted in-door in the auditorium with carpet flooring. Children practiced yoga in their comfortable loose clothes bare feet, removing the shoes and socks. Waist belts were either loosened or removed. Girl children during menstrual cycle were refrained from practicing yogic postures but are asked to be present in the session.

TABLE 15. Daily Schedule of Intervention

Time	Session	Details
5am		Wake Up
5:30am to 5:45am	Session 1	Morning Prayers
5:45am to 6:45am	Session 2	Yoga Asana (Physical postures)
6:45am to 7:30am	Session 3	Chanting and meditation (CM)
7:30am to 8:15am		Breakfast
8:15am to 9.00am	Session 4	Selfless service (altruistic group activities)
9.00am to 10:00 am		Bath & Wash
10:00am to 11:00am	Session 5	Lecture
11:00am to 12:00pm	Session 6	Pranayama practice
12:00pm to 1:00pm		Lunch
1:00pm to 2:00pm	Session 7	Relaxation (Deep relaxation technique, Quick relaxation technique, Instant relaxation)
2:00pm to 3:30pm	Session 8	Creativity (role-playing, story-telling etc.)
	Session 9	Indoor activities (parables, spiritual singing)

4:30pm to 5:00pm		Snacks
5:00pm to 6:15pm	Session 10	Outdoor Activities (play, games, nature walk)
6:15pm to 7:15pm		Dinner
7:15pm to 8:45pm	Session 11	Happy assembly (Cultural Activities)
8:45pm to 9.15pm		Milk / Light Snack
9.15pm to 9:30pm	Session 12	Diary Writing
9:30pm		Good Night

TABLE 16. Summary of the integrated yoga intervention program

SI No.	Name of the intervention session	Duration
1.	Prayer session	15 min
2.	Asana sessions: Standing postures, Sitting postures, Prone postures, Inverted postures, Supine postures	2 Hours
3.	Meditation session: Om meditation, Cyclic meditation	45 min
4.	Pranayama Session: Conscious breathing, Sectional breathing, Full yogic breathing, Dynamic (Bhastrika, Kapalbhathi), Balancing (Anuloma-viloma), Cooling (Shitli), Tranquilizing (Bhramari)	1 hour
5.	Relaxation session: IRT (Instant Relaxation Technique), QRT (Quick Relaxation Technique), DRT (Deep Relaxation Technique)	1 hour
6.	Lecture session: Yama-niyama concepts, Physical adolescent health, Emotional appraisal and control, Pro-social behavior	1 hour
7.	Chanting and singing session: 18 verses from Bhagavad Gita, Devotional songs, Patriotic songs	1 hour
8.	Creativity sessions: Karma yoga (altruistic group activities), Role modeling, Parables, Storytelling, Diary writing, Competitions	2 hours
9.	Game session: Yogic games, Group awareness	1 hour
10.	Happy assembly: Cultural program	1 hour

5B.5. DATA EXTRACTION

The data was collected from all eligible participants through self-reported questionnaires and performance tasks. During the data entry, on the basis of inclusion and exclusion criteria, selected data (N = 510) was entered in excel sheets and used for analysis.

5B.6. DATA ANALYSIS

A total of 510 participants' data was considered out of 640 for analysis. Around 130 participants were excluded from the data analysis on the basis of the criteria, however they were very much part of the data collection and intervention program. 510 participants comprised of 148 (87 boys and 61 girls), 167 (122 boys and 45 girls) and 195 (121 boys and 74 girls) in batch 1, 2, and 3, respectively. To maintain the confidentiality, the data sheets were coded and names and other personal identifiers were omitted during data entry. Analysis was done using SPSS (Version 16). While normality was assessed we proceeded to do parametric test considering the large sample size. The analysis was done in batches (batch 1, batch 2, and batch 3), age, and gender groups for physical, psychological, and social domains separately. Further, the analysis was done combining all the three batches. Most of the comparisons were made using paired t-test. Change over time was evaluated using the paired samples t-test and differences in change scores (δ scores) between genders and two sub groups of age was done using independent samples t-test. The mechanism of action was assessed by correlating between change scores. Correlation was done using Pearson's R. The results of the tests were deemed to be significant if probability values were less than 0.05, whereas trends ($p < 0.1$) have also been highlighted.

CHAPTER 6

RESULTS



6.0. RESULTS

The effect of a short-term residential yoga intervention was evaluated for its benefits on physical, psychological and social fitness parameters, by a single arm pre-post study, in three individual cohorts of adolescents. Further, the analysis was also done with all the subjects to see cumulative improvement.

TABLE 17. Age-wise and gender-wise details of the samples eligible for study

	Batch 1	Batch 2	Batch 3	Total
Girls	61 (41.22%)	45 (26.94%)	74 (37.94%)	180
Boys	87 (58.78%)	122 (73.05%)	121(62.05%)	330
	148	167	195	510
Junior	93 (62.84%)	90 (53.89%)	112 (57.44%)	295
Seniors	55 (37.16%)	77 (46.11%)	83 (42.56%)	215
	148	167	195	510

6.1. PHYSICAL PARAMETERS

The three cohorts comprised of 145 (41.38% girls) (62.76% juniors), 166 (27.11% girls) (59.64% juniors), and 194 (38.14% girls) (57.22% juniors), with a mean age of 11.84 ± 1.77 , 12.22 ± 1.82 , and 12.06 ± 1.82 , respectively. Physical fitness measures were evaluated using EUROFIT (European Test of Physical Fitness) battery.

6.1.1. Comparisons between the Independent Cohorts

As seen in Table 18, comparing pre and post data for each of the cohorts, there was significant ($p < 0.001$) decrease in scores of weight and BMI in all the three cohorts. Time taken in 10x5mR has not shown significant change in batch 1 and batch 2 but significant change was

seen in batch 3 ($p = 0.020$). The scores of SBJ in batch 1 ($p = 0.001$) and batch 2 ($p < 0.001$) increased significantly and a positive trend was observed in batch 3 ($p = 0.061$). Time taken for PLT was significantly decreased in batch 1 ($p < 0.001$) and batch 3 ($p < 0.001$) but significant increase was observed in batch 2. The SUP scores were significantly increased in batch 1 ($p = 0.003$), batch 2 ($p < 0.001$) and batch 3 ($p < 0.001$). The scores of SAR in batch 1 ($p < 0.001$) and batch 2 ($p < 0.001$) increased significantly and a positive trend was observed in batch 3 ($p = 0.069$).

TABLE 18. Comparison of pre-post data of the three cohorts

Measures	Batch 1 (n=145)			Batch 2 (n=166)			Batch 3 (n=194)		
	Pre Mean (\pm SD)	Post Mean (\pm SD)	p value	Pre Mean (\pm SD)	Post Mean (\pm SD)	p value	Pre Mean (\pm SD)	Post Mean (\pm SD)	p value
Weight (kg)	43.42 \pm 13.20	42.32 \pm 13.15	< 0.001*	41.33 \pm 12.24	40.47 \pm 12.08	< 0.001*	44.04 \pm 12.38	42.75 \pm 12.41	< 0.001*
BMI (kg/m ²)	19.34 \pm 3.80	18.84 \pm 3.80	< 0.001*	18.24 \pm 3.95	17.85 \pm 3.86	< 0.001*	19.28 \pm 4.98	18.68 \pm 4.93	< 0.001*
10x5mR (sec)	15.81 \pm 1.63	15.79 \pm 1.73	0.888	15.91 \pm 1.69	15.82 \pm 1.66	0.301	16.27 \pm 1.59	16.11 \pm 1.77	0.020*
SBJ (cm)	126.44 \pm 27.87	131.35 \pm 27.36	0.001*	128.34 \pm 25.82	136.71 \pm 25.44	< 0.001*	131.48 \pm 24.35	133.70 \pm 26.96	0.061
PLT (sec)	11.85 \pm 1.44	10.81 \pm 2.22	< 0.001*	12.01 \pm 2.07	12.95 \pm 2.55	< 0.001*	13.09 \pm 2.00	12.32 \pm 1.81	< 0.001*
SUP (freq./30s)	13.87 \pm 6.44	14.90 \pm 6.23	0.003*	15.93 \pm 6.35	17.33 \pm 6.37	< 0.001*	15.13 \pm 5.76	17.98 \pm 6.45	< 0.001*
SAR (cm)	31.78 \pm 6.31	33.22 \pm 7.29	< 0.001*	31.11 \pm 6.21	32.45 \pm 6.21	< 0.001*	31.12 \pm 7.21	31.69 \pm 7.06	0.069

BMI (Body mass index); PLT (Plate tapping); SAR (Sit and reach); SBJ (Standing board jump); SD (Standard deviation); SUP (Sit-ups); 10x5mR (Shuttle run); *indicates $p < 0.05$.

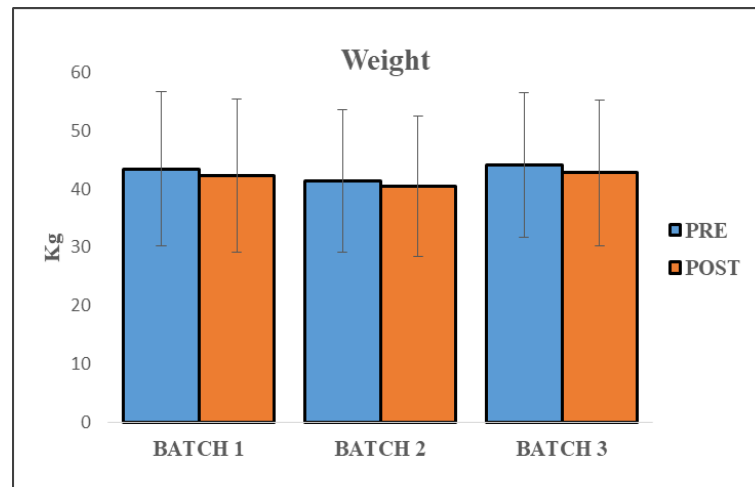
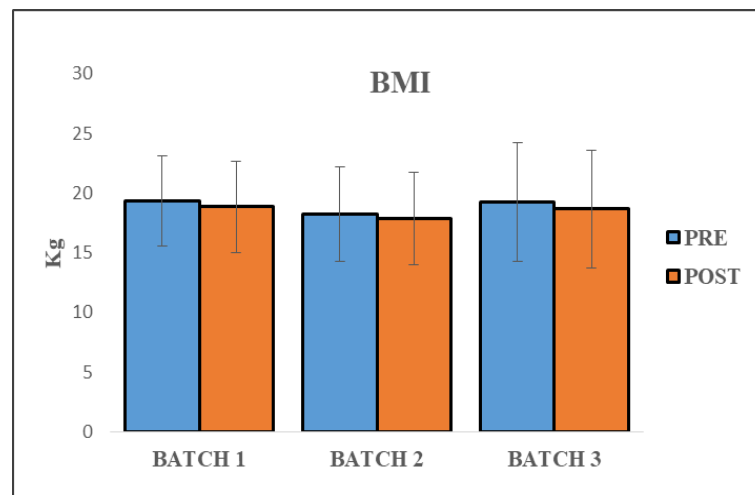
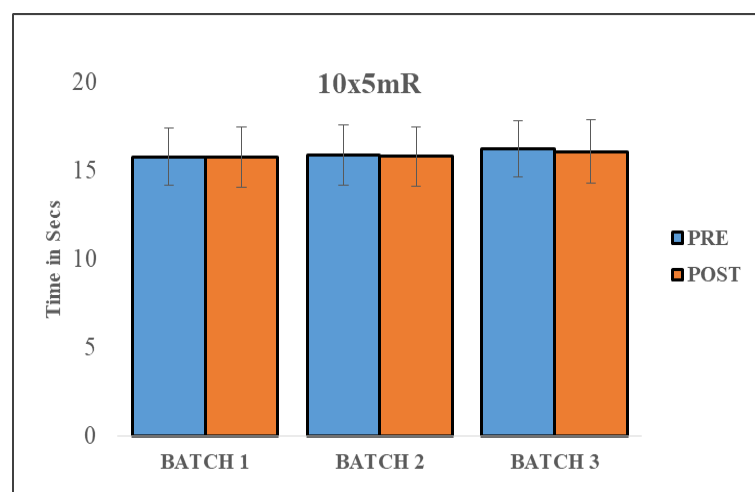
FIGURE 4. Pre-Post Changes on the Weight of the three cohorts**FIGURE 5. Pre-Post Changes on the BMI of the three cohorts****FIGURE 6. Pre-Post Changes on the 10x5mR of the three cohorts**

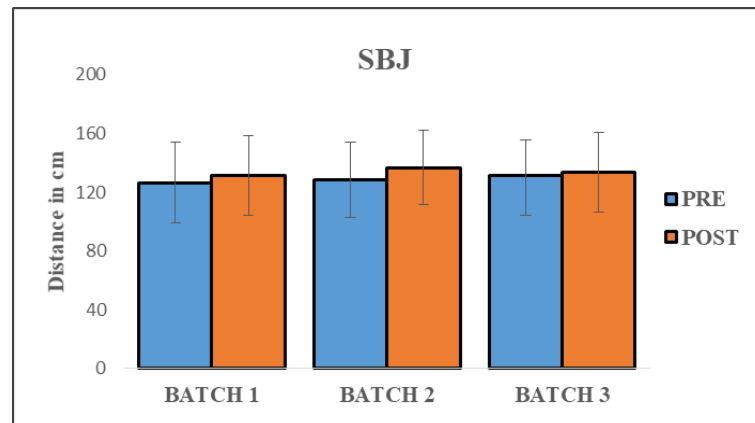
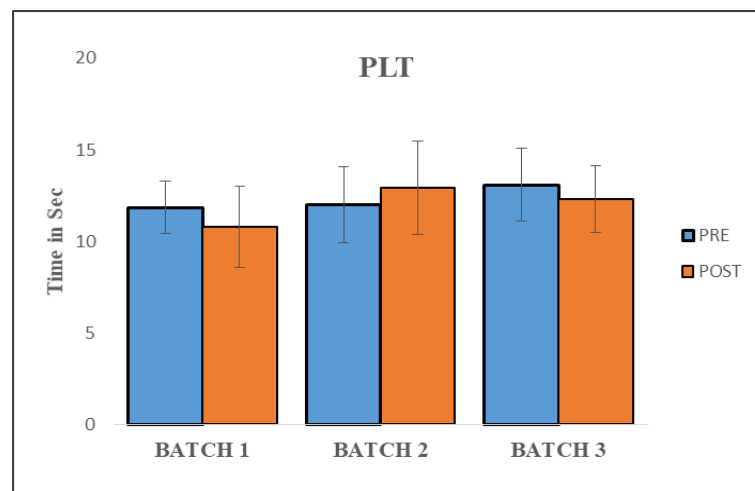
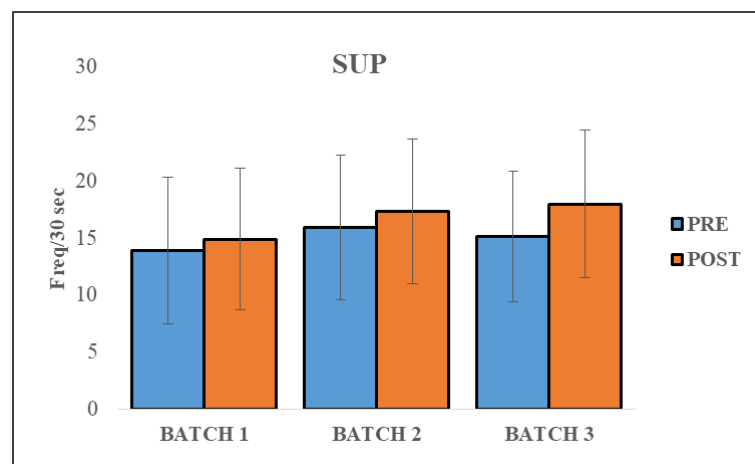
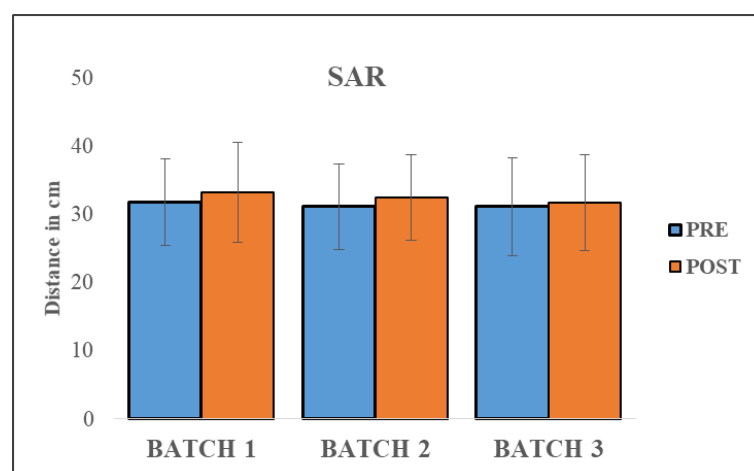
FIGURE 7. Pre-Post Changes on the SBJ of the three cohorts**FIGURE 8. Pre-Post Changes on the PLT of the three cohorts****FIGURE 9. Pre-Post Changes on the SUP of the three cohorts**

FIGURE 10. Pre-Post Changes on the SAR of the three cohorts

6.1.2. Juniors in all the Cohorts

Analysis of the junior subgroup, as presented in Table 19, showed significant decrease in the scores of Weight ($p < 0.001$) and BMI ($p < 0.001$) in all the three cohorts. Time taken in 10x5mR has not shown significant change in batch 1 and batch 3 but significant decrease was seen in batch 2. The scores of SBJ in batch 1 ($p = 0.012$) and batch 2 ($p < 0.001$) increased significantly and a slight decrease was observed in batch 3, but non-significant ($p = 0.272$). Time taken for PLT was significantly decreased in batch 1 ($p = 0.026$) and batch 3 ($p = 0.018$), respectively, but significant increase was observed in batch 2. The SUP scores were significantly increased ($p = 0.011$), ($p = 0.001$) and ($p = 0.001$) in batches 1, 2, and 3, respectively. The scores of SAR in batch 1 and batch 2 increased significantly ($p < 0.001$) and no significant change was seen in batch 3 ($p = 0.121$).

TABLE 19. Comparison of pre-post data of the juniors

Measures	Batch 1 (n=91)			Batch 2 (n=90)			Batch 3 (n=111)		
	Pre Mean (±SD)	Post Mean (±SD)	p value	Pre Mean (±SD)	Post Mean (±SD)	p value	Pre Mean (±SD)	Post Mean (±SD)	p value
Weight (kg)	37.26 ±10.28	36.01 ±10.04	< 0.001*	36.03 ±10.72	35.03 ±10.31	< 0.001*	38.27 ±9.99	36.74 ±9.98	< 0.001*
BMI (kg/m ²)	18.32 ±3.55	17.70 ±3.52	< 0.001*	17.62 ±4.14	17.14 ±3.98	< 0.001*	18.35 ±3.58	17.59 ±3.58	< 0.001*
10x5mR (sec)	16.12 ±1.61	15.99 ±1.68	0.438	16.75 ±1.31	16.38 ±1.42	0.001*	16.57 ±1.52	16.60 ±1.70	0.752
SBJ (cm)	121.57 ±26.52	126.54 ±26.05	0.012*	119.69 ±23.13	127.97 ±20.08	< 0.001*	129.85 ±21.34	128.50 ±21.86	0.272
PLT (sec)	11.86 ±1.15	11.39 ±2.30	0.026*	12.21 ±2.42	14.72 ±2.02	< 0.001*	13.47 ±2.06	13.04 ±1.56	0.018*
SUP (freq./30s)	13.11 ±6.67	14.30 ±6.18	0.011*	13.76 ±6.55	15.20 ±6.67	0.001*	14.27 ±5.91	15.52 ±6.64	0.001*
SAR (cm)	32.18 ±5.50	34.52 ±6.63	< 0.001*	30.97 ±5.60	32.11 ±5.48	< 0.001*	30.62 ±6.41	31.25 ±6.40	0.121

BMI (Body mass index); PLT (Plate tapping); SAR (Sit and reach); SBJ (Standing board jump); SD (Standard deviation); SUP (Sit-ups); 10x5mR (Shuttle run); *indicates p < 0.05.

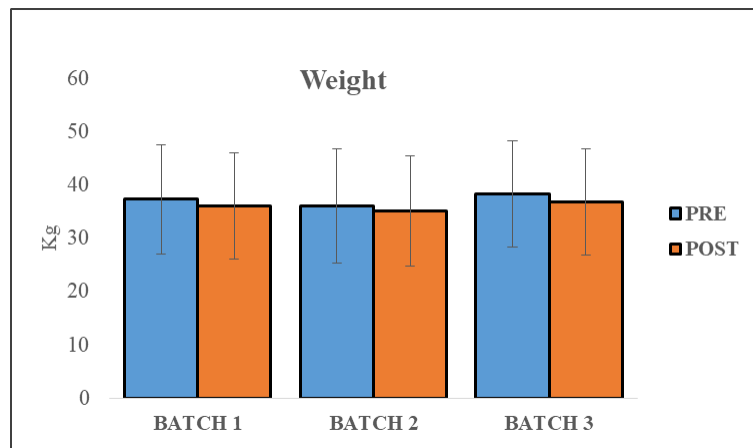
FIGURE 11. Pre-Post Changes on the Weight of the juniors

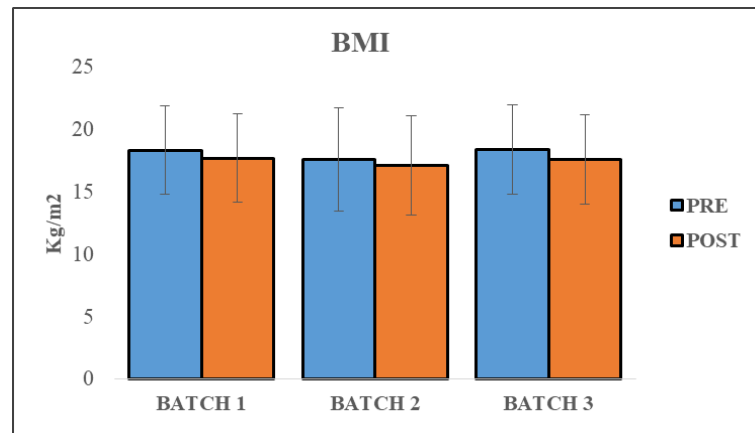
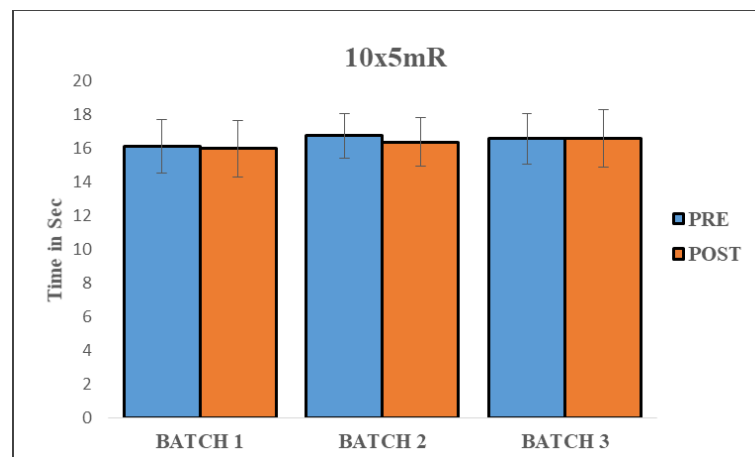
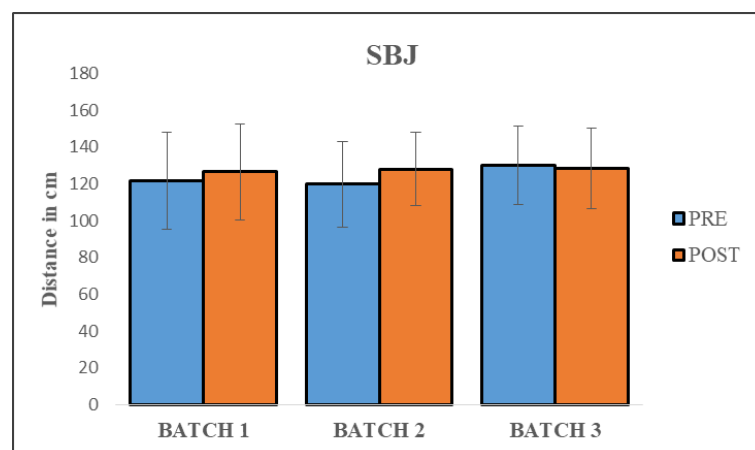
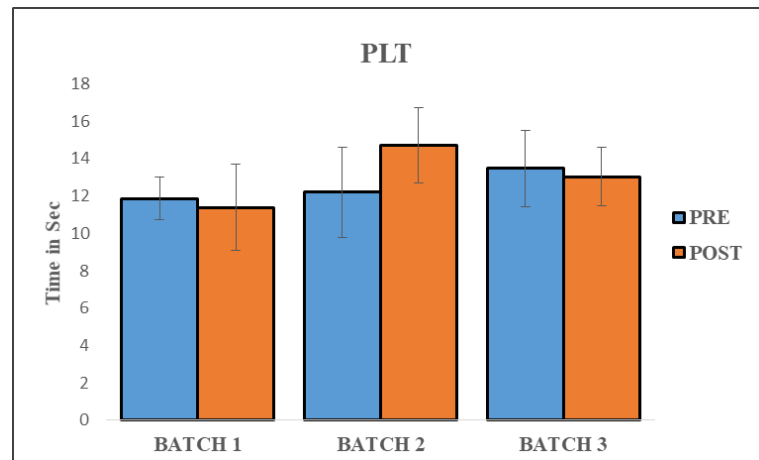
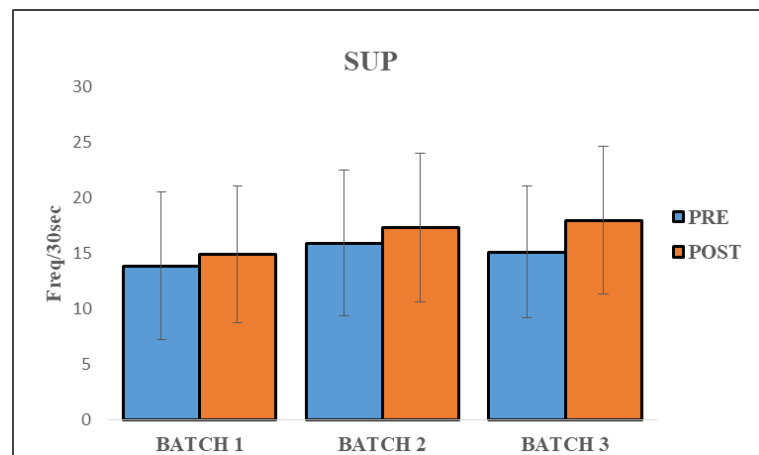
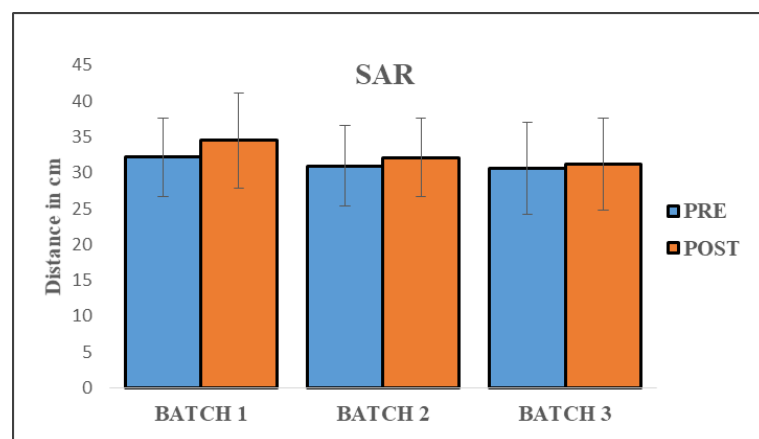
FIGURE 12. Pre-Post Changes on the BMI of the juniors**FIGURE 13. Pre-Post Changes on the 10x5mR of the juniors****FIGURE 14. Pre-Post Changes on the SBJ of the juniors**

FIGURE 15. Pre-Post Changes on the PLT of the juniors**FIGURE 16. Pre-Post Changes on the SUP of the juniors****FIGURE 17. Pre-Post Changes on the SAR of the juniors**

6.1.3. Seniors in all the Cohorts

Analysis of the senior subgroup, as presented in Table 20, showed significant decrease in the scores of weight and BMI in all the three cohorts. Time taken for 10x5mR was increased but not significant in batch 1 and batch 2, but a significant decrease was seen in batch 3 ($p < 0.001$). The scores of SBJ increased significantly with ($p = 0.015$), ($p < 0.001$), and ($p = 0.001$) in batch 1, 2, and 3, respectively. Time taken for PLT was significantly decreased with ($p < 0.001$), ($p < 0.001$), and ($p < 0.001$) in batches 1, 2, and 3, respectively. The SUP scores were significantly increased in batches 2 ($p = 0.001$) and 3 ($p < 0.001$) but not in batch 1 ($p = 0.143$). The scores of SAR increased significantly ($p < 0.001$) in batch 2 but not in batches 1 and 3.

TABLE 20. Comparison of pre-post data of the seniors

Measures	Batch 1 (n=54)			Batch 2 (n=76)			Batch 2 (n=83)		
	Pre Mean (±SD)	Post Mean (±SD)	p value	Pre Mean (±SD)	Post Mean (±SD)	p value	Pre Mean (±SD)	Post Mean (±SD)	p value
Weight (kg)	53.81 ±10.91	52.96 ±10.71	< 0.001*	47.60 ±10.95	46.91 ±10.82	< 0.001*	51.77 ±11.03	50.80 ±10.69	< 0.001*
BMI (kg/m ²)	21.10 ±3.58	20.78 ±3.49	< 0.001*	18.96 ±3.60	18.69 ±3.56	< 0.001*	20.52 ±6.20	20.13 ±6.03	< 0.001*
10x5mR (sec*)	15.23 ±1.53	15.42 ±1.78	0.262	14.94 ±1.57	15.17 ±1.69	0.067	15.88 ±1.60	15.47 ±1.66	< 0.001*
SBJ (cm)	135.08 ±28.35	139.85 ±27.81	0.015*	138.72 ±25.18	147.20 ±27.31	< 0.001*	133.66 ±27.85	140.66 ±31.36	0.001*
PLT (sec*)	11.83 ±1.84	9.80 ±1.65	< 0.001*	11.79 ±1.56	10.95 ±1.31	< 0.001*	12.59 ±1.81	11.37 ±1.68	< 0.001*
SUP (freq./30s)	15.10 ±5.92	15.88 ±6.24	0.143	18.50 ±5.03	19.84 ±4.96	0.001*	16.28 ±5.39	21.28 ±4.41	< 0.001*
SAR (cm)	31.10 ±7.49	31.04 ±7.88	0.883	31.29 ±6.89	32.86 ±7.00	< 0.001*	31.78 ±8.15	32.29 ±7.85	0.319

BMI (Body mass index); PLT (Plate tapping); SAR (Sit and reach); SBJ (Standing board jump); SD (Standard deviation); SUP (Sit-ups); 10x5mR (Shuttle run); *indicates $p < 0.05$.

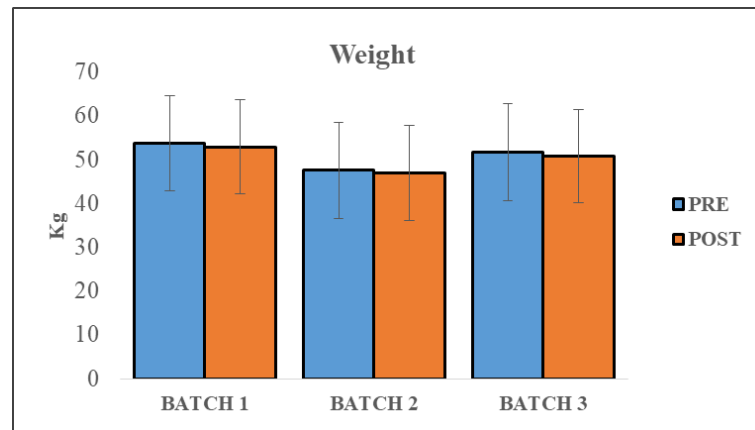
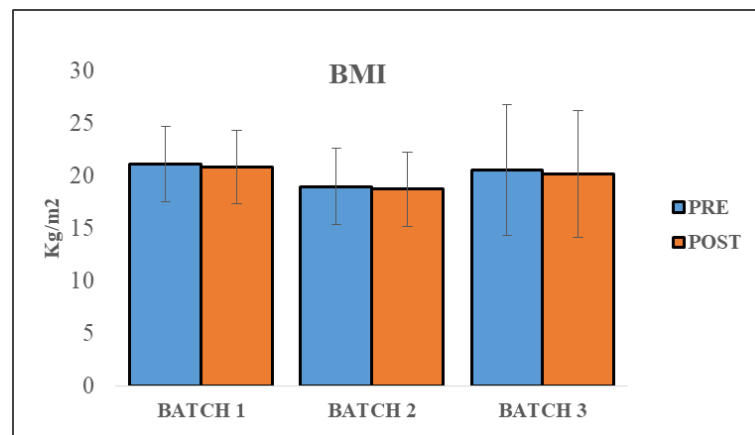
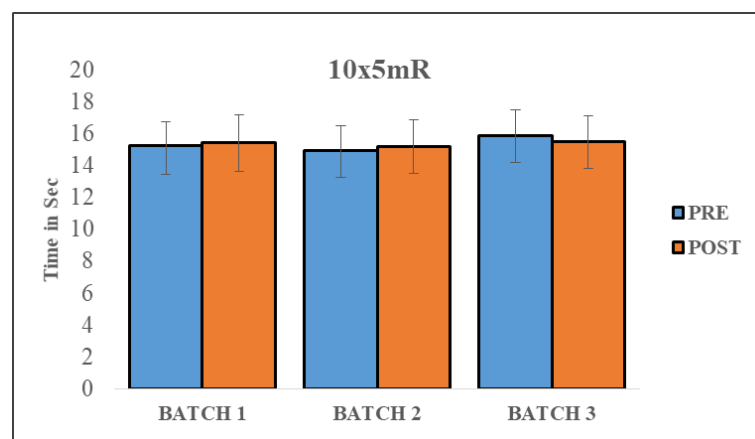
FIGURE 18. Pre-Post Changes on the Weight of the seniors**FIGURE 19. Pre-Post Changes on the BMI of the seniors****FIGURE 20. Pre-Post Changes on the 10x5mR of the seniors**

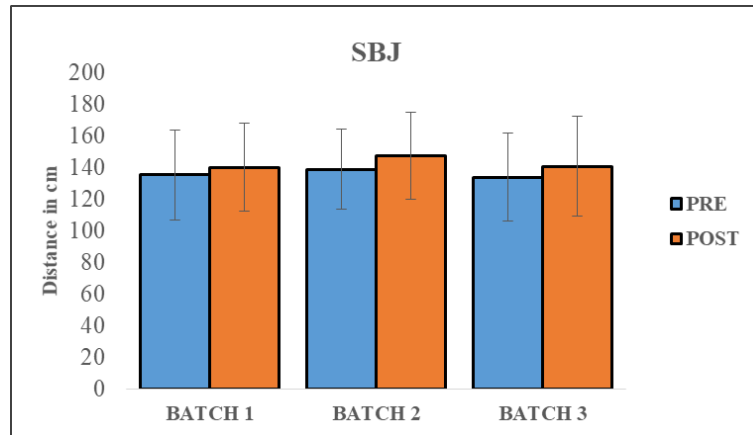
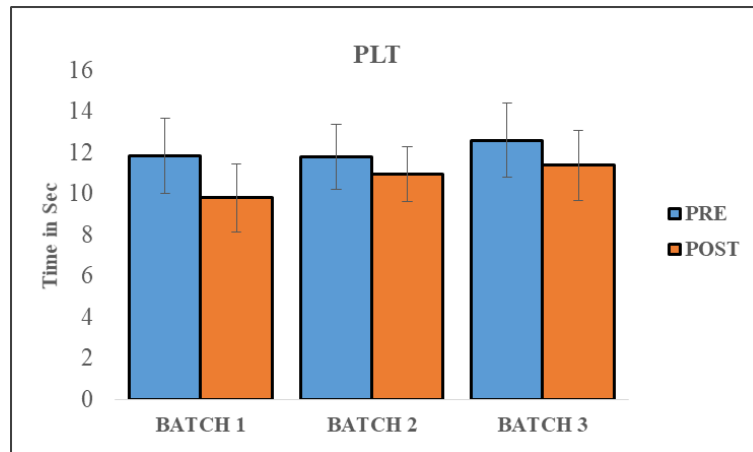
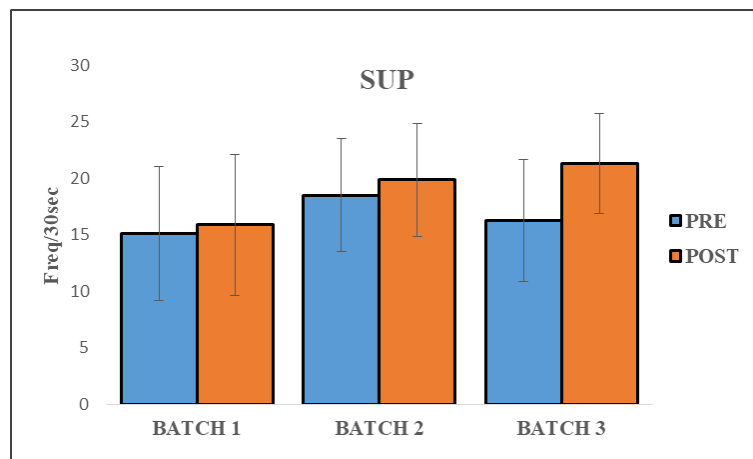
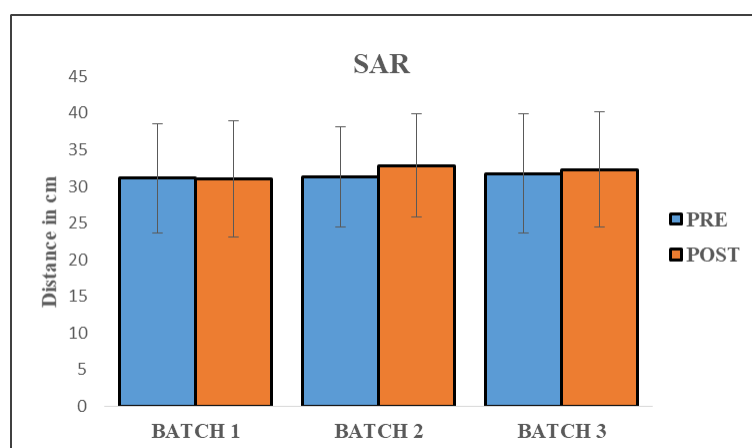
FIGURE 21. Pre-Post Changes on SBJ of the seniors**FIGURE 22. Pre-Post Changes on the PLT of the seniors****FIGURE 23. Pre-Post Changes on the SUP of the seniors**

FIGURE 24. Pre-Post Changes on the SAR of the seniors

6.2. PSYCHOLOGICAL PARAMETERS

The three cohorts comprised of 148 (41.22% girls) (62.84% juniors), 167 (26.94% girls) (53.9% juniors), and 195 (37.94% girls) (57.44% juniors), with a mean age of 11.84 ± 1.77 , 12.22 ± 1.82 , and 12.06 ± 1.82 , respectively. Psychological measures were evaluated using SEIS (Schutte Emotional Intelligence Scale), CERQ-short-form (Cognitive Emotion Regulation Questionnaire), CAS (Clinical Anger Scale), and Self-Concept scale.

6.2.1. Comparisons between the Independent Cohorts

As seen in table 21, comparing pre and post data for each of the three cohorts, overall scores of SEIS in batch 1 ($p < 0.001$), batch 2 ($p = 0.002$) and batch 3 ($p = 0.032$) increased significantly. The scores of CERQ increased significantly ($p < 0.001$) in all the three cohorts. Self-Concept has not shown significant change in any of the batches. A significant decrease was seen in scores of CAS in batch 1 ($p < 0.001$), batch 2 ($p = 0.008$) and batch 3 ($p = 0.003$), which is a positive change.

TABLE 21. Comparison of pre-post data of the three cohorts

	Batch 1 (n=148)			Batch 2 (n=167)			Batch 3 (n=195)		
	Pre Mean (±SD)	Post Mean (±SD)	p value	Pre Mean (±SD)	Post Mean (±SD)	p value	Pre Mean (±SD)	Post Mean (±SD)	p value
Emotional intelligence	123.59 ±16.09	129.86 ±19.30	< 0.001*	122.27 ±15.62	126.04 ±17.98	0.002*	123.63 ±17.40	126.15 18.98	0.032*
Emotional regulation strategies	51.83 ±10.68	57.11 ±13.59	< 0.001*	55.79 ±10.15	60.10 ±11.02	< 0.001*	54.15 ±10.47	58.62 ±12.47	< 0.001*
Self-concept	103.36 ±12.99	103.64 ±14.70	0.766	101.89 ±14.10	101.58 ±14.66	0.724	103.04 ±13.06	102.13 ±14.67	0.315
Clinical anger	13.59 ±10.44	10.94 ±10.68	< 0.001*	16.23 ±10.77	14.09 ±11.52	0.008*	14.61 ±10.59	12.51 ±10.54	0.003*

*indicates $p < 0.05$; SD (standard deviation).

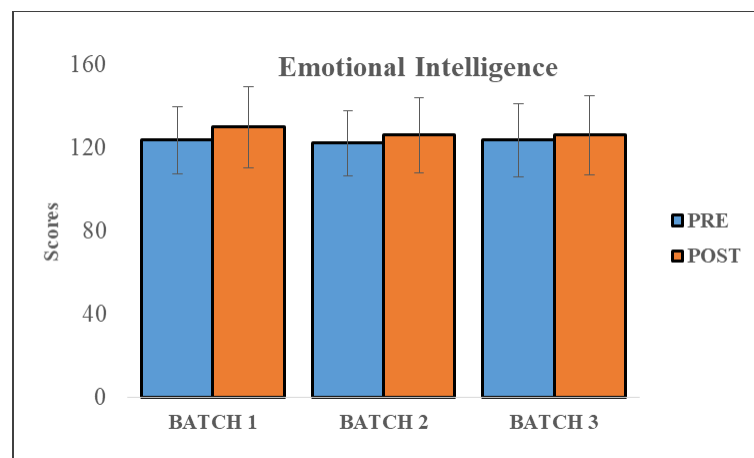
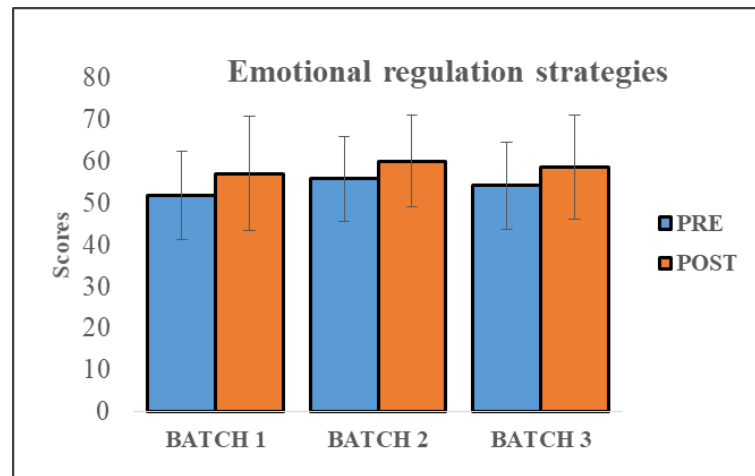
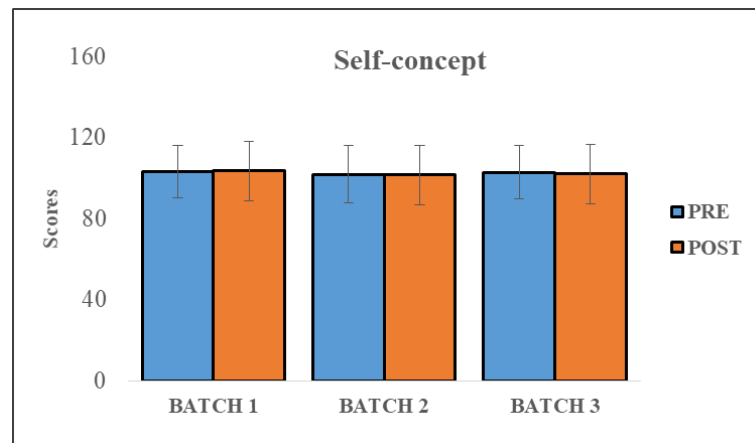
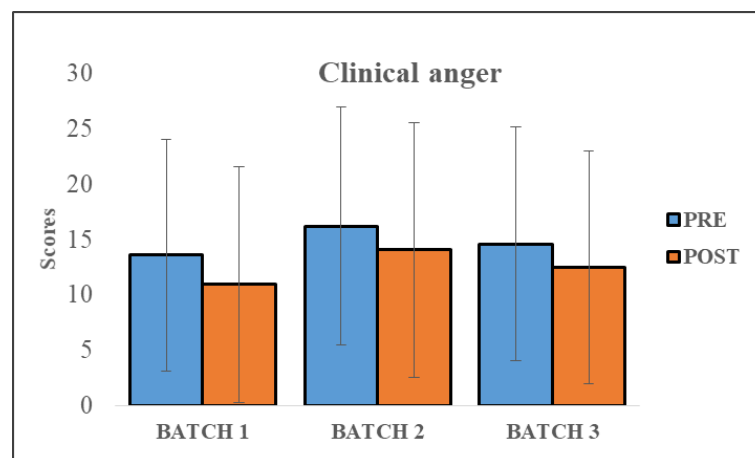
FIGURE 25. Pre-Post Changes on EI of the three cohorts

FIGURE 26. Pre-Post Changes on Emotional regulation of the three cohorts**FIGURE 27. Pre-Post Changes on the Self-concept of the three cohorts****FIGURE 28. Pre-Post Changes on Clinical anger of the three cohorts**

6.2.2. Juniors in all the Cohorts

Analysis of the junior subgroup, as presented in Table 22, showed a significant increase in the scores of SEIS in batch 1 juniors, and a trend of increase in batches 2 and 3 juniors. Scores of CERQ increased significantly in juniors of all the three cohorts. Self-Concept has not shown significant change in juniors of any of the cohorts. Significant decrease was seen in scores of CAS in batch 1 juniors. Decrease in scores of CAS was also seen in batches 2 and 3 juniors but not significant. Reduction in clinical anger is a positive change.

TABLE 22. Comparison of pre-post data of the juniors

	Batch 1 (n=93)			Batch 2 (n=90)			Batch 3 (n=112)		
	Pre Mean (±SD)	Post Mean (±SD)	p value	Pre Mean (±SD)	Post Mean (±SD)	p value	Pre Mean (±SD)	Post Mean (±SD)	p value
Emotional intelligence	121.46 ±17.21	128.77 ±20.33	< 0.001*	121.32 ±16.77	124.21 ±16.76	0.078	120.52 ±18.50	123.76 ±20.30	0.068
Emotional regulation strategies	52.20 ±11.52	58.65 ±13.31	< 0.001*	55.09 ±10.97	59.02 ±10.87	0.002*	52.48 ±10.66	58.42 ±13.59	< 0.001*
Self-concept	103.51 ±12.86	103.26 ±15.16	0.836	102.62 ±14.75	100.72 ±15.10	0.115	104.02 ±14.26	102.35 ±15.81	0.209
Clinical anger	14.74 ±10.56	12.48 ±11.18	0.023*	15.58 ±10.49	15.31 ±11.68	0.759	14.17 ±10.60	13.23 ±10.55	0.308

*indicates $p < 0.05$; SD (standard deviation).

FIGURE 29. Pre-Post Changes on EI of the juniors

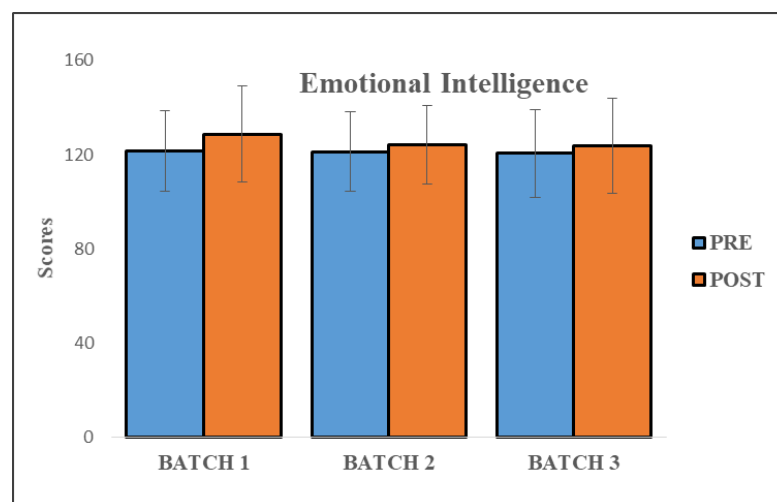


FIGURE 30. Pre-Post Changes on Emotional regulation of the juniors

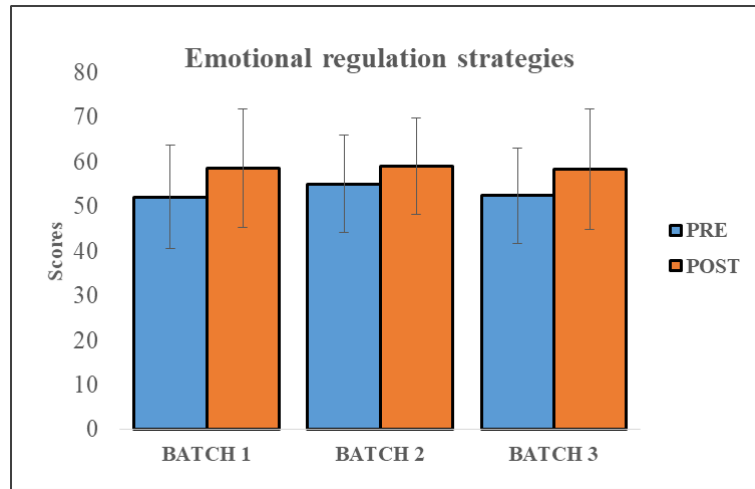


FIGURE 31. Pre-Post Changes on Self-concept of the juniors

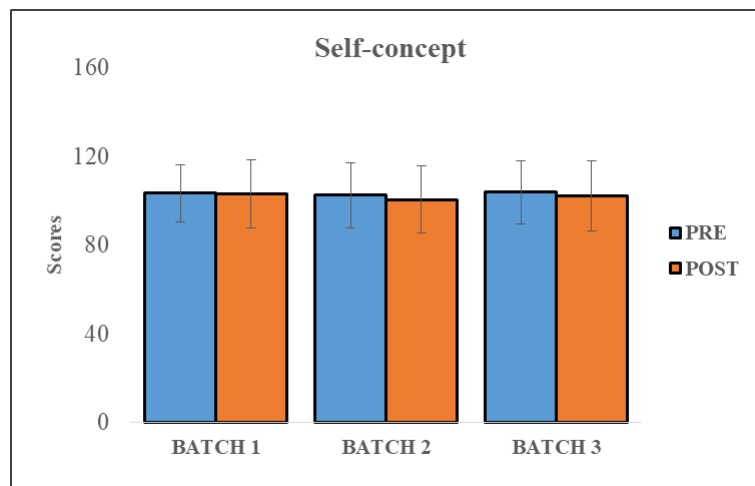
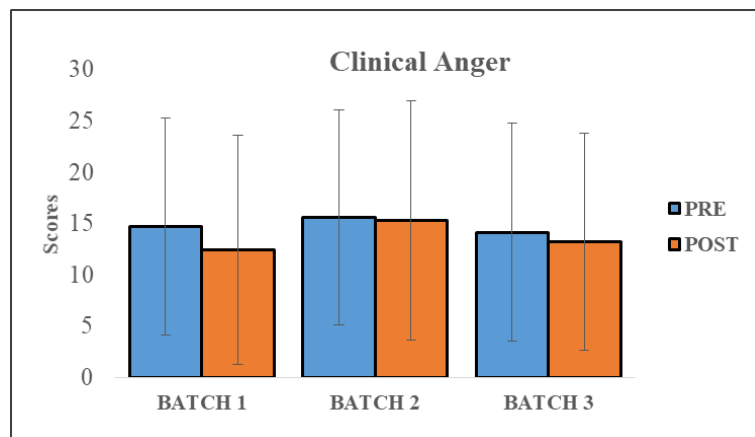


FIGURE 32. Pre-Post Changes on Clinical anger of the juniors



6.2.3. Seniors in all the Cohorts

Analysis of the senior subgroup, as presented in Table 23, showed significant increase in scores of SEIS in batches 1 and 2 seniors and non-significant increase was seen in batch 3 seniors. The scores of CERQ in seniors increased significantly in all the three cohorts. Self-Concept has not shown significant change in seniors in any of the cohorts. Significant decrease was seen in the scores of CAS in seniors of all the three cohorts.

TABLE 23. Comparison of pre-post data of the seniors

	Batch 1 (n=55)			Batch 2 (n=77)			Batch 3 (n=83)		
	Pre Mean (\pm SD)	Post Mean (\pm SD)	p value	Pre Mean (\pm SD)	Post Mean (\pm SD)	p value	Pre Mean (\pm SD)	Post Mean (\pm SD)	p value
Emotional intelligence	127.26 \pm 13.29	131.74 \pm 17.42	0.026*	123.38 \pm 14.18	128.18 \pm 19.21	0.007*	127.82 \pm 14.88	129.39 \pm 16.60	0.265
Emotional regulation strategies	51.20 \pm 9.18	54.53 \pm 13.79	0.049*	56.61 \pm 9.11	61.35 \pm 11.13	< 0.001*	56.41 \pm 9.82	58.88 \pm 10.84	0.040*
Self-concept	103.11 \pm 13.29	104.31 \pm 14.02	0.480	101.03 \pm 13.36	102.58 \pm 14.16	0.218	101.71 \pm 11.18	101.82 \pm 13.07	0.926
Clinical anger	11.67 \pm 10.06	8.36 \pm 9.32	< 0.001*	16.97 \pm 11.10	12.01 \pm 11.06	< 0.001*	15.19 \pm 10.63	11.53 \pm 10.50	0.001*

*indicates $p < 0.05$; SD (standard deviation).

FIGURE 33. Pre-Post Changes on EI of the seniors

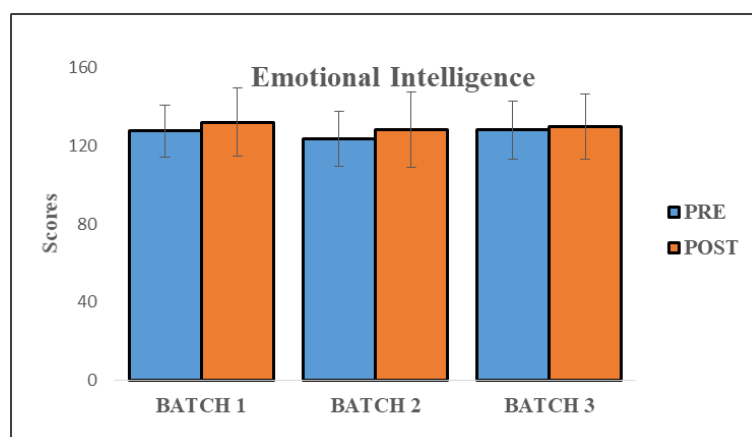
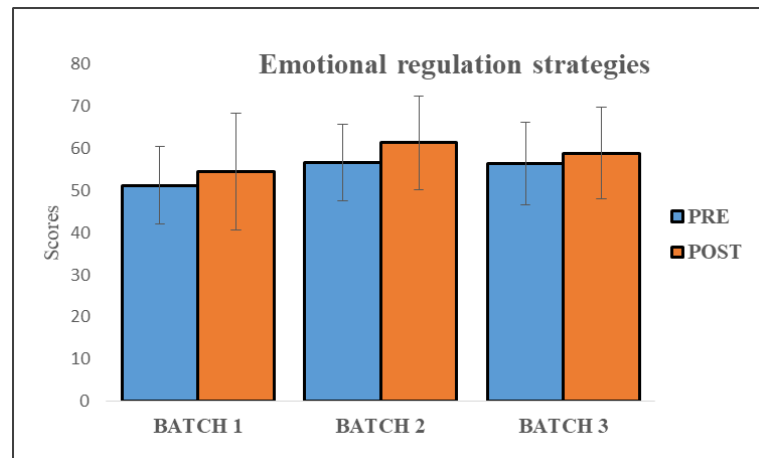
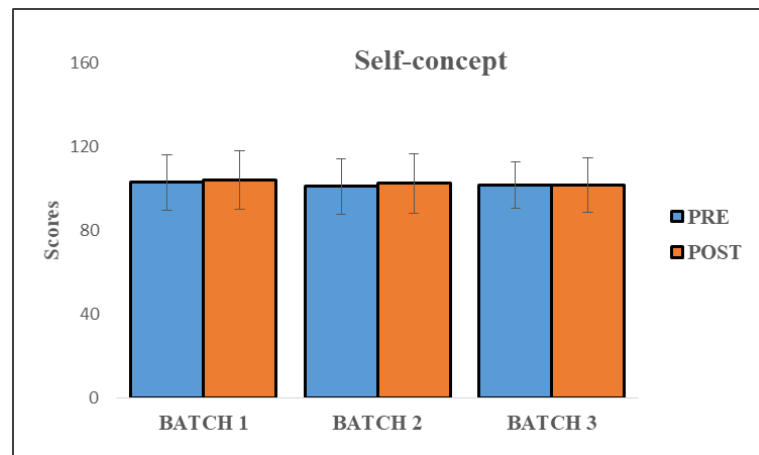
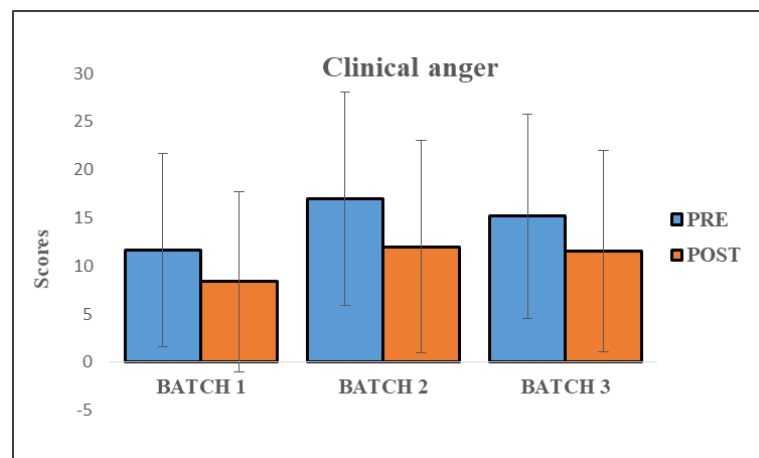


FIGURE 34. Pre-Post Changes on Emotional regulation of the seniors**FIGURE 35. Pre-Post Changes on Self-concept of the seniors****FIGURE 36. Pre-Post Changes on Clinical anger of the seniors**

6.3. SOCIAL PARAMETERS

The three cohorts comprised of 148 (42.2% girls) (62.8% juniors), 167 (26.9% girls) (53.9% juniors), and 195 (37.9% girls) (57.4% juniors), with a mean age of 11.84 ± 1.77 , 12.22 ± 1.82 , and 12.06 ± 1.82 , respectively. The effect of a short-term residential yoga intervention was evaluated for its benefits on social competence, empathy, altruism, parent relationship, and peer friendship.

6.3.1. Comparisons between the Independent Cohorts

As seen in Table 24, comparing pre and post data for each of the cohorts, showed that there were no significant changes, observed in the batch 1, whereas subsequent batches showed statistically meaningful changes in teen empathy ($p < 0.001$) in the batches 2 and 3, and social competence ($p = 0.021$) and altruism ($p = 0.002$) in batch 3. An interesting observation was that, while all changes, although non-significant, were in the positive direction, peer friendship had changed negatively.

TABLE 24. Comparison of pre-post data of the three cohorts

Measures	Batch 1 (n=148)			Batch 2 (n=167)			Batch 3 (n=195)		
	Pre Mean (\pm SD)	Post Mean (\pm SD)	p value	Pre Mean (\pm SD)	Post Mean (\pm SD)	p value	Pre Mean (\pm SD)	Post Mean (\pm SD)	p value
Empathy	14.70 ± 3.344	15.05 ± 3.841	0.207	14.32 ± 3.014	15.28 ± 3.116	<0.001*	13.97 ± 3.341	14.90 ± 3.284	<0.001*
Social competence	33.21 ± 6.702	33.70 ± 7.866	0.363	33.19 ± 5.381	34.06 ± 6.816	0.055	32.43 ± 6.513	33.48 ± 6.463	0.021*
Altruism	13.15 ± 3.786	13.43 ± 4.113	0.355	13.27 ± 3.574	13.78 ± 3.419	0.052	12.87 ± 3.498	13.66 ± 3.524	0.002*
Parent relationship	23.61 ± 4.827	23.84 ± 5.273	0.606	23.58 ± 4.928	23.89 ± 4.885	0.423	23.66 ± 4.168	24.19 ± 4.746	0.099
Peer friendships	20.62 ± 4.278	20.45 ± 4.678	0.663	20.70 ± 4.002	20.43 ± 4.109	0.385	20.03 ± 4.323	20.01 ± 3.900	0.929

*indicates $p < 0.05$; SD (standard deviation).

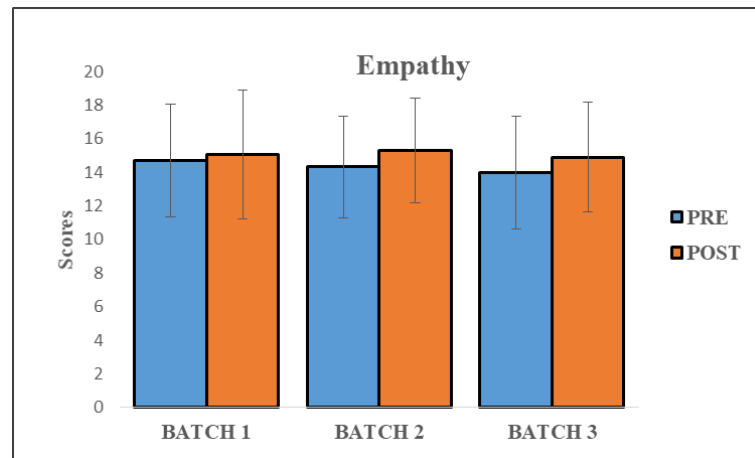
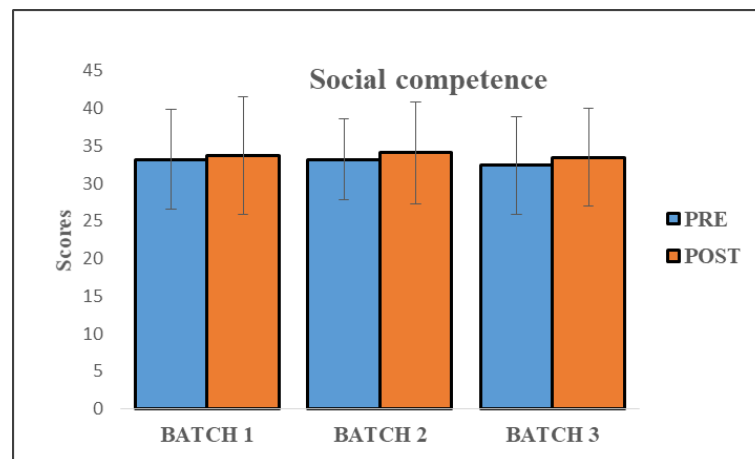
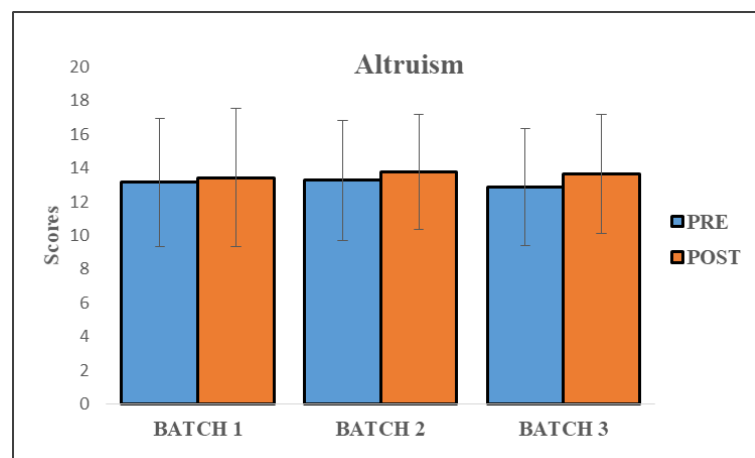
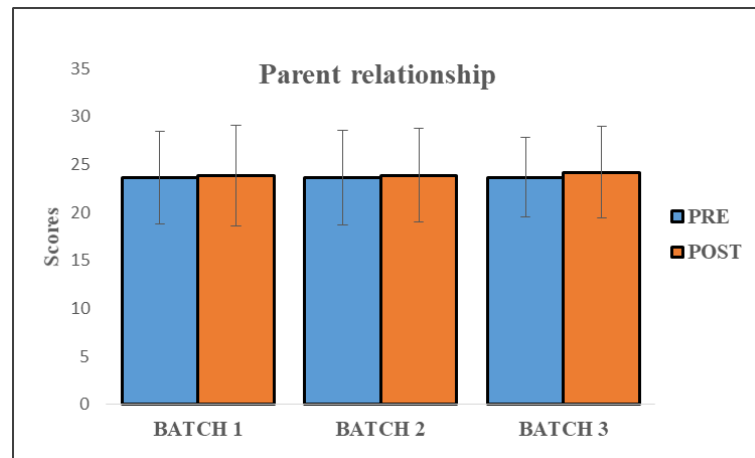
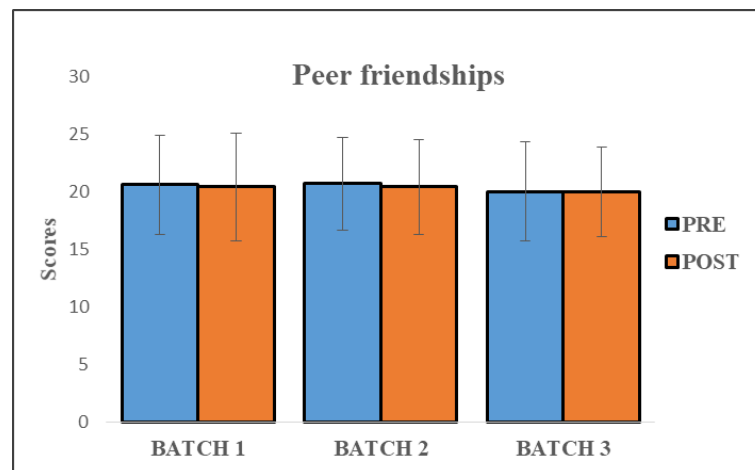
FIGURE 37. Pre-Post Changes on Empathy of the three cohorts**FIGURE 38. Pre-Post Changes on Social competence of the three cohorts****FIGURE 39. Pre-Post Changes on Altruism of the three cohorts**

FIGURE 40. Pre-Post Changes on Parent relationship of the three cohorts**FIGURE 41. Pre-Post Changes on Peer friendships of the three cohorts**

6.3.2. Juniors in all the cohorts

Analysis of the junior subgroup, as presented in Table 25, show that empathy significantly improved in all the three batches, social competence improved significantly in the batch 1 and altruism improved significantly in the batch 3. It was interesting to note that unlike the overall result, peer friendship had increased, although non-significantly in two of the three batches. All other variables also showed a non-significant positive change.

TABLE 25. Comparison of pre-post data of the juniors

Measures	Batch 1 (n=93)			Batch 2 (n=90)			Batch 3 (n=112)		
	Pre Mean (±SD)	Post Mean (±SD)	p value	Pre Mean (±SD)	Post Mean (±SD)	p value	Pre Mean (±SD)	Post Mean (±SD)	p value
Empathy	14.41 ±3.275	15.12 ±3.557	0.033*	13.90 ±2.860	14.78 ±3.042	0.029*	13.87 ±3.424	14.65 ±3.427	0.022*
Social competence	32.40 ±6.823	33.83 ±6.882	0.029*	32.51 ±5.707	33.04 ±7.228	0.465	31.89 ±6.616	32.63 ±6.710	0.236
Altruism	13.56 ±3.740	13.82 ±3.776	0.488	12.82 ±3.740	13.33 ±3.576	0.199	12.89 ±3.483	13.63 ±3.521	0.041*
Parent relationship	23.49 ±5.058	24.10 ±4.632	0.227	23.48 ±5.383	24.01 ±4.775	0.361	23.71 ±4.433	24.21 ±4.973	0.295
Peer friendships	19.98 ±4.604	20.62 ±3.785	0.143	20.16 ±3.940	19.98 ±4.081	0.682	19.66 ±4.788	19.71 ±4.060	0.918

*indicates $p < 0.05$; SD (standard deviation).

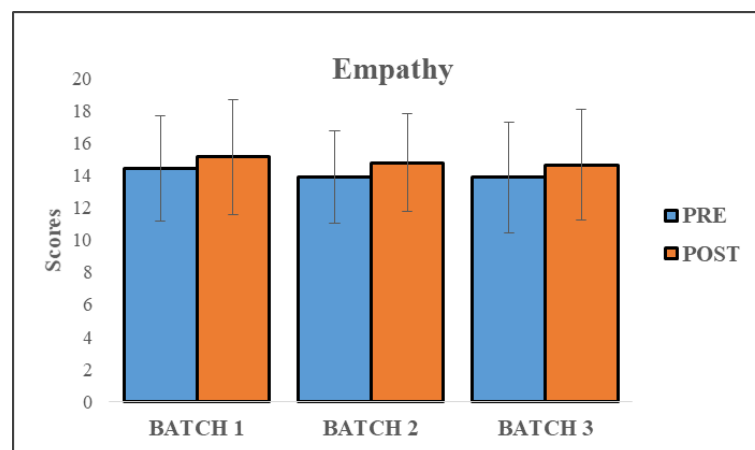
FIGURE 42. Pre-Post Changes on Empathy of the juniors

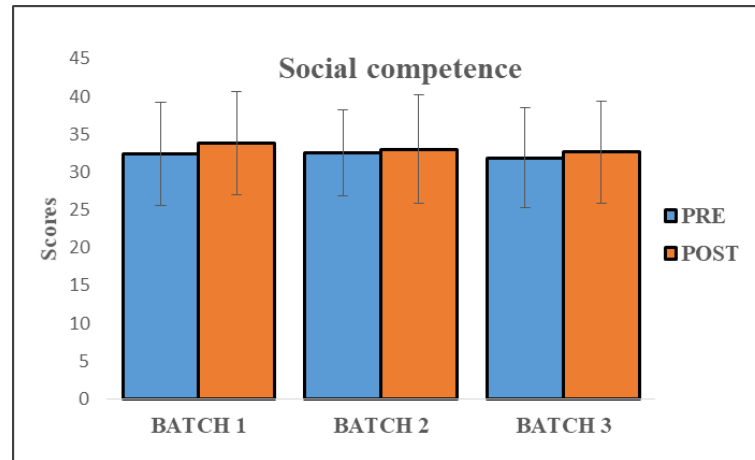
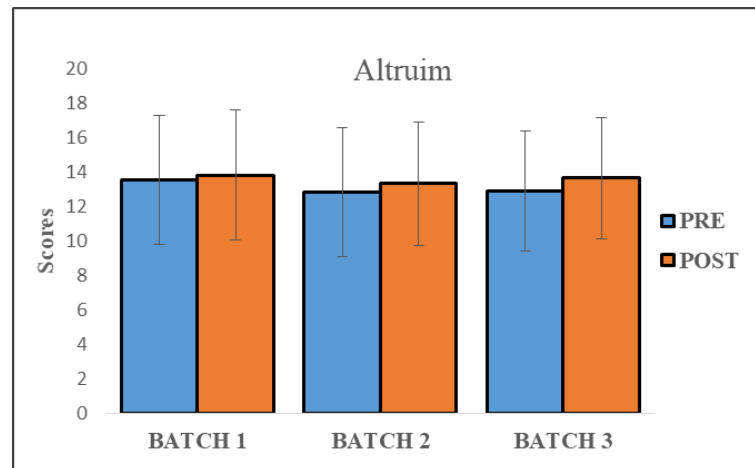
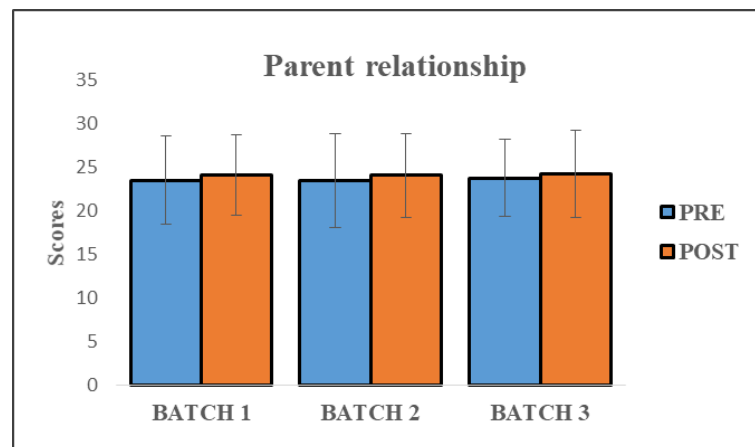
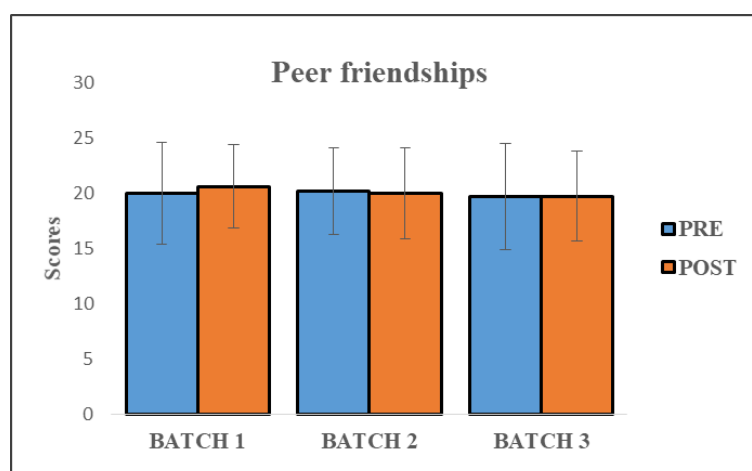
FIGURE 43. Pre-Post Changes on Social competence of the juniors**FIGURE 44. Pre-Post Changes on Altruism of the juniors****FIGURE 45. Pre-Post Changes on Parent relationship of the juniors**

FIGURE 46. Pre-Post Changes on Peer friendships of the juniors

6.3.3. Seniors in all the cohorts

Analysis of the senior subgroup, as presented in Table 26, showed that there was no significant positive change in any of the outcomes in batch 1, but social competence and empathy changed positively in the two subsequent batches. Altruism also showed a significant positive change in the batch 3. Peer friendship showed a significant reduction in the batch 1, which was not seen in the two subsequent batches.

TABLE 26. Comparison of pre-post data of the seniors

Measures	Batch 1 (n=55)			Batch 2 (n=77)			Batch 3 (n=83)		
	Pre Mean (±SD)	Post Mean (±SD)	p value	Pre Mean (±SD)	Post Mean (±SD)	p value	Pre Mean (±SD)	Post Mean (±SD)	p value
Empathy	15.18 ±3.432	14.93 ±4.311	0.607	14.81 ±3.133	15.86 ±3.119	0.001*	14.12 ±3.240	15.23 ±3.070	0.002*
Social competence	34.58 ±6.318	33.49 ±9.363	0.248	33.99 ±4.890	35.25 ±6.135	0.010*	33.16 ±6.339	34.63 ±5.965	0.028*
Altruism	12.45 ±3.795	12.76 ±4.586	0.544	13.79 ±3.318	14.31 ±3.168	0.131	12.84 ±3.539	13.71 ±3.549	0.011*
Parent relationship	23.82 ±4.448	23.42 ±6.232	0.640	23.70 ±4.368	23.75 ±5.040	0.917	23.59 ±3.806	24.16 ±4.452	0.144
Peer friendships	21.71 ±3.436	20.16 ±5.918	0.031*	21.34 ±4.005	20.96 ±4.105	0.400	20.53 ±3.569	20.41 ±3.659	0.729

*indicates $p < 0.05$; SD (standard deviation).

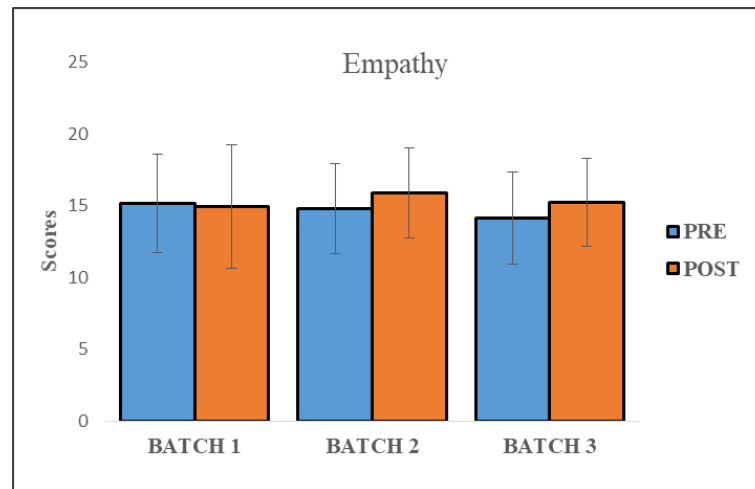
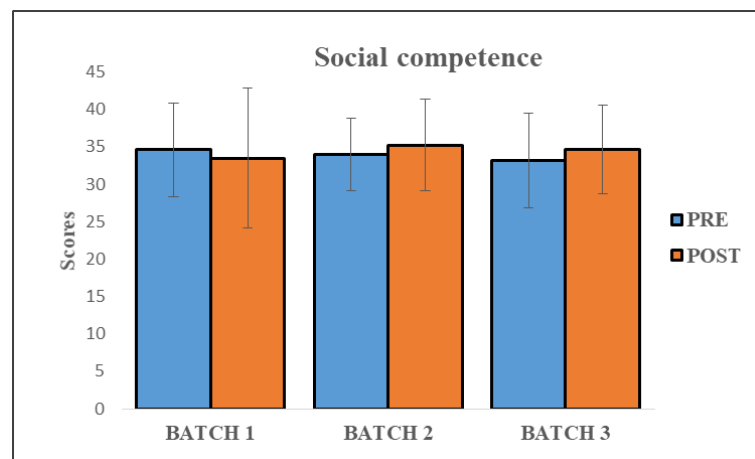
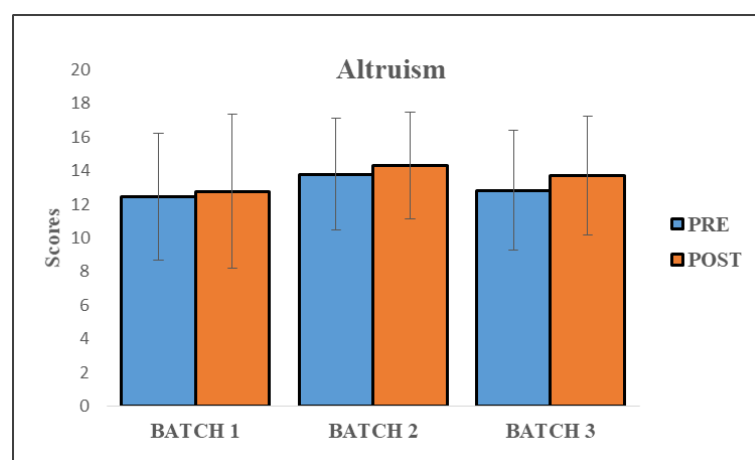
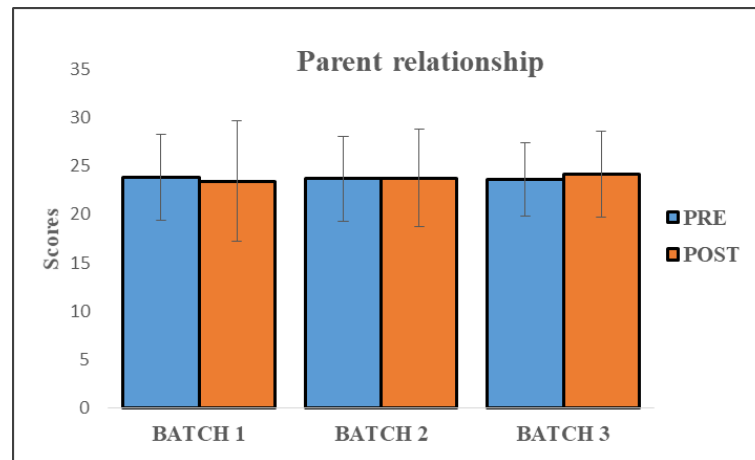
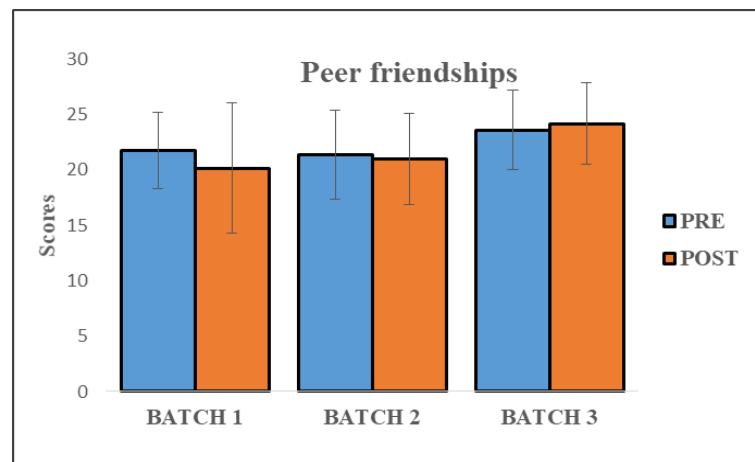
FIGURE 47. Pre-Post Changes on Empathy of the seniors**FIGURE 48. Pre-Post Changes on Social competence of the seniors****FIGURE 49. Pre-Post Changes on Altruism of the seniors**

FIGURE 50. Pre-Post Changes on Parent relationship of the seniors**FIGURE 51. Pre-Post Changes on Peer friendships of the seniors**

6.3.4. Comparison of Parent and Children Data

In total, all recruited students completed their questionnaire before and after the intervention. A total of 340 parental responses were collected before and only 43 parental responses got collected three months later as a follow-up data. Hence pre-post data of children was analysed for the entire sample size and parents' data was assessed only for 43 subjects.

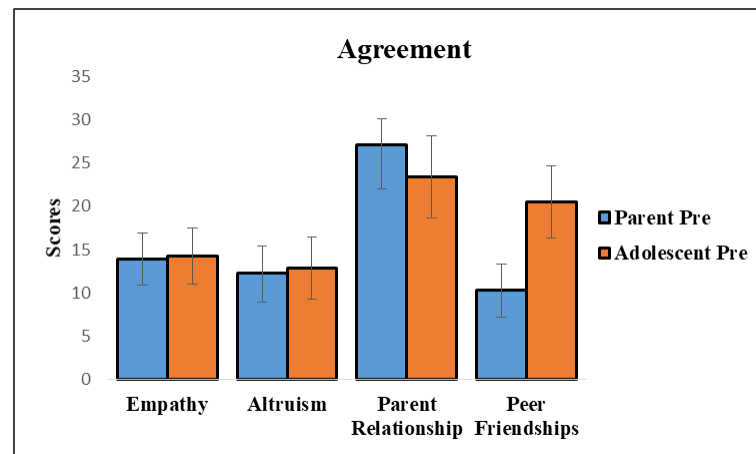
Additional analyses compared (n=340) pre data of the outcomes between the adolescents and their parents, (200 juniors) as seen in table 27. There was significantly lower altruism and

peer friendship and significantly higher parent relationship reported by parents as compared to their children.

TABLE 27. Agreement between parents and adolescents (n=340)

	Parent data Mean	SD	Adolescent data Mean	SD	p-value
Empathy	13.90	3.052	14.26	3.278	0.131
Altruism	12.31	3.339	12.84	3.614	0.023
Parent Relationship	27.10	5.084	23.41	4.762	< 0.001
Peer Friendships	10.29	3.113	20.45	4.177	< 0.001

FIGURE 52. Pre scores of parents and adolescents



Changes in empathy, altruism, parent relationship, and peer friendship were compared between the responses received by the 43 adolescents and parents as shown in Table 6. It was interesting to note that the adolescents reported a significant change ($p = 0.003$) in altruism and the parents reported a significant change ($p = 0.035$) in parent relationship as a result of the yoga intervention.

TABLE 28. Comparison of change scores between parents and adolescents (n=43)

Data Description→ Outcome Measures ↓	Parent data set			Adolescent data set		
	Pre data	Post Data	p value	Pre data	Post Data	p value
	Mean (±SD)	Mean (±SD)		Mean (±SD)	Mean (±SD)	
Empathy	12.47 ±2.914	12.93 ±2.772	0.446	14.12 ±3.52	14.84 ±3.703	0.171
Altruism	10.35 ±3.101	11 ±3.867	0.372	12.3 ±3.827	13.65 ±3.484	0.003
Parent Relationship	24.95 ±5.3	27.05 ±3.879	0.035	23.19 ±4.36	23.88 ±4.3	0.095
Peer Friendships	9.51 ±2.53	9.56 ±3.026	0.929	20.37 ±4.37	20.58 ±3.923	0.708

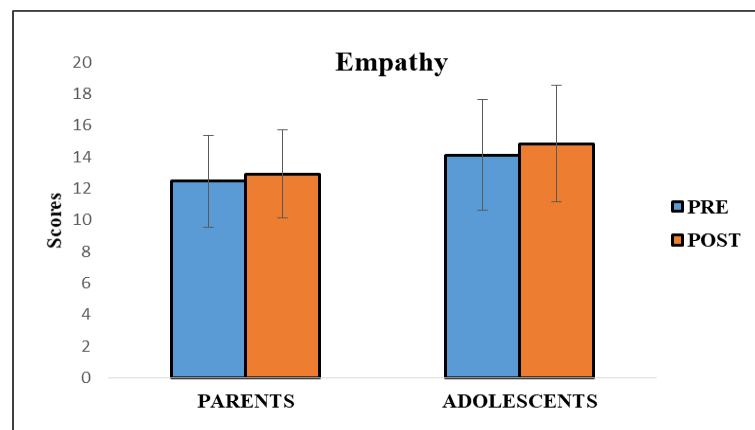
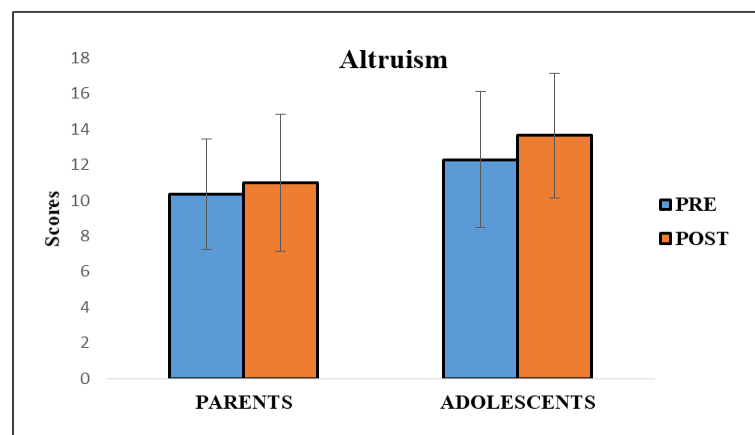
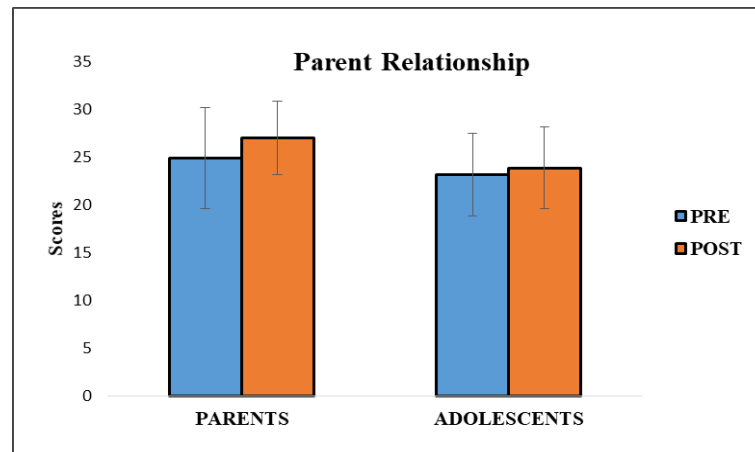
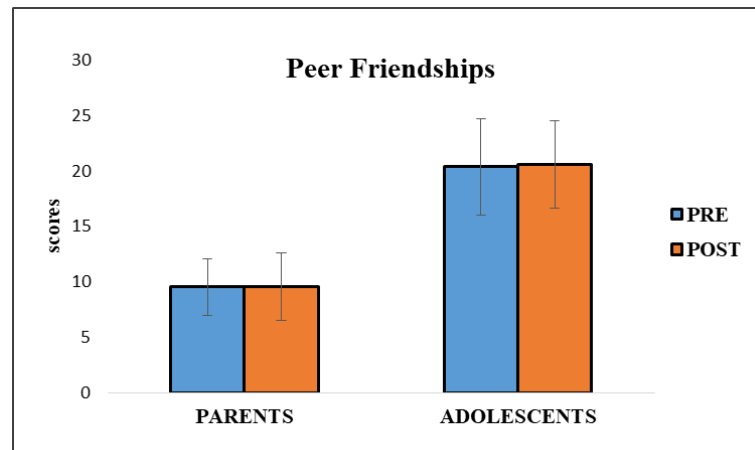
FIGURE 53. Change scores of Empathy of parents and adolescents**FIGURE 54. Change scores of Altruism of parents and adolescents**

FIGURE 55. Change scores of Parent relationship of parents and adolescents**FIGURE 56. Change scores of Peer friendships of parents and adolescents**

6.4. OVERALL CUMULATIVE RESULTS

A total 510 adolescents were included in the present study, of which 183 (35.89%) females, were evaluated for Physical (Eurofit battery), Psychological (SEIS (Schutte Emotional Intelligence Scale), CERQ-short-form (Cognitive Emotion Regulation Questionnaire), CAS (Clinical Anger Scale) and Self-Concept), and social (Social Competence, Altruism, Empathy, Positive Parent Relationship and Peer Friendship) fitness measures. Change over time was evaluated using the paired samples t-test and differences in change scores (δ scores) between genders and two subgroups of age was done using independent sample t-test. The

mechanism of action was assessed by correlating between change scores. Correlation was done using Pearson's R.

6.4.1. All Measures within Whole Group

As seen in table 29, the results showed reduction in the body weight of participants (-2.52%, $p < 0.001$) and the BMI (-2.67%, $p < 0.001$) was also significantly decreased. Besides, there was a significant decrease in time taken (sec) in shuttle run (-0.74%, $p = 0.059$) and plate tapping (-2.72%, $p = 0.008$) that showed increase in agility, speed, and coordination respectively as reduction in time shows better performance. Likewise, there was a significant increase in the board jumping (3.67%, $p < 0.001$) that showed positive change in strength, significant increase in sit-ups (13.34%, $p < 0.001$) and sit and reach (3.39%, $p < 0.001$) showed positive change in muscle endurance and flexibility respectively. Also SEIS score (3.25%, $p < 0.001$), CERQ (9.29%, $p < 0.001$), empathy (5.55%, $p < 0.001$), altruism (4.42%, $p < 0.001$), social competence (3.11%, $p < 0.001$), and parent relationship (1.99%, $p = 0.020$) increased significantly. Nevertheless, there was a slight decrease in peer friendship (-0.34%, $p = 0.738$) and self-concept (-0.35%, $p = 0.491$), although not significant. CAS significance decrease (-15.05%, $p < 0.001$) showing a positive change.

TABLE 29. Measures within group

No.	Variable	Pre Mean \pm SD	Post Mean \pm SD	% change	Within group Sig.
DEMOGRAPHY					
1	Age	12.05 \pm 1.82			
2	Height	149.63 \pm 12.86			
3	Father's Age	43.66 \pm 4.41			
4	Mother's Age	38.3 \pm 4.01			

ANTHROPOMETRY					
5	Weight (kg)	42.94 ± 12.61	41.86 ± 12.54	-2.52	<0.001*
6	Body Mass Index (kg/m ²)	18.89 ± 3.82	18.38 ± 3.78	-2.67	<0.001*
PHYSICAL					
7	10m*5 shuttle run	16.04 ± 1.66	15.92 ± 1.72	-0.74	0.059
8	Standing board Jump	129.13 ± 26.04	133.87 ± 26.55	3.67	<0.001*
9	Plate Tapping	12.41 ± 1.98	12.08 ± 2.35	-2.72	0.008*
10	Sit Ups	14.84 ± 6.37	16.82 ± 6.44	13.34	<0.001*
11	Sit and Reach	31.30 ± 6.64	32.36 ± 6.89	3.39	<0.001*
PSYCHOLOGICAL					
12	SEIS	123.17 ± 16.42	127.19 ± 18.79	3.25	<0.001*
13	CERQ	53.99 ± 10.52	59.01 ± 11.58	9.29	<0.001*
13a	Self-blame	5.45 ± 2.2	6.23 ± 2.21	14.27	<0.001*
13b	Acceptance	5.84 ± 2.07	6.52 ± 2.04	11.73	<0.001*
13c	Rumination	6.18 ± 2.23	6.62 ± 2.12	7.11	<0.001*
13d	Positive Refocusing	6.3 ± 2.25	6.67 ± 2.13	5.81	0.002*
13e	Refocus on Planning	7.28 ± 2.16	7.57 ± 1.99	4.03	0.011*
13f	Positive Reappraisal	6.51 ± 2.13	7.03 ± 2.06	7.94	<0.001*
13g	Putting into Perspective	5.95 ± 2.2	6.67 ± 2.15	12.25	<0.001*
13h	Catastrophizing	5.91 ± 2.26	6.56 ± 2.23	10.96	<0.001*
13i	Other blame	4.64 ± 2.19	5.42 ± 2.36	16.84	<0.001*
14	CAS	15.32 ± 10.47	13.02 ± 10.89	-15.05	<0.001*
15	Self-Concept	102.75 ± 13.38	102.39 ± 14.67	-0.35	0.491
15a	Athletic Competence	19.4 ± 3.88	19.56 ± 4.13	0.82	0.356
15b	Conduct/Morality	21.4 ± 4.05	20.87 ± 4.3	-2.48	0.007*
15c	Peer Acceptance	19.07 ± 3.23	19.55 ± 3.19	2.52	0.002*
15d	Physical Appearance	20.67 ± 4.92	20.53 ± 5.14	-0.68	0.474
15e	Scholastic Competence	22.21 ± 4.31	21.87 ± 4.59	-1.53	0.061
SOCIAL					
16	Empathy	14.3 ± 3.25	15.09 ± 3.34	5.55	<0.001*
17	Social Competence	32.91 ± 6.22	33.94 ± 6.52	3.11	<0.001*
18	Altruism	13.11 ± 3.56	13.69 ± 3.57	4.42	<0.001*
19	Parent Relationship	23.62 ± 4.61	24.09 ± 4.72	1.99	0.020*
20	Peer Friendships	20.42 ± 4.21	20.35 ± 4.01	-0.34	0.738
Shuttle run: 10 x 5 m (SHR) (Sec*); Standing board jump (SBJ) (cm); Plate tapping (PLT) (25 cycles in sec*); Sit-ups (SUP) (freq/30sec); Sit and reach (SAR) (cm); SEIS (Schutte Emotional Intelligence Scale); CERQ-short-form (Cognitive Emotion Regulation Questionnaire); CAS (Clinical Anger Scale); *indicates p < 0.05; SD (standard deviation).					

6.4.2. All Measures within and between Age Groups (Juniors and Seniors)

As seen in table 30, the sub-factor analyses within age groups indicated the scores of weight (juniors -3.4%, $p < 0.001$; seniors -1.63%, $p < 0.001$) and BMI (juniors -3.48%, $p < 0.001$; seniors: -1.66%, $p < 0.001$) decreased significantly for both the age groups. While board jump, shuttle run, sit-ups and plate tapping showed statistically significant positive change in both the groups. Similarly, SEIS (juniors 3.65%, $p < 0.001$; seniors 2.74%, $p < 0.001$), CERQ (juniors 10.78%, $p < 0.001$; seniors: 7.34%, $p < 0.001$), empathy (juniors 5.62%, $p < 0.001$; seniors 5.53%, $p < 0.001$), altruism (juniors 3.98%, $p = 0.017$; seniors 5.1%, $p = 0.001$), and social competence (juniors 3.1%, $p = 0.005$; seniors 3.13%, $p = 0.009$) increased significantly for both the age groups. CAS (juniors -6.17%, $p = 0.093$; seniors -27.03%, $p < 0.001$) decreased in both the age groups but significant in seniors showing positive change in both the groups. The parent relationship (juniors 2.29%, $p = 0.068$; seniors -2.7%, $p = 0.142$) and peer friendship (juniors 0.85%, $p = 0.509$; seniors -1.8%, $p = 0.118$) significantly increased among juniors, but decreased non-significantly among seniors. The self-concept, however showed non-significant decrease in juniors and non-significant increase in seniors (juniors -1.25%, $p = 0.076$; seniors 0.89%, $p = 0.237$). There were significant differences between age groups in the scores of weight ($p < 0.001$), BMI ($p < 0.001$), self-concept ($p = 0.041$), CAS ($p < 0.001$), plate tapping ($p < 0.001$), and sit-ups ($p < 0.001$) between juniors and seniors. Graphical representation is given in **Figure 57 to Figure 72**.

TABLE 30. Measures within and between age groups

Variable	Group	Pre mean \pm SD	Post mean \pm SD	Within group Sig.	Between group Sig.	% Change
DEMOGRAPHY						
Age (years)	Junior	10.8 \pm 1.69				
	Senior	13.76 \pm 0.93				
Height (cm)	Junior	142.65 \pm 10.29				
	Senior	159.29 \pm 9.34				
Father's Age (years)	Junior	42.67 \pm 4.35				
	Senior	45.06 \pm 4.12				
Mother's Age (years)	Junior	37.24 \pm 3.72				
	Senior	39.8 \pm 3.93				
ANTHROPOMETRY						
Weight (Kg)	Junior	37.2 \pm 10.31	35.93 \pm 10.08	<0.001	<0.001	-3.40
	Senior	50.83 \pm 11.16	50 \pm 10.92	<0.001		-1.63
BMI	Junior	18.12 \pm 3.75	17.49 \pm 3.68	<0.001	<0.001	-3.48
	Senior	19.94 \pm 3.68	19.61 \pm 3.58	<0.001		-1.66
PHYSICAL						
Shuttle run (10x5mR) (Sec*)	Junior	16.5 \pm 1.53	16.34 \pm 1.63	0.051	0.312	-0.97
	Senior	15.38 \pm 1.62	15.35 \pm 1.67	0.601		-0.23
Standing board jump (SBJ) (cm)	Junior	124.36 \pm 24.25	127.72 \pm 22.66	0.001		2.70
	Senior	135.82 \pm 27.02	141.29 \pm 29.11	<0.001		4.03
Plate tapping (PLT) (25 cycles in sec*)	Junior	12.63 \pm 2.09	13.02 \pm 2.35	0.003	<0.001	3.06
	Senior	12.12 \pm 1.77	10.81 \pm 1.66	<0.001		-10.81
Sit-ups (SUP) (freq/30sec)	Junior	13.65 \pm 6.4	15.01 \pm 6.43	<0.001	<0.001	9.96
	Senior	16.43 \pm 5.98	19.28 \pm 5.59	<0.001		17.35
Sit and reach (SAR) (cm)	Junior	31.2 \pm 5.91	32.44 \pm 6.36	<0.001	0.103	3.97
	Senior	31.44 \pm 7.52	32.25 \pm 7.58	0.004		2.58
PSYCHOLOGICAL						
SEIS	Junior	121.06 \pm 17.53	125.48 \pm 19.37	<0.001	0.511	3.65
	Senior	126.1 \pm 14.3	129.55 \pm 17.75	<0.001		2.74
CERQ	Junior	53.14 \pm 11.05	58.87 \pm 12.24	<0.001	0.108	10.78
	Senior	55.15 \pm 9.64	59.2 \pm 10.62	<0.001		7.34
Self-blame		5.39 \pm 2.24	6.39 \pm 2.24	<0.001	0.027	18.55
	Senior	5.53 \pm 2.16	6.01 \pm 2.15	0.006		8.68
Acceptance	Junior	5.78 \pm 2.2	6.39 \pm 2.06	<0.001	0.430	10.55
	Senior	5.91 \pm 1.87	6.69 \pm 2	<0.001		13.20
Rumination	Junior	6.05 \pm 2.27	6.63 \pm 2.15	<0.001	0.080	9.59
	Senior	6.36 \pm 2.15	6.59 \pm 2.08	0.209		3.62

Positive Refocusing	Junior	6.32 ± 2.27	6.63 ±2.14	0.057	0.531	4.91
	Senior	6.28 ± 2.23	6.73 ±2.13	0.014		7.17
Refocus on Planning	Junior	7.18 ± 2.21	7.46 ±2.03	0.072	0.861	3.90
	Senior	7.42 ± 2.09	7.73 ±1.92	0.070		4.18
Positive Reappraisal	Junior	6.38 ± 2.15	6.95 ±2.05	<0.001	0.596	8.93
	Senior	6.7 ± 2.09	7.15 ±2.08	0.004		6.72
Putting into Perspective	Junior	5.76 ± 2.19	6.53 ±2.16	<0.001	0.685	13.37
	Senior	6.2 ± 2.2	6.87 ±2.12	<0.001		10.81
Catastrophizing	Junior	5.77 ± 2.33	6.62 ±2.34	<0.001	0.053	14.73
	Senior	6.1 ± 2.15	6.47 ±2.07	0.047		6.07
Other blame	Junior	4.61 ± 2.14	5.54 ±2.35	<0.001	0.081	20.17
	Senior	4.68 ± 2.27	5.25 ±2.36	0.001		12.18
Self-Concept	Junior	103.43 ± 13.96	102.14 ±15.37	0.076	0.041	-1.25
	Senior	101.82 ± 12.51	102.73 ±13.68	0.237		0.89
Athletic Competence	Junior	19.55 ± 3.96	19.85 ±4.15	0.226	0.341	1.53
	Senior	19.19 ± 3.75	19.16 ±4.07	0.907		-0.16
Conduct/Morality	Junior	21.44 ± 4.18	20.47 ±4.31	<0.001	0.009	-4.52
	Senior	21.35 ± 3.86	21.42 ±4.24	0.806		0.33
Peer Acceptance	Junior	19.02 ± 3.28	19.46 ±3.34	0.038	0.744	2.31
	Senior	19.13 ± 3.18	19.68 ±2.97	0.020		2.88
Physical Appearance	Junior	21.01 ± 4.96	20.56 ±5.18	0.114	0.081	-2.14
	Senior	20.22 ± 4.84	20.49 ±5.08	0.346		1.34
Scholastic Competence	Junior	22.41 ± 4.37	21.79 ±4.73	0.011	0.069	-2.77
	Senior	21.93 ± 4.21	21.97 ±4.41	0.868		0.18
CAS	Junior	15.24 ± 10.36	14.3 ±11.03	0.093	<0.001	-6.17
	Senior	15.43 ± 10.63	11.26 ±10.46	<0.001		-27.03
SOCIAL						
Empathy	Junior	14.05 ± 3.21	14.84 ±3.35	<0.001	1.00	5.62
	Senior	14.64 ± 3.27	15.45 ±3.29	<0.001		5.53
Social Competence	Junior	32.24 ± 6.41	33.24 ±6.66	0.005	0.912	3.10
	Senior	33.82 ± 5.86	34.88 ±6.22	0.009		3.13
Altruism	Junior	13.08 ± 3.65	13.6 ±3.61	0.017	0.625	3.98
	Senior	13.14 ± 3.45	13.81 ±3.52	0.001		5.10
Parent Relationship	Junior	23.57 ± 4.92	24.11 ±4.79	0.068	0.695	2.29
	Senior	23.69 ± 4.16	23.05 ±4.62	0.142		-2.70
Peer Friendships	Junior	19.91 ± 4.48	20.08 ±3.99	0.509	0.120	0.85
	Senior	21.12 ± 3.72	20.74 ±4.03	0.118		-1.80
BMI (Body Mass Index); SEIS (Schutte Emotional Intelligence Scale); CERQ-short-form (Cognitive Emotion Regulation Questionnaire); CAS (Clinical Anger Scale); *indicates p < 0.05; SD (standard deviation).						

6.4.3. All Measures within and between Genders (Males and Females)

As seen in table 31, the sub-factor analyses within genders showed the scores of weight (males -2.43%, $p < 0.001$; females -2.68%, $p < 0.001$) and BMI (males -2.6%, $p < 0.001$; females -2.84%, $p < 0.001$) decreasing significantly in both the groups. While SEIS (males 2.11%, $p = 0.007$; females 5.23%, $p < 0.001$), CERQ (males 8.42%, $p < 0.001$; females 10.94%, $p < 0.001$), empathy (males 5.38%, $p < 0.001$; females 6.02%, $p < 0.001$), altruism (males 3.91%, $p = 0.009$; females 5.79%, $p = 0.006$) increased significantly in both the groups with the exception of social competence (males -1.17%, $p = 0.087$; females 5.17%, $p < 0.001$). There was an increase in parent relationship (males 0.38%, $p = 0.718$; females 4.78%, $p < 0.001$) in both groups, more noteworthy in females. The peer friendship (males -1.35%, $p = 0.28$; females 1.43%, $p = 0.253$) and self-concept (males: -0.69%, $p = 0.283$; females: 0.24%, $p = 0.777$) showed a decrease in males and an increase in females. There was a significant decrease in CAS (males -9.54%, $p = 0.006$; females -27.17%, $p < 0.001$) showing positive change in both the groups. There were significant changes between gender group differences in SEIS ($p = 0.006$), Social Competence ($p = 0.026$), Positive Parent Relationship ($p = 0.007$), CAS ($p = 0.016$) and Standing board jump ($p = 0.013$) between males and females. Graphical representation is given in **Figure 57 to Figure 72**.

TABLE 31. Measures within and between gender groups

Variable	Group	Pre mean \pm SD	Post mean \pm SD	Within group Sig.	Between group Sig.	% Change
DEMOGRAPHY						
Age	Male	12.04 \pm 1.79				
	Female	12.06 \pm 1.86				
Height	Male	150.04 \pm 13.58				
	Female	148.9 \pm 11.48				

Father Age	Male	43.57 ± 4.54				
	Female	43.84 ± 4.16				
Mother Age	Male	38.11 ± 4.08				
	Female	38.67 ± 3.86				
ANTHROPOMETRY						
Weight	Male	42.41 ± 12.78	41.38 ± 12.71	<0.001	0.189	-2.43
	Female	43.9 ± 12.29	42.72 ± 12.2	<0.001		-2.68
BMI	Male	18.51 ± 3.6	18.03 ± 3.55	<0.001	0.244	-2.60
	Female	19.56 ± 4.11	19 ± 4.09	<0.001		-2.84
PHYSICAL						
Shuttle run (10x5mR)	Male	15.57 ± 1.61	15.53 ± 1.7	0.596	0.084	-0.30
	Female	16.89 ± 1.39	16.64 ± 1.52	0.022		-1.48
Standing board jump (SBJ)	Male	135.77 ± 27.03	142.22 ± 25.83	<0.001	0.013	4.75
	Female	117.08 ± 18.97	118.87 ± 20.6	0.069		1.53
Plate tapping (PLT)	Male	12.32 ± 2.14	11.99 ± 2.36	0.077	0.687	-2.71
	Female	12.59 ± 1.65	12.24 ± 2.34	0.032		-2.73
Sit-ups (SUP)	Male	16.16 ± 6.35	18.17 ± 6.48	<0.001	0.584	12.41
	Female	12.46 ± 5.69	14.37 ± 5.59	<0.001		15.26
Sit and reach (SAR)	Male	30.77 ± 6.56	31.94 ± 6.7	<0.001	0.169	3.80
	Female	32.28 ± 6.69	33.12 ± 6.98	0.018		2.60
PSYCHOLOGICAL						
SEIS	Male	121.09 ± 16.7	123.64 ± 19.13	0.007	0.006	2.11
	Female	126.93 ± 15.25	133.57 ± 16.39	<0.001		5.23
CERQ	Male	54.74 ± 10.52	59.35 ± 11.22	<0.001	0.298	8.42
	Female	52.65 ± 10.4	58.41 ± 12.2	<0.001		10.94
Self-blame	Male	5.43 ± 2.2	6.32 ± 2.11	<0.001	0.253	16.39
	Female	5.49 ± 2.21	6.08 ± 2.37	0.003		10.75
Acceptance	Male	5.93 ± 2.08	6.49 ± 1.98	<0.001	0.103	9.44
	Female	5.66 ± 2.03	6.58 ± 2.13	<0.001		16.25
Rumination	Male	6.31 ± 2.2	6.6 ± 2.08	0.041	0.087	4.60
	Female	5.95 ± 2.26	6.64 ± 2.19	<0.001		11.60
Positive Refocusing	Male	6.4 ± 2.26	6.73 ± 2.11	0.024	0.748	5.16
	Female	6.13 ± 2.22	6.55 ± 2.17	0.038		6.85
Refocus on Planning	Male	7.2 ± 2.15	7.48 ± 2.03	0.062	0.842	3.89
	Female	7.42 ± 2.18	7.74 ± 1.91	0.077		4.31
Positive Reappraisal	Male	6.62 ± 2.13	7 ± 2.12	0.011	0.061	5.74
	Female	6.32 ± 2.12	7.08 ± 1.97	<0.001		12.03

Putting into Perspective	Male	5.96 ± 2.21	6.67 ± 2.09	<0.001	0.741	11.91
	Female	5.89 ± 2.2	6.68 ± 2.24	<0.001		13.41
Catastrophizing	Male	5.98 ± 2.25	6.65 ± 2.14	<0.001	0.872	11.20
	Female	5.79 ± 2.29	6.39 ± 2.38	0.005		10.36
Other blame	Male	4.96 ± 2.25	5.76 ± 2.27	<0.001	0.810	16.13
	Female	4.06 ± 1.97	4.8 ± 2.38	<0.001		18.23
Self-Concept	Male	102.27 ± 13.78	101.56 ± 14.98	0.283	0.384	-0.69
	Female	103.62 ± 12.62	103.87 ± 14.05	0.777		0.24
Athletic Competence	Male	19.76 ± 3.93	19.82 ± 4.07	0.779	0.459	0.30
	Female	18.76 ± 3.71	19.09 ± 4.2	0.206		1.76
Conduct/Morality	Male	20.99 ± 4.14	20.45 ± 4.27	0.032	0.936	-2.57
	Female	22.14 ± 3.77	21.63 ± 4.25	0.106		-2.30
Peer Acceptance	Male	18.91 ± 3.24	19.44 ± 3.23	0.006	0.673	2.80
	Female	19.36 ± 3.22	19.75 ± 3.1	0.139		2.01
Physical Appearance	Male	20.73 ± 5.01	20.4 ± 5.17	0.192	0.208	-1.59
	Female	20.57 ± 4.76	20.77 ± 5.08	0.551		0.97
Scholastic Competence	Male	21.88 ± 4.49	21.44 ± 4.77	0.062	0.483	-2.01
	Female	22.8 ± 3.9	22.63 ± 4.16	0.553		-0.75
CAS	Male	16.29 ± 10.57	14.74 ± 11.26	0.006	0.016	-9.54
	Female	13.59 ± 10.08	9.9 ± 9.45	<0.001		-27.17
SOCIAL						
Empathy	Male	13.93 ± 3.15	14.68 ± 3.3	<0.001	0.670	5.38
	Female	14.95 ± 3.32	15.85 ± 3.29	<0.001		6.02
Social Competence	Male	32.39 ± 6.17	32.01 ± 6.62	0.087	0.026	-1.17
	Female	33.84 ± 6.22	35.59 ± 6	<0.001		5.17
Altruism	Male	13.06 ± 3.58	13.57 ± 3.61	0.009	0.428	3.91
	Female	13.13 ± 3.55	13.89 ± 3.5	0.006		5.79
Parent Relationship	Male	23.38 ± 4.74	23.47 ± 5.93	0.718	0.007	0.38
	Female	24.05 ± 4.35	25.2 ± 4.09	<0.001		4.78
Peer Friendships	Male	20.07 ± 4.2	19.8 ± 4.11	0.280	0.116	-1.35
	Female	21.04 ± 4.17	21.34 ± 3.64	0.253		1.43
BMI (Body Mass Index); SEIS (Schutte Emotional Intelligence Scale); CERQ-short-form (Cognitive Emotion Regulation Questionnaire); CAS (Clinical Anger Scale); *indicates p < 0.05; SD (standard deviation).						

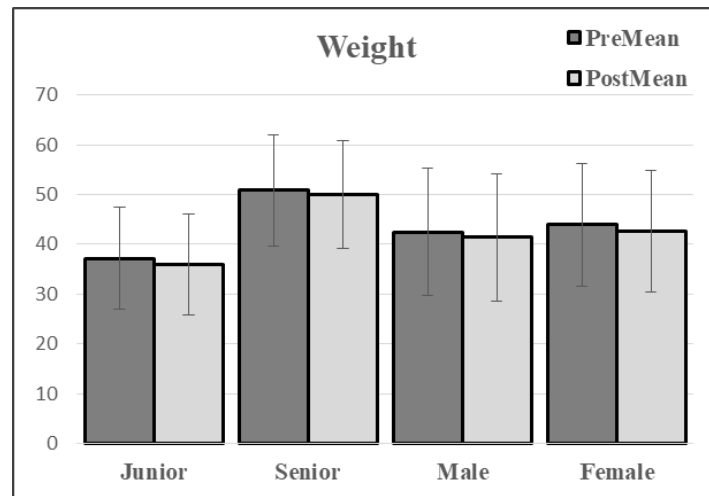
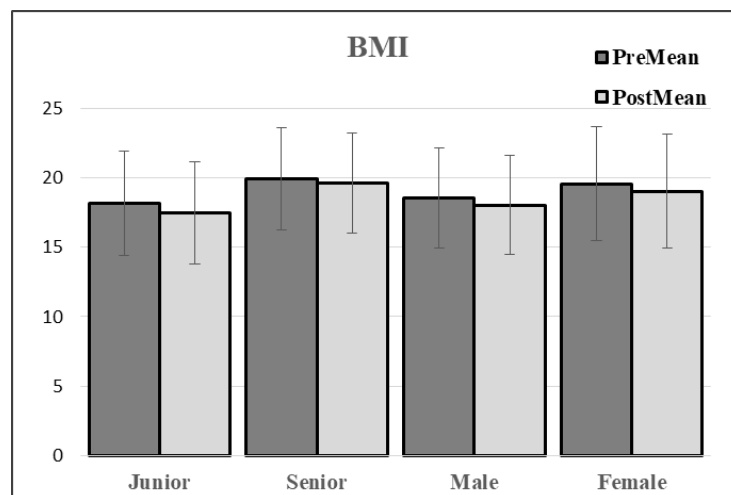
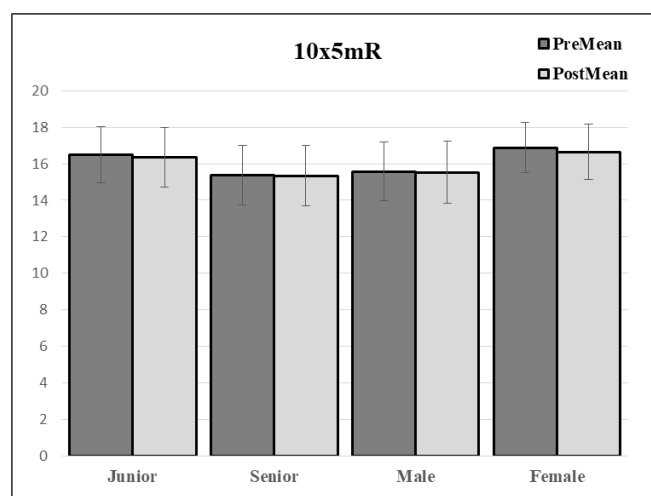
FIGURE 57. Pre-post change on Weight among age and gender sub-groups**FIGURE 58. Pre-post change on BMI among age and gender sub-groups****FIGURE 59. Pre-post change on 10x5mR among age and gender sub-groups**

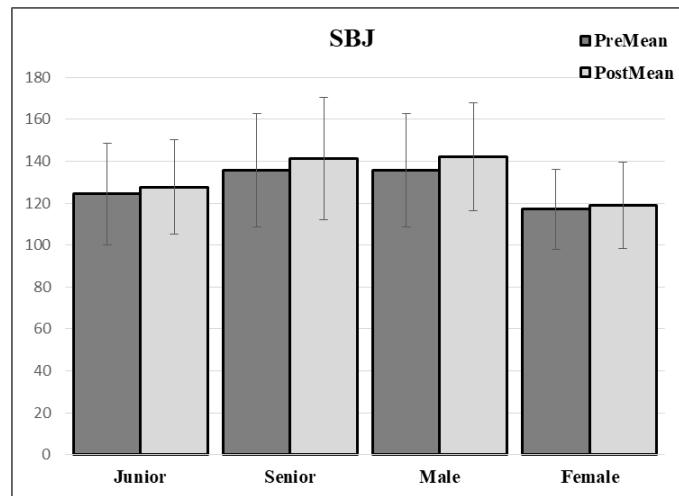
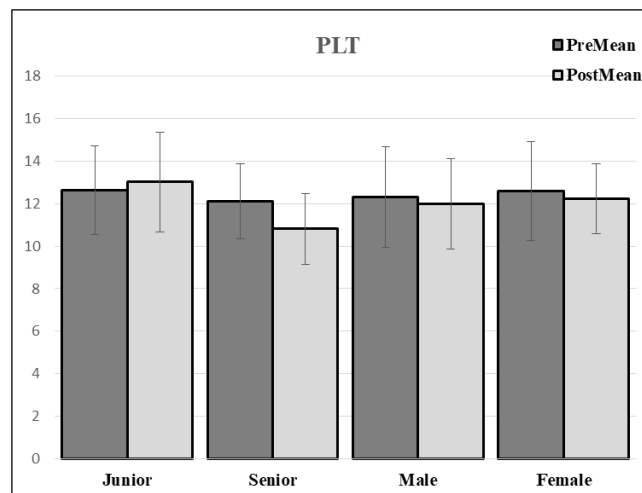
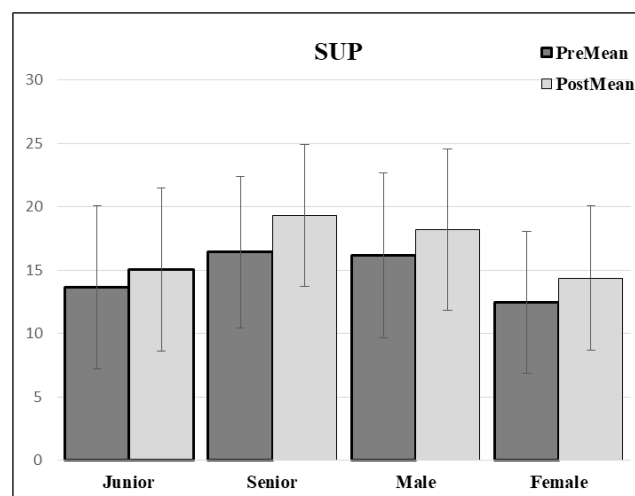
FIGURE 60. Pre-post change on SBJ among age and gender sub-groups**FIGURE 61. Pre-post change on PLT among age and gender sub-groups****FIGURE 62. Pre-post change on SUP among age and gender sub-groups**

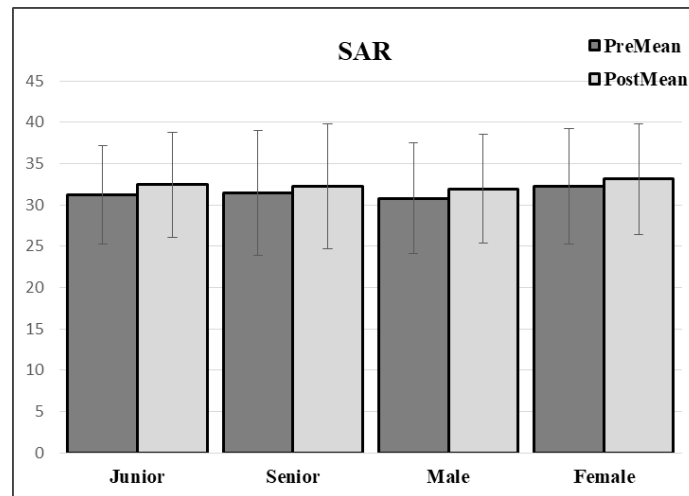
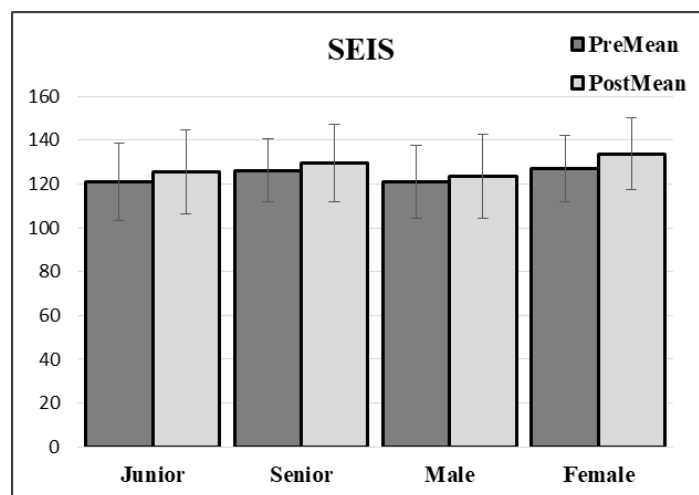
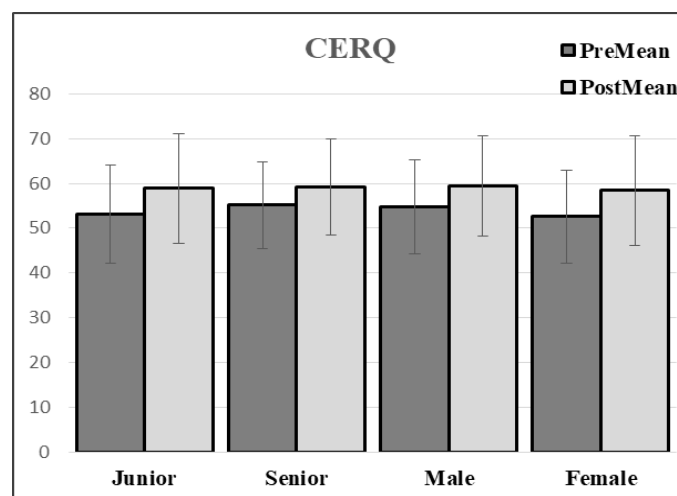
FIGURE 63. Pre-post change on SAR among age and gender sub-groups**FIGURE 64. Pre-post change on EI among age and gender sub-groups****FIGURE 65. Pre-post change on CER among age and gender sub-groups**

FIGURE 66. Pre-post change on Self-concept among age and gender sub-groups

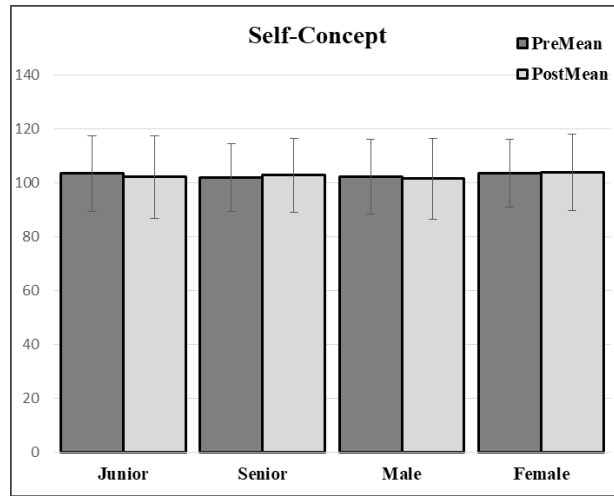


FIGURE 67. Pre-post change on Anger among age and gender sub-groups

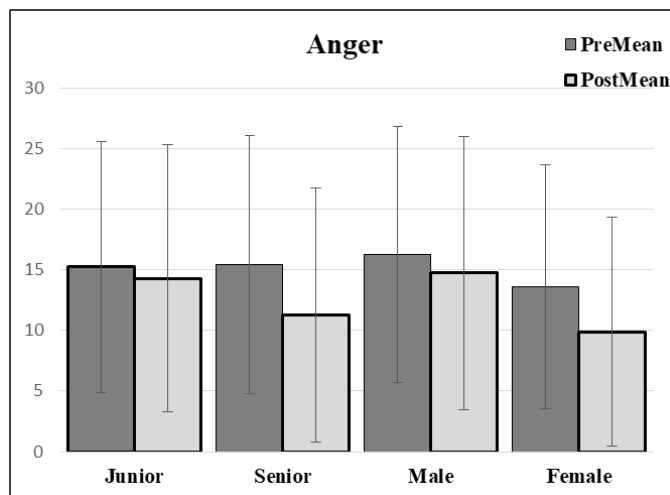


FIGURE 68. Pre-post change on Empathy among age and gender sub-groups

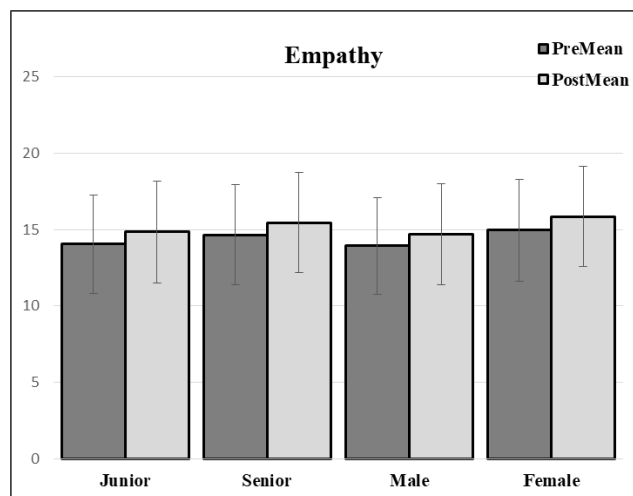


FIGURE 69. Pre-post change on Social competence among age and gender sub-groups

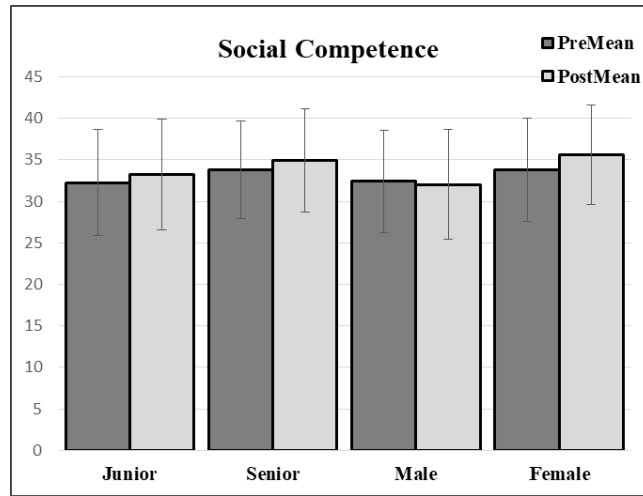


FIGURE 70. Pre-post change on Altruism among age and gender sub-groups

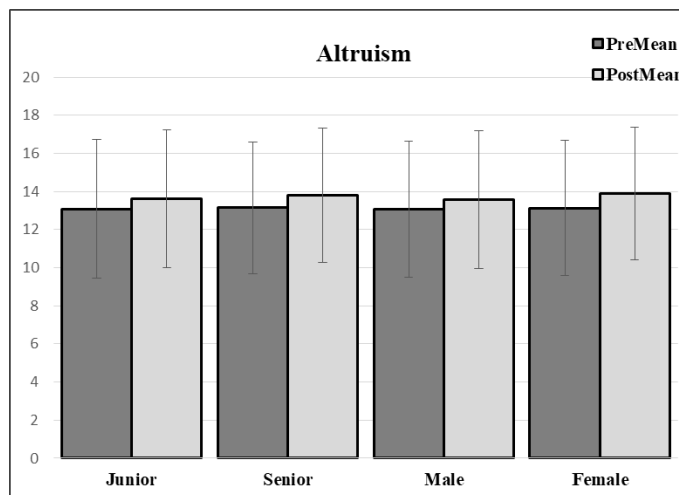


FIGURE 71. Pre-post change on Parent relationship among age and gender sub-groups

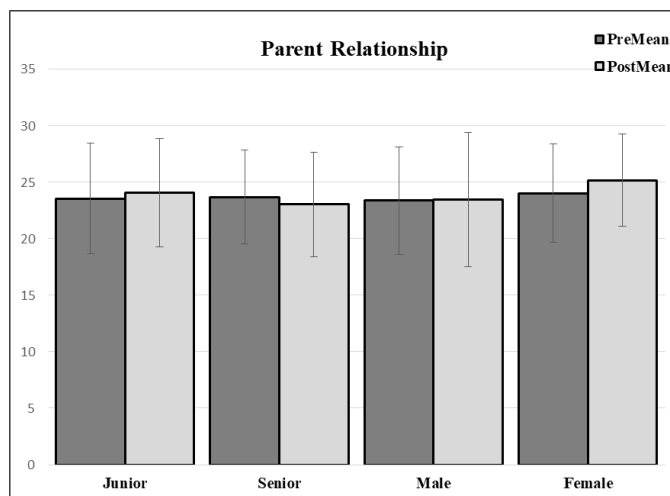
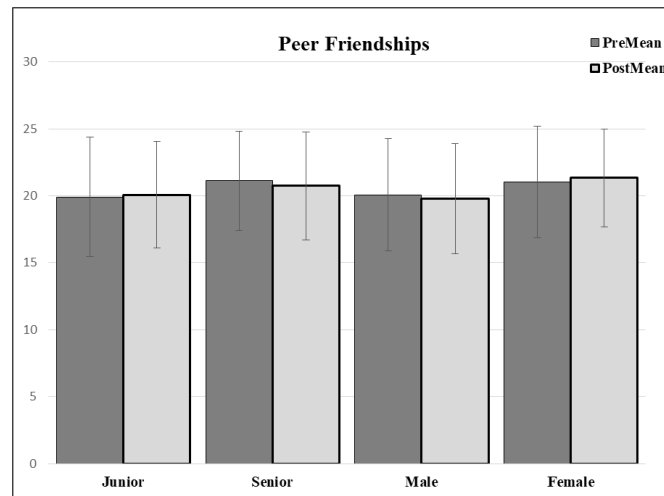


FIGURE 72. Pre-post change on Peer friendships among age and gender sub-groups

6.4.4. All Measures between Gender (Males and Females) in Seniors and Juniors

Among seniors, there were significant differences among genders in SEIS ($p = 0.006$) but no significance among juniors. In CERQ, the difference between genders in seniors was noted. Likewise, there was significant difference among genders in the scores of CAS ($p = 0.027$) and parent relationship ($p = 0.003$) among seniors, whereas no change was seen in juniors ($p = 0.207$). Also, there was significant gender difference in peer friendship ($p < 0.001$) in seniors whereas no change was seen in juniors ($p = 0.672$). There were significant gender differences in seniors in shuttle run ($p < 0.001$) and sit and reach ($p = 0.044$) but not seen in juniors. Detailed results are tabulated in **Table 32** and a graphical representation is given in **Figure 73**.

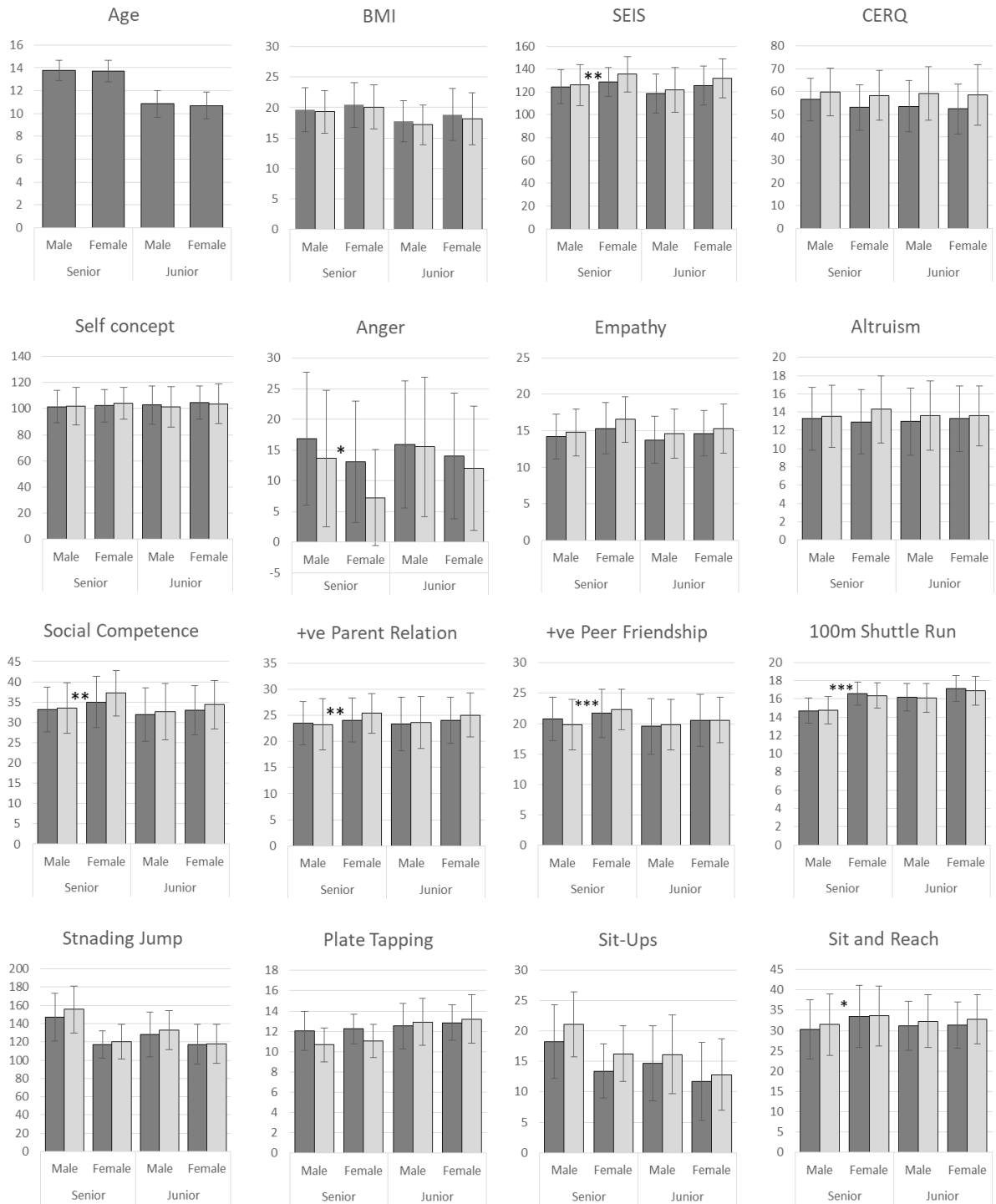
TABLE 32. Measures between gender groups in seniors and juniors

Variable	Age group	Gender group	Pre mean \pm SD	Post mean \pm SD	Between group Sig. in change scores	% Change
DEMOGRAPHY						
Age	Senior	Male	13.78 \pm 0.91		0.717	
		Female	13.73 \pm 0.96			
	Junior	Male	10.86 \pm 1.17		0.231	
		Female	10.69 \pm 1.16			
Height	Senior	Male	160.84 \pm 10.46		<0.001	
		Female	156.74 \pm 6.4			
	Junior	Male	142.62 \pm 10.04		0.959	
		Female	142.69 \pm 10.8			
Father Age	Senior	Male	44.95 \pm 4.23		0.701	
		Female	45.22 \pm 3.99			
	Junior	Male	42.73 \pm 4.53		0.758	
		Female	42.53 \pm 3.92			
Mother Age	Senior	Male	39.63 \pm 3.75		0.528	
		Female	40.05 \pm 3.86			
	Junior	Male	37.2 \pm 4.01		0.790	
		Female	37.33 \pm 2.97			
ANTHROPOMETRY						
Weight	Senior	Male	51.12 \pm 12.11	50.33 \pm 11.83	0.453	-1.53
		Female	50.36 \pm 4.21	49.44 \pm 9.27		-1.81
	Junior	Male	36.36 \pm 9.28	35.16 \pm 9.09	0.197	-3.30
		Female	38.78 \pm 11.9	37.39 \pm 11.64		-3.58
BMI	Senior	Male	19.63 \pm 3.65	19.32 \pm 3.52	0.408	-1.56
		Female	20.46 \pm 3.68	20.09 \pm 3.65		-1.81
	Junior	Male	17.74 \pm 3.37	17.15 \pm 3.31	0.257	-3.36
		Female	18.84 \pm 4.3	18.16 \pm 4.24		-3.63

PSYCHOLOGICAL						
SEIS	Senior	Male	124.6 ± 15.11	126.01 ± 18.13	0.006	1.13
		Female	128.59 ± 12.53	135.48 ± 15.48		5.35
	Junior	Male	118.65 ± 17.34	121.99 ± 19.67	0.142	2.81
		Female	125.62 ± 17.06	132.08 ± 16.99		5.14
CERQ	Senior	Male	56.46 ± 9.29	59.77 ± 10.49	0.227	5.87
		Female	52.99 ± 9.86	58.27 ± 10.82		9.96
	Junior	Male	53.55 ± 11.17	59.06 ± 11.71	0.635	10.30
		Female	52.37 ± 10.85	58.52 ± 13.23		11.74
Self-Concept	Senior	Male	101.58 ± 12.63	101.95 ± 14.41	0.375	0.37
		Female	102.24 ± 12.37	104.01 ± 12.37		1.74
	Junior	Male	102.75 ± 14.53	101.28 ± 15.37	0.741	-1.42
		Female	104.73 ± 12.76	103.77 ± 15.32		-0.92
CAS	Senior	Male	16.83 ± 10.84	13.63 ± 11.09	0.027	-18.99
		Female	13.1 ± 9.91	7.22 ± 7.82		-44.89
	Junior	Male	15.9 ± 10.39	15.51 ± 11.33	0.232	-2.48
		Female	13.98 ± 10.25	12 ± 10.1		-14.16
PSYCHOSOCIAL						
Teen Empathy	Senior	Male	14.22 ± 3.03	14.78 ± 3.23	0.165	4.00
		Female	15.33 ± 3.54	16.56 ± 3.11		8.02
	Junior	Male	13.74 ± 3.22	14.6 ± 3.35	0.611	6.30
		Female	14.64 ± 3.12	15.28 ± 3.33		4.42
Teen Altruism	Senior	Male	13.27 ± 3.43	13.53 ± 3.39	0.127	1.92
		Female	12.94 ± 3.5	14.29 ± 3.71		10.43
	Junior	Male	12.97 ± 3.68	13.61 ± 3.77	0.455	4.87
		Female	13.28 ± 3.59	13.58 ± 3.31		2.21
Social Competence	Senior	Male	33.12 ± 5.48	33.5 ± 6.17	0.008	1.14
		Female	34.98 ± 6.3	37.19 ± 5.62		6.33
	Junior	Male	31.88 ± 6.58	32.67 ± 6.91	0.431	2.48
		Female	32.93 ± 6.03	34.34 ± 6.02		4.29

Positive Parent Relationship	Senior	Male	23.46 ± 4.13	23.26 ± 4.87	0.003	-0.88
		Female	24.06 ± 4.21	25.36 ± 3.86		5.41
	Junior	Male	23.32 ± 5.13	23.61 ± 4.98	0.207	1.27
		Female	24.05 ± 4.48	25.07 ± 4.27		4.24
Positive Peer Friendship	Senior	Male	20.79 ± 3.52	19.78 ± 4.14	<0.001	-4.85
		Female	21.67 ± 3.98	22.33 ± 3.3		3.04
	Junior	Male	19.58 ± 4.56	19.82 ± 4.1	0.672	1.25
		Female	20.55 ± 4.26	20.57 ± 3.73		0.10
PHYSICAL						
Shuttle run: 10 x 5 m (SHR)	Senior	Male	14.69 ± 1.37	14.73 ± 1.52	<0.001	0.30
		Female	16.58 ± 1.28	16.37 ± 1.41		-1.25
	Junior	Male	16.18 ± 1.48	16.08 ± 1.59	0.291	-0.60
		Female	17.12 ± 1.43	16.86 ± 1.58		-1.55
Standing board jump (SBJ)	Senior	Male	147.11 ± 26.19	155.62 ± 25.81	0.064	5.78
		Female	116.71 ± 15.01	120.25 ± 19.22		3.04
	Junior	Male	128.02 ± 24.81	132.92 ± 21.43	0.077	3.83
		Female	117.37 ± 21.6	117.77 ± 21.67		0.35
Plate tapping (PLT)	Senior	Male	12.04 ± 1.93	10.66 ± 1.66	0.467	-11.47
		Female	12.24 ± 1.47	11.06 ± 1.64		-9.69
	Junior	Male	12.51 ± 2.25	12.92 ± 2.33	0.595	3.27
		Female	12.86 ± 1.74	13.2 ± 2.39		2.65
Sit-ups (SUP)	Senior	Male	18.25 ± 6.05	21.08 ± 5.36	0.896	15.54
		Female	13.4 ± 4.46	16.25 ± 4.59		21.27
	Junior	Male	14.68 ± 6.16	16.13 ± 6.43	0.267	9.91
		Female	11.71 ± 6.45	12.83 ± 5.88		9.57
Sit and reach (SAR)	Senior	Male	30.29 ± 7.24	31.46 ± 7.61	0.044	3.86
		Female	33.4 ± 7.64	33.56 ± 7.38		0.48
	Junior	Male	31.11 ± 6.03	32.27 ± 6.49	0.973	3.74
		Female	31.39 ± 5.71	32.76 ± 6.11		4.38
BMI (Body Mass Index); SEIS (Schutte Emotional Intelligence Scale); CERQ-short-form (Cognitive Emotion Regulation Questionnaire); CAS (Clinical Anger Scale); *indicates p < 0.05; SD (standard deviation).						

FIGURE 73. Comparison of variables within different age groups



BMI (Body Mass Index); SEIS (Schutte Emotional Intelligence Scale); CERQ (Cognitive Emotion Regulation Questionnaire); CAS (Clinical Anger Scale); within group paired sample t-test (* p<0.05, ** p<0.01, *** p<0.001); between group independent sample t-test for change score († p<0.05, †† p<0.01, ††† p<0.001)

6.4.5. Correlations between Change in Variables

The correlation between change scores (δ scores) was explored to understand the relationships between the changes brought about by yoga. The age was positively correlated with the change in physical speed, endurance, BMI, strength and temper (anger). The age was negatively correlated with the change in EI. While the change in EI was negatively correlated with the BMI, strength and age but positively correlated to social interaction. Change in self-concept was positively correlated with social interaction, anger, endurance and age. The social interaction was positively related to the change in EI and self-concept but negatively related to strength. However, the change in anger was positively related to endurance, self-concept and age. Correlations and respective significance between all variables are presented in **Table 33**. Significant associations within these variables are represented as an association network diagram in **Figure 74**.

FIGURE 74. Association network diagram of change in variables

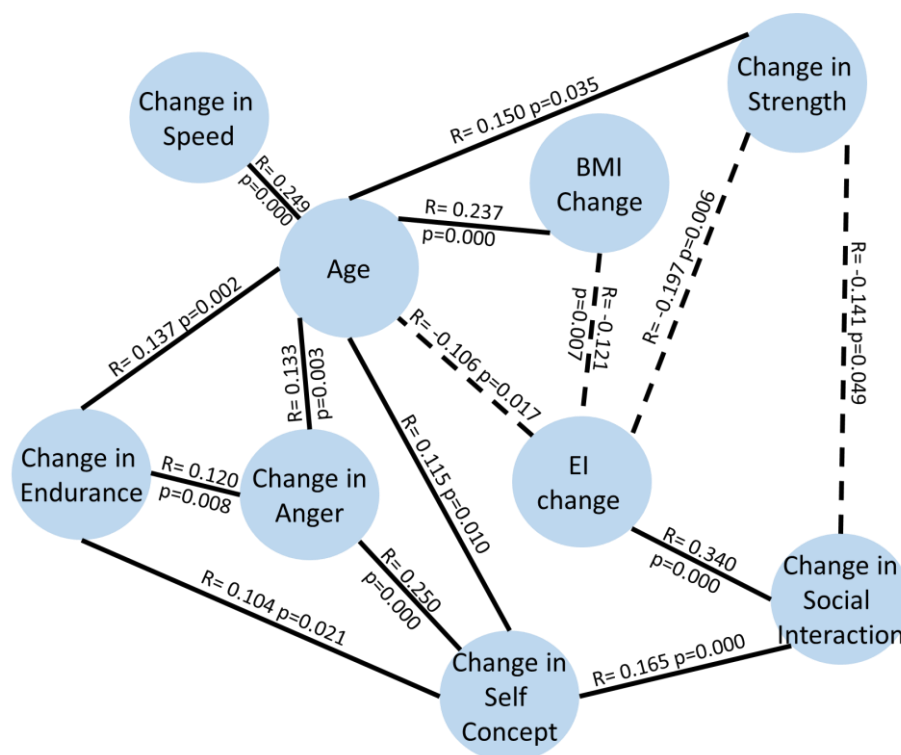


TABLE 33. Correlation matrix of change in variables

		Age	Change in BMI	Change in EI	Change in Social Interaction	Change in Self Concept	Change in Anger	Change in Strength	Change in Speed	Change in Endurance
Age	R	1								
	P-value									
Change in BMI	R	.237**	1							
	P-value	.000								
Change in EI	R	-.106*	-.121**	1						
	P-value	.017	.007							
Change in Social Interaction	R	-.014	-.027	.340**	1					
	P-value	.762	.545	.000						
Change in Self Concept	R	.115**	.043	.016	.165**	1				
	P-value	.010	.332	.727	.000					
Change in Anger	R	-.133**	-.037	.021	-.051	-.250**	1			
	P-value	.003	.413	.647	.264	.000				
Change in Strength	R	.150*	.116	-.197**	-.141*	.066	.074	1		
	P-value	.035	.106	.006	.049	.353	.304			
Change in Speed	R	-.249**	-.069	.036	.063	.043	.047	.069	1	
	P-value	.000	.132	.433	.167	.348	.310	.347		
Change in Endurance	R	.137**	-.013	-.033	.044	.104*	-.120**	.030	-.008	1
	P-value	.002	.776	.461	.333	.021	.008	.671	.865	

R (Pearson Correlation coefficient); ** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed)

CHAPTER 7

DISCUSSIONS



7. DISCUSSIONS

The current study was aimed to investigate the effect of a seven-day residential yoga intervention on the physical, psychological and social fitness of adolescents in three independent cohorts by way of a single arm pre-post study. The study showed significant improvement in physical fitness parameters (weight, BMI, speed and agility, explosive leg strength, upper body reaction and coordination, abdominal strength, and flexibility), psychological fitness (EI, cognitive emotional regulation strategies, and statistically significant reduction in clinical anger), and social fitness (empathy, altruism, parent relationship) after the intervention. The secondary objective was to compare if some of these effects were also observed by the parents.

7.1. PHYSICAL FITNESS OUTCOMES

7.1.1. Weight and BMI

Significant weight loss and decreased BMI were observed in all three independent cohorts. Further, the overall result of all 510 subjects showed significant reduction in BMI by 2.67%. There were no significant between group differences in male and female. Significant between group differences were seen in juniors and seniors in an overall analysis. Weight loss in juniors was more. Previous study done in obese adolescent boys have shown similar findings of significant decrease in body weight and BMI compared with baseline after yoga intervention of one hour thrice a week over 8 weeks (Seo et al., 2012). Other two studies done with obese adults, one reported improvement in weight loss after a 5-day residential weight loss yoga program (Braun, Park, & Conboy, 2012). Another single group study have also shown decrease in BMI after a 6-day residential yoga and vegetarian diet program (Telles, Visweswaraiyah, Balkrishna, & Kumar, 2009). In contrast, another RTC study done in children

between 8 to 13 years have shown weight gain and increased BMI after yoga intervention (45 minutes 5 days/week) for three months. (Telles, Singh, Bhardwaj, Kumar, & Balkrishna, 2013). This might be due to the variation in the yoga intervention or time duration. As the present study was carried out in a residential setting, the weight loss across all batches could be attributed to the holistic approach, which included yogic practices, disciplined lifestyle, and balanced vegetarian diet.

7.1.2. Speed & agility

Decrease in time taken in 10x5mR has shown improvement in speed and agility. The direction of change (decrease in time) was similar in all three batches although significant in batch 3. Further, the overall result of all 510 subjects showed trend of reduction by 0.74%. There was no significant between age group difference in juniors and seniors. Significant between gender group differences were seen in an overall analysis. Female responded better to the intervention. Previous RCT done in 98 school children between the age of 8 to 13 years have not shown any changes in speed in any of the group (yoga and PE) after intervention (45 minutes 5 days/week) for three months (Telles et al., 2013). Time taken for 10x5mR did not change significantly overall. Long intervention may be required to improve the agility and speed.

7.1.3. Explosive leg strength

Distance covered in SBJ has shown improvement in explosive leg strength, which was significant in batch 1 and 2 and a trend of positive change was seen in batch 3. Further, the overall result of all 510 subjects showed significant increase by 3.67%. There were significant between group differences in age groups. Seniors have shown relatively better change in leg

strength. Significant between group differences was seen in gender in an overall analysis. Males have shown relatively better change in leg strength. One previous study done among school children did not reflect any changes in leg strength (Telles et al., 2013). The improvement seen in present study might be due to stretch and strengthening of the muscles through asana and Suryanamaskar practices. Inverted postures might have helped in reducing the venous pressure in the legs. Standing balancing postures strengthen the calf and leg muscles.

7.1.4. Upper body reaction and coordination

Reduction in time showed improvement in PLT that measures upper body reaction, eye-hand coordination. The results of batches 1 and 3 have shown significant reduction, but batch 2 did not. Further, the overall result of all 510 subjects showed significant reduction in time taken in tapping performance by 2.72%. There was a significant between group difference in juniors and seniors. Seniors have shown significant decrease in time taken, while juniors have shown an increase. Significant between group differences were seen in males and females in an overall analysis. Males have shown relatively better change. In the present study, results of the juniors were not in line with the previous study on children of 8-13 years (Telles, Sharma, Yadav, Singh, & Balkrishna, 2014). Juniors may need long duration of intervention to improve upper body reaction. In one of the previous studies, yoga intervention improved eye-hand coordination in professional computer users by improving the tapping speed (Telles, Dash, & Naveen, 2009). An overall increase in reaction and coordination could be attributed to improved concentration and attention due to calming down of the mind by practicing bhakti yoga and jnana yoga.

7.1.5. Abdominal strength

Significant increase in SUP (number of sit ups in 30 seconds) across the batches has shown improvement in abdominal strength and muscular endurance. Further, the overall result of all 510 subjects showed significant improvement in abdominal strength by 13.37%. There was no significant between group differences in age groups (juniors and seniors), neither between genders (males and females) in the overall analysis. Results of the present study are in agreement with the earlier study in children (8-13 years) (Telles et al., 2013) and with another study in 41 boys (11-15 years) of rural residential school after 12 weeks of yoga intervention (Anita, Shete Sanjay, Ghanshyam Singh, Kulkarni Dattatraya, & Bhogal, 2014). These positive changes might be due to strengthening of the abdominal muscles by practicing asanas, and suryanamaskara. An improvement in whole-body endurance including respiratory and resting cardio-pulmonary functions can be observed in children and adolescents (A. Bhavanani, Madanmohan, Udupa, & Ravindra, 2011).

7.1.6. Flexibility

Flexibility of trunk significantly improved in batch 1 and 2 and a similar trend was seen in batch 3. Further, the overall result of all 510 subjects has shown significant improvement in flexibility by 3.39%. There were no significant between group differences in age groups (juniors and seniors), neither between genders (males and females) in the overall analysis. Results are in line with these studies, one done in adolescent girls 14 to 18 years after yoga intervention of two sessions per week for 7 weeks (Donahoe-Fillmore, Brahler, Fisher, & Beasley, 2010), one in children (Chen, Mao, Lai, Li, & Kuo, 2009) and another in young adults (Bal B.S., 2009) following yoga practices. Results of the present study is in line with previous findings of significant increase in flexibility in 41 boys (11-15 years) of rural

residential school after 12 weeks of yoga intervention (Anita et al., 2014). This improved flexibility might be due to different loosening practices and forward, backwards and side bending yoga postures included in this study. However, any physical activity, mainly asana, pranayama and so on involves concentration, mindfulness, psychological steadfastness, and a relaxed calm mind. This could be achieved through Jnana yoga, Bhakti yoga, and Karma yoga practices.

7.1.7. Summary

Results have shown significant changes in weight, BMI, SBJ, SUP, and SAR. The trend of change was in the same direction and was similar in all three batches. The positive outcomes of the present study also corroborated with the finding of earlier studies on yoga and physical fitness among children (Bal B.S., 2009; Benavides & Caballero, 2009; A. B. Bhavanani, Udupa, Madanmohan, & Ravindra, 2011; Bhutkar, Bhutkar, Taware, & Surdi, 2011; Chen et al., 2009; D'souza & Avadhany, 2014; Donahoe-Fillmore et al., 2010). Similarly, activities involving yoga have improved cardiorespiratory fitness, metabolic parameters, muscular flexibility, balance, and agility (Felver, Butzer, Olson, Smith, & Khalsa, 2015; Seo et al., 2012).

7.2. PSYCHOLOGICAL FITNESS OUTCOMES

7.2.1. Emotional Intelligence

The present study showed significant improvement in emotional intelligence (EI) across all the batches. Further, the overall result of all 510 participants has shown significant improvement in EI by 3.39%. There were no significant between age group differences (juniors and seniors). Significant gender group differences (males and females) were seen in

the overall analysis. Girls (5.23%) have shown more improvement than boys (2.11%) in EI. Reports have shown that females tend to have better EI than males at baseline (Petrides & Furnham, 2000) (Naghavi & Redzuan, 2011), which is similar to the findings of this study. Also, relatively the girls responded well to the intervention. This study showed significant improvements in EI by enhancing self-awareness with better ability to manage emotions, while increasing sensitivity to empathy to better manage relationships. This is similar to the observations of Jakovljevic (Jakovljevic, 2011). Previous research indicates improved EI through 20 minutes of meditation over eight weekly sessions in graduate students (Chu, 2010). Another study showed improvement in EI after six weeks (75 min session, 5 days/week) of integrated yoga intervention in managers (Adhia, Nagendra, & Mahadevan, 2010). Evidence suggests increased self-awareness, emotional intelligence, and social skills in response to sitting meditation among youths (Black, Milam, & Sussman, 2009). If the adolescent focuses on enhancing EI, they will display more emotional agility, altruistic behavior and would be able to bring about a larger changes in their social relationships and interactions (Ybrandt, 2008; Yip & Martin, 2006). Regulated breathing, chanting, relaxation, meditation, creative activity, lectures, and games were specially designed for emotional development that accounted for positive change.

7.2.2. Cognitive emotional regulation strategies

The present study showed significant improvement in coping strategies for emotional regulation across all the batches. Further, the overall result of all 510 participants has shown significant improvement in cognitive emotional regulation and coping strategies by 9.29%. There were no significant between age group differences (juniors and seniors), or gender group differences (male and female) in the overall analysis. The results on emotional

regulation are in line with the previous study done on 159 students with yoga-based intervention in a classroom setting (Frank, Kohler, Peal, & Bose, 2017). Pranayama, breathing practices, chanting and meditation, yama-niyama concept-driven creativity and games specially designed for emotional development may have accounted for these positive changes and enhanced coping abilities in the present study. Luhrmann et al. stated that prayer contributes to healing due to changes in cognitive processing (Luhrmann, Nusbaum, & Thistle, 2013). Research has shown that meditation and prayer can calm the mind, enhance coping abilities, manage emotions, improve inter-personal relationships, and induce deep relaxation (Birnie, Speca, & Carlson, 2010; Frank, Bose, & Schrobenhauser-Clonan, 2014; Garland, Gaylord, & Fredrickson, 2011; Robins, Keng, Ekblad, & Brantley, 2012; Tang, Yang, Leve, & Harold, 2012; Tomasino, Fregona, Skrap, & Fabbro, 2012; Vasiliauskas & McMinn, 2013; Wisner, Jones, & Gwin, 2010).

7.2.3. Self-concept

Self-concept didn't change although some sub-domains of it did change; long and more periodic intervention may be required to change self-concept. Significant between age group differences (juniors and seniors) were seen. Seniors responded relatively better to the yoga intervention. There were no gender group differences (males and females) in the overall analysis. Studies have shown that the ability to change self-concept improves with age through interventions or experience (Durlak, Weissberg, & Pachan, 2010; Sebastian, Burnett, & Blakemore, 2008).

7.2.4. Anger

In the present study, significant reduction in CAS across all the cohorts showed reduction in cognitive, physiological, social, and behavioral symptoms due to anger. Further, the overall result of all 510 participants has shown significant reduction in clinical anger by 15.05%. There were significant between age group differences (reduction in juniors by 6.17% and seniors by 27%), and significant between gender group differences (reduction in boys by 9.54% and girls by 27.17%) seen in the overall analysis. Clinical anger scores were reduced in both age and gender groups but were more significant in seniors and girls. This showed better anger control in seniors and girls. Present study findings of reduced anger is similar to the significant findings observed in the previous study done in adolescents (13-14 years) after yoga intervention for a period of 4 months with 2 yoga sessions per week (Mani, Sharma, Marimuttu, Omkar, & Nagendra, 2016). This is in contrast to one of the previous RCT in which insignificant changes in anger control and many of the psychological parameters were seen within groups and between groups with semester-long intervention in school curriculum in adolescents (Khalsa, Hickey-Schultz, Cohen, Steiner, & Cope, 2012). In another RCT, no changes were seen in emotional and behavioral functions within the yoga group, as well as between groups (Haden, Daly, & Hagins, 2014). The small sample size and inadequate dose of intervention (only 18 hours over 12 weeks) may be the reason for no changes. All these limitations were considered in the present study in the form of a well-organized integrated yoga program. Improvement in effective coping strategies allows for stable emotional response that enables reduction in anger. As age progresses, reduction in anger may come through change in emotional management (Phillips, Henry, Hosie, & Milne, 2006). The specially-designed yoga module conducted in a residential setting may have accounted for significant reduction in clinical anger and other significant positive psychological changes.

7.2.5. Summary

Results of all the psychological parameters are consistent in all the three batches showing consistency, which confirmed the effect of the intervention. Pranayama, meditation, and Jnana yoga activities may help them look at the positive side of events, think positive, and respond responsibly. The positive outcomes in this study are generally consistent with the previous studies of yoga and meditation in school settings, although the use of different outcome indicators and research design precludes a precise comparison (Hagen & Nayar, 2014; Wisner et al., 2010). The positive findings of another study on psychological measures done in adults with a five-day residential yoga program (Braun et al., 2012) supports the positive findings of the present study. The results showed significant improvement in all assessed psychological outcome measures except self-concept and reflects a positive change.

7.3. SOCIAL FITNESS OUTCOMES

7.3.1. Empathy

This study showed positive change in empathy, which significantly improved in batch 2 and batch 3. Further, the overall result of all 510 participants has shown significant improvement in empathy by 5.55%. There were no significant between age group differences (juniors and seniors), or gender group differences (males and females) seen in the overall analysis. Psychosocial fitness stems from empathy, which is being able to put oneself in another's situation to understand their feelings. This, in turn, impacts one's behavior and makes them better equipped to relate to their peers, parents, and surroundings at large. The results shown in this research, also correspond to a previous study involving 12 weeks of yoga practice by 125 adolescents from low-income backgrounds that enhanced empathy and sociality while reducing anger (Velásquez, López, Quiñonez, & Paba, 2015). Another study was done in the

United States with 411 undergraduate students, being assigned to a 16 day prayer group, a devotional attention group, or a no-contact control group. Participants in the prayer intervention group showed significant changes in empathy toward their offender (Vasiliauskas & McMinn, 2013). According to one study self-regulatory skills associated with emotion and prosocial dispositions, such as empathy can be strengthened through systematic contemplative practices, such as meditation (J. Davidson et al., 2012).

7.3.2. Social competence

Social competence was significantly improved in batch 3 though positive change was seen in batch 1 and 2 also but not significant. Further, the overall result of all 510 participants has shown significant improvement in social competence by 3.11%. There were no significant between age group differences (juniors and seniors). Significant gender group differences (increase in females) were seen in the overall analysis. Yogic games improve socialization skills like team planning, cooperation, team building etc.

7.3.3. Altruism

This study showed positive change in altruism which significantly improved in batch 3. Further, the overall result of all 510 participants has shown significant improvement in altruism by 4.42%. There were no significant between age group differences (juniors and seniors), or gender group differences (male and female) seen in the overall analysis. Altruism is also a pro-social behavioral pattern of resulting from increased empathy (Christov-Moore et al., 2014; Morelli, Rameson, & Lieberman, 2014) and these patterns of psychosocial behavior define an individual's social competence. Selfless social service reportedly helped to develop altruistic behavior (Mulla & Krishnan, 2008).

7.3.4. Parent Relationship

There was no significant change seen in parent relationship in any of the batches. Further, the overall result of all 510 participants has shown significant change by 1.99%. There were no significant between age group differences (juniors and seniors). Significant gender group differences (improved in girls (4.78%) when compared with boys (0.78%)) were seen in the overall analysis.

The adolescent data, collected before and after the seven-day intervention, might not have been adequate to appraise the change. Also, not having exposure to parents during this time may have made it non-conducive for its appraisal.

7.3.5. Peer relationship

There was no change seen in peer relationships in any of the batches. Further, the overall result of all 510 participants has shown slight decrease by 0.34%. There were significant between age group differences (increase in juniors and decrease in seniors). There were no significant gender group differences was seen in the overall analysis. The point of reference for peer friendship during the pre-data was an established set of peers from their native setting, whereas the post-data elicited had a point of reference of peers within the camp. This subtle disparity is appreciated more in seniors, which has resulted in a significant drop in scores of peer friendship, whereas in juniors there is a higher degree of adaptability indicated by a non-significant increase in peer friendship in the first and third batch.

7.3.6. Summary

Building self-awareness is the key to developing skill of emotional appraisal and control, whereby positive social competencies may be achieved. Yoga, being the science of holistic

wellbeing, consists of practices that encourage internalization and development of self-awareness and, thereby, the capacity of self-control (Jakovljevic, 2011). Yoga practices, through a sequence of awareness- building and relaxing practices, evoke a deeper calming effect, which help students get into a frame of mind conducive to learning, which is distinct from the effects of physical exercise alone (Frank et al., 2014b). The results of our study may suggest that seven days of yoga practices may have only been adequate to show small change in scores and a longer intervention might have been necessary to show consistent impact on downstream behavioral patterns. Other studies have also indicated that Karma Yoga (Mulla & Krishnan, 2008), yoga practices, mindfulness (Birnie, Speca, & Carlson, 2010), and prayer (Vasiliauskas & McMinn, 2013) have an influence over the aspects of empathy, altruistic behavior, and social competence in adolescents.

7.4. PARENTAL PERSPECTIVE

Variables of empathy, altruism, and peer and parental relationship are easily underestimated or overestimated while using a self-reported instrument. Thus, parallel data of these variables were also sought from parents. It is, however, known that parents are not able to report accurately certain aspects of their adolescent children's behavior (Verhulst & Ende, 1992). Comparison of corresponding adolescent and parent data provides rich information on the discrepancies of opinions held by each of them. Comparing baseline values between parents and their children, it was interesting to note that apart from having an agreement in scores on empathy, all other outcomes were significantly different. It was interesting that parents opine that their children have very positive parental relationships and very low peer friendships, but their children think otherwise. Noting these discrepancies, we further assessed the changes in these parameters resulting from the yoga intervention in both these populations.

In the present study, adolescents reported only a trend of improvement ($p=0.095$) in parental relationship as a result of the yoga intervention, but the parents reported a significant ($p=0.035$) improvement three months after the intervention. However, contrary to the expectation, the parameters of peer friendship reduced, significantly ($p=0.031$) in seniors of the first batch.

A positive parent-child relationship is an essential component of adolescent development. During this transitional age, the concepts and opinions of oneself grow stronger, taking precedence over that of their parents (MJ bin Yaacob, 2006) and conflicts with parental ideologies emerge. Retaining a healthy relationship with parents and peers plays a crucial role in an individual's psychological and physical health (Johnson, Kent, & Leather, 2005). Components of the intervention also comprised of activities that were geared to provide calmness and balance to the mind (Pranayama, meditation) and promote the quality of relationships and moral behavior (Yama Niyama) in adolescents (Wisner et al., 2010). This effect, as observed by the parents three months after the intervention, could suggest a sustained change in the parental relationships as a result of yoga.

7.5. CORRELATIONS BETWEEN CHANGE IN VARIABLES

The correlation between change scores (δ scores) was explored to understand the relationships and pathways between the changes. So we looked at the change in one variable versus change in other variable, to see the correlations and the significance of the correlation. We have mapped out all the correlations which were significantly related to each other (association network diagram in figure 74) and noticed that there is connection between biological, psychological, and psychosocial parameters. Although there was no pathway derivation that

was there. Mechanism of action of these correlations was not done in this study. But from this, it is clear that biological, psychological, and social domains are related to each other.

7.6. MECHANISM OF INTEGRATED YOGA INTERVENTION

In this study, we analyzed the physical, psychological, and psychosocial aspects of adolescent health. We did not treat changes in one domain, independent of changes in other domain. Therefore, we evaluated a holistic mechanism by incorporating all parameters and how one affects the other, irrespective of their biological, psychological, or social tendencies. As a matter of fact, the mind-body therapies involve both the top-down (via mental processing at the level of the cerebral cortex) and bottom-up (via central neural processing and pathways from brainstem and cerebral cortex) contrivances (Taylor, Goehler, Galper, Innes, & Bourguignon, 2010). Yoga involves a bi-directional approach, facilitating healthier interactions and balancing the mind-body response through psychological and neurophysiological mechanisms. Maintenance of specific body postures improves flexibility and strength of muscles while increasing oxygen intake that may contribute to stabilization of blood circulation and function of various hormones (Rocha et al., 2012). Mindful movement practices (asanas) cultivate focused attention, mindful awareness. By gently returning the mind to the pose when one notices it wanders, these practices also cultivate emotion regulation (Vago & Silbersweig, 2012). “Because the focal object of attention in mindful movement practices is the body and breath, the “transfer” of insights from the practice to action in the world is concrete and may be particularly beneficial for youth (e.g., awareness of states of tension and relaxation in the body and breath, attention to posture)” (Robert W. Roeser, 2014).

Controlled slow breathing may enable balancing the autonomic nervous system through enhanced activation of parasympathetic nervous system, which may reduce stress and increase emotional regulation (Braboszcz & Hahusseau, 2010; Froeliger, Garland, & McClernon, 2012; Gard, Noggle, Park, Vago, & Wilson, 2014; Jerath, Edry, Barnes, & Jerath, 2006). Yogic breathing and relaxation reportedly improved respiratory function, while relaxation reduced sympathetic activity and psychological distress (Felver et al., 2015; Kaley-Isley, Peterson, Fischer, & Peterson, 2010; Robins et al., 2012). Prayer helps individuals manage negative emotions such as fear, sadness, and anger. Prayer is an imaginary social support interaction with a deity that provides individuals with resources to carry out emotional management, reducing sadness while improving hope (Sharp, 2010). Literature review claimed that children and young adult need yoga for self-regulation, stress management and healthy development (Hagen & Nayar, 2014). Similarly, creativity and yogic games have shown to promote expression, communication, and focus. Role-play, for example is an excellent way to develop interpersonal communication skills (Russell & Shepherd, 2010). Yoga, being the science of holistic wellbeing consists of practices that encourage internalization and development of self-awareness, thereby improving the capacity of self-control (Jakovljevic, 2011). According to the studies done in the United States, it is suggested that implementation of meditation and yoga-based practices in school induce changes in brain function enhancing behavior skills, mental and physical health, and performance of students (Butzer et al., 2015; J. Davidson et al., 2012).

7.7. STRENGTHS

This is the first study of this scale, with many objectives with distinct processes in three consecutive independent cohorts, in adolescents. The intervention being tested was also developed in a comprehensive manner, referring to authentic Indian texts of yoga, modern-day literature of its interpretations. It was modified through several iterations with subject experts in yoga, psychology and adolescent health. Interventions that focus on holistic psychosocial development of adolescents administered in group settings have shown to be more effective in improving social skills if there is at least one medical health professional or an adolescent psychologist involved in its development (Das et al., 2016). It ensured that while the premise of yoga is grounded to its authentic roots, the practices themselves were able to elicit the interest of the selected age group. Other strengths are large sample size, capital heterogeneous group, no dropouts, and age-appropriate measures. Qualitative feedback elicited from adolescents and parents on all aspects of the camp was very good. Considering that other literature provided strong evidence of the benefits of yoga among adolescents, an attempt was also made to evaluate a residential camp setting as a way to impart these practices to this age group. To provide a multidimensional intervention like yoga in such large numbers, the study employed close to 40 trainers who were rigorously trained and monitored for uniform quality of instruction. Maintaining uniformity in execution of intervention and overall conduct of the program across the three cohorts' acted as a replication of the study. The similar results in each cohort not only confirmed the effectiveness of the program in establishing the fitness among adolescents but also nullified the lacuna arising due to the absence of an active control group. Also, the capture of parental data along with corresponding data from their children is a novel endeavor.

7.8. LIMITATIONS

The absence of a control group may undermine the conclusions drawn in this study. Considering this, the design was reworked to detect the repeatability of the results. Non-significant changes in some results demonstrate that yoga, being a multi-modal set of activities, is heavily dependent on how well each person is able to internalize these practices and drive the change of mindset. Adolescent data should have also been collected along with that of their parents, three months after the camp, to evaluate sustained changes in their relationships. The controlled environment of the camp setting might have only provided the required information needed for the psychosocial improvement and evaluating the same after the subjects had been given an opportunity to express it in their existing relationships would have provided a fairer comparison. Secondary qualitative data, in anticipation of a non-conclusive result could have been pre-meditated, which would have given a rich feedback about the changes needed in the module and implementation of this intervention.

As there were no indigenous scales available to study the used parameters in the Indian setting, the psychometric scales developed by Westerners were used in the study. This may also be considered another limitation of this study.

CHAPTER 8

APPRAISALS



8.0. APPRAISALS

8.1. CONCLUSIONS

Even though providing a targeted intervention for holistic development and assessing the same might be challenging for this age group, the tools used in the study helped to conclude that this integrated yoga intervention improved physical, psychological and social fitness among adolescents.

The observation of the results of assessed outcome measures in all the three cohorts confirmed that an integrated yoga intervention significantly improved weight loss, flexibility, trunk and abdominal strength, and muscular endurance. Integrated yoga intervention significantly improved emotional intelligence, emotional regulation strategies, and anger management. Yoga may have the potential to prevent inappropriate behaviors and attitudes through better self-awareness. Improvement is seen in empathy, social competence and altruism. The pattern of changes is consistent across all the three cohorts. The observations by the parents three months after the intervention could suggest a sustained change in the parental relationship as a result of yoga. Successful repeatability with independent cohorts provided strong evidence for promoting residential short-term integrated yoga camps as a powerful tool to establish the overall fitness among adolescents. It also helped to demonstrate that administering yoga was acceptable and feasible in a residential setting.

The present study also shines a light on the need for future studies exploring the long-term effects of yoga, considering the parental data on psychosocial behavioral issues of adolescents. Another aspect of the study exhibits that yoga is one of the sportive components that can help to improve personality in a holistic way. Interest in the adolescent's

biopsychosocial health has been burgeoning in recent years worldwide. Yoga certainly has a potential role to play in all the aspects of health of adolescents in society. In our view, a controlled study with long-term follow up is needed to advance research on the effectiveness of the yoga program with adolescents and improve scientific validity. It is essential to incorporate parental feedback in the transformation process.

8.2. IMPLICATIONS OF THE STUDY

Yoga interventions have the potential to prevent the development of psychological and psychosocial pathology. It can help to appraise and regulate anti-social emotions. The residential program can be used every year during holidays to improve physical, mental and social fitness levels in any adolescent population. This study provides the proof of concept for future controlled experiments. This study provides the foundation for the study of other core emotions and behaviors in adolescents in different settings, other than school.

8.3. SUGGESTIONS FOR FUTURE STUDIES

This is just a beginning, working on the concept of overall fitness and its dynamics, especially in adolescent population. There is ample scope for future studies taking this work forward, few of them are mentioned below:

1. A controlled trial that will help to isolate the effect of the intervention from other confounders.
2. Since psychosocial and socio-cultural domains play an important role in holistic development, and India being a multicultural society, it would be interesting to look at a factor analysis of multicentre study.
3. Spiritual fitness can also be taken into consideration.

4. The yoga program can be further modified focusing on each gender and age within adolescence.
5. Religious aspects could be minimized to generalize this integrated yoga program for the broader adolescent community.
6. A longer-duration intervention may be required to drive the concept of overall fitness, including physical parameters, self-concept, peer relationship, and so on. The current duration of study is 10 days with 7 days of intervention.
7. The present study examined the self-reported scales for psychological and social assessments. Future studies also could consider subjective feedback, experiential aspects, and other types of assessment.
8. The present study has taken parental data only on social measures. Parental data can also be collected for psychological measures.
9. Further studies could also consider the evaluation of teachers on psychological and social measures.
10. The present study has taken follow-up data from parents. Further study could collect the follow-up data from participants also and could evaluate the agreement.
11. The present study has taken a broad age range (9-16 years), which was further sub-divided to (9-12 years) and (13-16 years). But there is still huge scope for exploring smaller groups within these age ranges to get more specific results.
12. We have done a preliminary study with the concepts of Triguna and Gurukula style of education to compare it to modern education for overall development of adolescents. Studies could be focused in this direction also.

13. The current study tried collecting data related to influencing factors, such as socio-economic background, family type, handedness, mother-father's age, siblings, girl's menstruation cycle, and so on. However, analysis could be done to see their influence on baseline itself. Future studies could work in this direction.
14. Long-term residential intervention and homogenous samples can also lead to improvements in future research in this field.

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APPENDICES



APPENDIX - I

INFORMED CONSENT FORM



S-VYASA Deemed University
 Swami Vivekananda Yoga Anusandhana Samsthana
 Deemed University u/S of 3 of the UGC Act, 1956

**EFFECT OF A 7 DAY EVIDENCE BASED YOGA PROGRAM
 FOR EMOTIONAL INTELLIGENCE IN INDIAN
 ADOLESCENTS.**

This Informed Consent Form is for the parents of children attending the 7 day residential personality development camp for Emotional Intelligence at Prashanti Kutiram

RESEARCH CONTACT

Ms. Astha Choukse
 Swami Vivekananda Yoga Anusandhana Samsthana
 19, EKNATH BHAVAN, Gavipuram Circle
 Kempgowadanagar, Bangalore 560019, India
 Email: asthachoukse@yahoo.co.uk
 Phone: 966 330 7706 (8pm – 9:30pm)

GENERAL CONTACT

Shailesh Pradhan
 Phone: 776 051 0622
 (10am – 4pm)

(Please note that the above numbers are for enquiries of research details or emergencies only)

This Informed Consent Form has two parts:

- Information Sheet (to share information about the study with you)
- Certificate of Consent (for signatures if you agree that your child may participate)

You will be given a copy of the full Informed Consent Form

**PART I: INFORMATION
 SHEET**

INTRODUCTION

I am Astha Choukse, working for the SVYASA University. We are doing

research on Emotional Intelligence in adolescents and how yoga would effect it. It is necessary for children to learn about identifying and dealing with their emotions at an early age so that they are able to lead a more satisfied and successful life.

I am going to give you information and invite you to have your child participate in this research. Before you decide, you can talk to anyone you feel comfortable with.

There may be some words that you do not understand. Please ask me to stop as we go through the information and I will take time to explain. If you have questions later, you can ask them of me or the staff.

PURPOSE OF THE RESEARCH STUDY

Emotional Intelligence is the ability to observe, control and manage our emotions and others emotions. It is ability to understand others feelings and point of view. Emotional Intelligence is skill to communicate well with others. During adolescence, it is very important and necessary to understand and express emotions which is helpful for overall growth and success in each step. In order to give them successful future, EI has to be developed, and for this, Yoga program is more ideal because it has components like Asana (physical exercise), Pranayama (breathing exercise), creativity, lectures, games and meditation. We are doing this research to find out if this integrated Yoga program is helpful for developing their skills needed for conflict resolution,

decision-making, communication, anger management, leadership etc.

TYPE OF RESEARCH INTERVENTION

Through the 7 days, you child will be taught Yoga for Emotional Intelligence. Each day will start from 6 in the morning with prayers and chanting followed by different yoga related practices and activities. The day would conclude at 9pm every day. Each day would have different content and topics that are taught and discussed. All the practices and techniques have been carefully selected to be non-religious and aimed at improving emotional ability in children. The children would not be forced to do any activity they find objectionable.

PARTICIPANT SELECTION

There is information available for the Yoga to be effective in Adults for developing EI. Therefore we are attempting to provide simple yoga based practices to evaluate its efficacy in adolescents as good Emotional Intelligence is really important in this age group. We would like to invite you to be a part of this study by allowing your child to participate.

VOLUNTARY PARTICIPATION

Your decision to have your child participate in this study is entirely

voluntary. It is your choice whether to have your child participate or not. If you choose not to consent, all the services you and your child receive at this residential camp will continue and nothing will change. You may also choose to change your mind later and stop participating, even if you agreed earlier, and the services you and/or your child receives at the camp will continue.

INFORMATION ON THE TRIAL (EVIDENCE BASED YOGA PROGRAM)

Yoga based programs for emotional intelligence has been tested in different age groups before but only with older children and adults. In these studies, the program improved emotional intelligence. The present study attempts to test the effectiveness of a 7 day Evidence Based Yoga program for Emotional intelligence in Indian adolescents.

PROCEDURES AND PROTOCOL

If you consent to participate in the study, your child would also be independently requested to assent for the participation. He or she would then be screened for suitability and if found suitable, would be required to fill 3 questionnaires evaluating emotional intelligence, anger processing and self-concept and perform 5 tasks to

assess physical fitness and IQ. Apart from this routine measurements like height, weight, etc. will be measured. A few questions related to their daily activities, stress, etc. would be asked.

The project assistant would be monitoring your child carefully during the data collection process. If there is anything you are concerned about or that is bothering you about the research please talk to me or one of the other staff.

A. Unfamiliar Procedures

The project would select and collect data only on suitable students who satisfy the selection criteria. This would be a subset of all the student attending the camp. Irrespective of whether you child gets selected for data collection or not, he/she would be provided the yoga program and there would be no difference in the contents of the camp. If your child is not selected for the data collection, suitable alternative activities would be scheduled at the time of data collection for the other group.

B. Description of the Process

Since you have enrolled your child in this ten day residential camp, you would not be allowed to interact with the children once they have arrived on campus. Therefore, you would not be around during the

screening and data collection period. On the first day, all the camp children would arrive on campus for lunch, which would be followed by resting for an hour. The camp registration, grouping and the screening would follow this. The intervention would commence on the second day at 6am and continue per schedule till the 8th Day. The ninth day would consist of second round of data collection. The tenth day would be a valedictory ceremony followed by their departure. You are cordially invited to attend the concluding day's programs on the tenth day.

One of the researchers would contact you, during or after the camp to collect information about your child from you. Please ensure that you have provided accurate contact information to the researchers to enable this activity. Also we would contact you and your child after approximately one month to collect follow up information of what changes are seen as a result of the camp.

At the end of the study, we will contact you by email and inform you about the findings of this research study.

RISKS

The yoga practices are absolutely safe when done under supervision. If your child

is not accustomed to regular physical activity he/she may experience generalized body pain/cramps in the first few days. This is normal and continued practiced reverses these problems. The SVYASA University has several years of experience in conducting yoga research and no injuries have been observed as a result of the practices that are taught.

BENEFITS

If your child participates in this research, he/she will learn how to observe and understand his emotions better. He would also have the opportunity to interact with several children of his age and learn and share several new experiences from them. This camp provides yoga programs and several past researches have indicates that this improves physical health, social skills and cognitive abilities. While there is not direct benefit to you as parents, your participation is likely to help us find the answer to our research questions. There may not be any benefit to the society at this stage of the research, but future generations are likely to benefit.

REIMBURSEMENTS

Yoga practices are seen to be safe and no previous injuries are reported in previous literature, hence we anticipate that, if done under supervision and in accordance with

the instructions provided, the yoga practices do not pose more than minimum threat. The campus is equipped with emergency medical care and would be provided in case of injury to the study subject resulting from the intervention. There would be no monetary compensation provided to the children in case of injury. You will not be provided any incentive to take part in this research.

CONFIDENTIALITY

The information that we collect from this research project will be kept confidential. Information about your child that will be collected from the research will be put away and no-one but the researchers will be able to see it. Any information about your child will have a number on it instead of his/her name. Only the researchers will know what his/her number is and we will lock that information up with a lock and key. It will not be shared with or given to anyone except if required by law.

SHARING OF THE RESULTS

The knowledge that we get from this study will be shared with you before it is made widely available to the public. Confidential information will not be shared. Afterwards, we will publish the results in order that other interested people may learn from our research.

RIGHT TO REFUSE OR WITHDRAW

You do not have to agree to your child taking part in this research if you do not wish to do so and refusing to allow your child to participate will not affect your child experience in the camp in any way. You and your child will still have all the benefits that you would otherwise have at this camp. You may stop your child from participating in the research at any time that you wish without either you or your child losing any of your rights as a camp participant here.

WHO TO CONTACT

If you have any questions you may ask them now or later, even after the study has started. If you wish to ask questions later, you may contact any of the following: Astha Choukse, 9663307706 & asthachoukse@yahoo.co.uk

This proposal has been reviewed and approved by IEC of SVAYSA Yoga University, which is a committee whose task it is to make sure that research participants are protected from harm. If you wish to find about more about the IEC, contact Dr Nagaratna at 9845088086 or write to her at rnagaratna@gmail.com

PART II: CERTIFICATE OF CONSENT

CERTIFICATE OF CONSENT

I have been invited to have my child participate in research of a yoga program designed for emotional intelligence. I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily for my child to participate as a participant in this study.

Print Name of Participant	
Print Name of Parent or Guardian	
Signature of Parent or Guardian	
Date (Day/month/year)	

IF ILLITERATE

I have witnessed the accurate reading of the consent form to the parent of the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

Print name of witness		AND, Thumb print of parent
Signature of witness		
Date (Day/month/year)		

STATEMENT BY THE RESEARCHER/PERSON TAKING CONSENT

I have accurately read out the information sheet to the parent of the potential participant, and to the best of my ability made sure that the person understands that the following will be done:

1. Baseline assessment; 2. Intervention for 7 days; 3. Final assessment; 4. Follow up after 3 months

I confirm that the parent was given an opportunity to ask questions about the study, and all the questions asked by the parent have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

A copy of this ICF has been provided to the participant.

Print Name of Researcher/person taking the consent	
Signature of Researcher /person taking the consent	
Date (Day/month/year)	

APPENDIX - II

INFORMED ASSENT FORM



S-VYASA Deemed University
Swami Vivekananda Yoga Anusandhana Samsthana
 Deemed University u/S of 3 of the UGC Act, 1956

**EFFECT OF A 7 DAY EVIDENCE BASED YOGA PROGRAM FOR EMOTIONAL
 INTELLIGENCE IN INDIAN ADOLESCENTS.**

This Informed Assent Form is for children between the ages of 9 – 16, who are attending the
 10 day Personality Development Camp at Prashanti Kutiram

RESEARCH CONTACT

Ms. Astha Choukse

Swami Vivekananda Yoga Anusandhana Samsthana (SVYASA)
(10am – 4pm)

19, EKNATH BHAVAN, Gavipuram Circle

Kempegowadanagar, Bangalore 560019, India

Email: asthachoukse@yahoo.co.uk

Phone: 966 330 7706 (8pm – 9:30pm)

GENERAL CONTACT

Shailesh Pradhan

Phone: (776) 051-0622

(Please note that the above numbers are for enquiries of research details or emergencies only)

PART I: INFORMATION SHEET**INTRODUCTION**

My name is Astha and my job is to research and test different yoga practices to see which work best to improve emotions. We want to know if this new ten day camp will improve emotions in children and we think this research could help tell us that.

I am going to give you information and invite you to be part of a research study. You can choose whether or not you want

to participate. We have discussed this research with your parent(s)/guardian and they know that we are also asking you for your agreement. If you are going to participate in the research, your parent(s)/guardian also have to agree. But if you do not wish to take part in the research, you do not have to, even if your parents have agreed.

You may discuss anything in this form with your parents or friends or anyone else

you feel comfortable talking to. You can decide whether to participate or not after you have talked it over. You do not have to decide immediately.

There may be some words you don't understand or things that you want me to explain more about because you are interested or concerned. Please ask me to stop at any time and I will take time to explain.

WHY ARE YOU DOING THIS RESEARCH?

Emotional Intelligence is the ability to observe, control and manage our emotions. It is ability to understand others feelings and point of view. Emotional Intelligence is skill to communicate well with others. During your ages, it is very important and necessary to understand and express emotions which is helpful for overall growth and success in each step. We have a new yoga based program that we are going to conduct during these ten days and we are hoping that this program is helpful for you in developing skills needed for recognizing and controlling your emotions.

WHY ARE YOU ASKING ME?

We are doing this study on children who are your age - between 9 and 16 years old - who are attending this Personality Development Camp.

DO I HAVE TO DO THIS?

You don't have to be part of this research if you don't want to be. It is up to you. If you decide not to be in the research, it is okay and nothing changes. This is still your camp, everything stays the same. Even if you say "yes" now, you can change your mind later and it is still okay. If anything changes and we want you to stay in the research study even if you want to stop, we will talk to you first.

WHAT IS THIS NEW YOGA PROGRAM?

The yoga program that we are testing is developed to improve emotional intelligence. These area a set of yoga practices including body posture, breathing exercises, activities, games and lecture sessions. These activities are designed for children of your age, keeping in mind of the situations and problems that are experienced. All these practices are safe and not requiring any special abilities on your part. We have already conducting this program for other children if your age and seen positive changes in them.

WHAT IS GOING TO HAPPEN TO ME?

During the camp, you will be taught different Yoga practices for seven days. On the first day, following registration,

lunch and rest, you would be required to answer questions by filling 3 questionnaires. Also you would be asked to perform 5 simple tasks. Apart from this, routine measurements like height, weight, etc. will be measured. A few questions related to your daily activities would be asked. You would not have to give detailed answers but only respond with a yes/ no or give a numbered rating. The yoga practices would start on the second day and continue till the 8th day. Each day will start from 6 in the morning with prayers and chanting followed by different yoga related practices and activities. The day would end at 9pm every day. Each day would have different topics that are taught and discussed. On the 9th day, you would have to fill the same 3 questionnaires and complete the same 5 tasks for a second time. The tenth day would be a concluding program followed by your departure. Also we would contact you and your parents after approximately one month to collect follow up information of what changes are seen as a result of the camp.

IS THIS BAD OR DANGEROUS FOR ME?

All the practices are safe if you follow how it is being taught. The organizers of the camp are experienced and have been trained to teach it in a manner that is not

going to cause any injury. If anything unusual happens to you, however, we need to know and you should feel free you to tell us anytime with your concerns or questions. The campus is equipped with emergency medical care and would be provided in case of any injury to you resulting from the intervention.

WILL IT HURT?

None of the activities that are part of the camp will hurt you. However, if you are not use to regular physical activity, it is normal to feel body pain or cramps in the first few days.

IS THERE ANYTHING GOOD THAT HAPPENS TO ME?

If you participate in this research, you might learn how to understand and express your emotions better. You also might learn to control your impulses and communicate better. You would also have the opportunity to interact with several children of your age and learn and share several new experiences from them. In previous camps many children have said that their physical health and social skills have improved. Even if this new program does not improve your emotional ability, you would have helped us find the answer to our research questions. There may not be any direct benefit to you at this stage of

the research, but now or later that could help other children.

DO I GET ANYTHING FOR BEING IN THE RESEARCH?

No. You will not be provided any incentive to take part in this research.

IS EVERYBODY GOING TO KNOW ABOUT THIS?

We will not tell other people that you are in this research and we won't share information about you to anyone who does not work in the research study. After the research is over, you and your parents will be told the results.

Information about you that will be collected from the research will be put away and no-one but the researchers will be able to see it. Any information about you will have a number on it instead of your name. Only the researchers will know what your number is and we will lock that information up with a lock and key. It will not be shared with or given to anyone except me.

WHAT HAPPENS IF I GET HURT?

If you become sick during the research, we will look after you. You are our priority and we will take good care of you. We have given your parents information about what to do if you are hurt or get sick during the research.

WILL YOU TELL ME THE RESULTS?

When we are finished the research, I will tell you and your parents about what we learnt. Afterwards, we will be telling more people, scientists and others, about the research and what we found. We will do this by writing and sharing reports and by going to meetings with people who are interested in the work we do.

CAN I CHOOSE NOT TO BE IN THE RESEARCH? CAN I CHANGE MY MIND?

You do not have to be in this research. No one will be mad or disappointed with you if you say no. It is your choice. You can think about it and tell us later if you want. You can say "yes" now and change your mind later and it will still be okay.

WHO CAN I TALK TO OR ASK QUESTIONS TO?

You can ask me questions now or later. I am around always, you can talk to me any time. If you want to talk to someone else you can also talk to the coordinator or any other staff. **If you choose to be part of this research I will also give you a copy of this paper to keep for yourself. You can ask your parents to look after it if you want.**

PART II: CERTIFICATE OF ASSENT

I understand the research is about testing a Yoga program designed for Emotional Intelligence. I understand that I need to take part in data collection procedure.

I have read this information (or had the information read to me) I have had my questions answered and know that I can ask questions later if I have them.

<p>I agree to take part in the research.</p> <p><u>Only if child assents:</u></p> <p>Print name of child _____</p> <p>Signature of child: _____</p> <p>Date: _____ day/month/year</p>	<p><i>OR</i></p>	<p>I do not wish to take part in the research and I have <u>not</u> signed the assent below.</p> <hr/> <p style="text-align: center;">(Signed by child/minor)</p>
---	------------------	---

WITNESS ATTESTATION	RESEARCHER VERIFICATION
I have witnessed the accurate reading of the assent form to the child, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.	I have accurately read or witnessed the accurate reading of the assent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given assent freely.
Print name of witness (not a parent) _____	Print name of researcher _____
Signature of witness _____	Signature of researcher _____
Date _____ Day/month/year	Date _____ Day/month/year

STATEMENT BY THE RESEARCHER/PERSON TAKING ASSENT

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the child understands that the following will be done: 1. Baseline assessment; 2. Intervention for seven days; 3. Final assessment; 4. Follow up after one month. I confirm that the child was given an opportunity to ask questions about the study, and all the questions asked by him/her have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily. A copy of this assent form has been provided to the participant.

Print Name of Researcher / person taking the assent	Signature of Researcher / person taking the assent	Date _____ Day/month/year
Copy provided to the participant		_____(initialed by researcher/assistant)
Parent/Guardian has signed an informed consent		___Yes ___No (initialed by researcher/assistant)

APPENDIX - III

SCREENING FORM



S-VYASA Deemed University

Swami Vivekananda Yoga Anusandhana Samsthana

Deemed University u/S of 3 of the UGC Act, 1956

SCREENING FORM:

Full Name		Age	
Gender	Male Female	Date of Birth	

Language used in your school	English	Other (Specify)		
Do you have any health problems?	NO	YES (Specify)		
Do you take any Medicines regularly?	NO	YES (Name of Medicine)		
Have you been sick in last two months?	NO	YES (Specify)		
Did you do yoga in the last 3 months?	NO	YES (Where?)		
How many are there people in your immediate family?	Mother or Father	Mother and Father	Grandparent (s)	Other uncles and aunts

(Show your above answers to your coordinator before you continue further)

How many brother and sisters do you have	Younger sisters	Younger Brothers	ME	Older sisters	Older Brothers			
Are you a vegetarian?	YES				NO			
Which class did you just finish this year?	4	5	6	7	8	9	10	11
Which hand do you use for most activities?	Left Hand				Right Hand			
What activities do you regularly do?	<input type="checkbox"/> Running / Jogging <input type="checkbox"/> Gym <input type="checkbox"/> Karate (martial arts) <input type="checkbox"/> Tennis / Cricket <input type="checkbox"/> Yoga				<input type="checkbox"/> Dance <input type="checkbox"/> Aerobics <input type="checkbox"/> None <input type="checkbox"/> Other <input type="checkbox"/> _____ <input type="checkbox"/> _____			
Today's date								

Thank you for answering these questions. Please fill out the rest of this booklet!

APPENDIX-IV

IEC (Institutional Ethics Committee) APPROVAL



स्वामी विवेकानन्द योग अनुसंधान संस्थान
Swami Vivekananda Yoga Anusandhāna Samsthāna

(Declared as Deemed-to-be University under Section 3 of the UGC Act, 1956)

Ekmath Bhavan, # 19, Gavipuram Circle, Kempegowda Nagar, Bangalore - 560 019

Ph: 080 - 2661 2669, Telefax: 080 - 2660 8645

E-mail: svyasa@svyasa.edu.in Website: www.svyasa.edu.in

RES/IEC-SVYASA/64/2015

02 September 2015

To,
Dr H R Nagendra,
Chancellor,
S-VYASA University,
Bengaluru.

Reference:

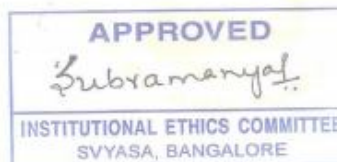
"Effect of a 7 day Evidence Based Yoga Program for Emotional intelligence in Indian adolescents." - Committee Approval of the above mentioned study.

Dear Dr H R Nagendra,

We have received from you the following study related documents vide your letter dated 19 march 2015

1	Project Proposal
2	Informed consent form

Ethics committee meeting was held on **25 april 2015** between 2:00 PM and 5:00 PM at Ekmath Bhavan, Bengaluru. Above documents were examined and discussed in the meeting. After due consideration, the committee has decided to approve conducting the aforementioned study.





स्वामी विवेकानन्द योग अनुसंधान संस्थान
Swami Vivekananda Yoga Anusandhāna Samsthāna

(Declared as Deemed-to-be University under Section 3 of the UGC Act, 1956)

Ekmath Bhavan, # 19, Gavipuram Circle, Kempegowda Nagar, Bangalore - 560 019

Ph: 080 - 2661 2669, Telefax: 080 - 2660 8645

E-mail: svyasa@svyasa.edu.in Website: www.svyasa.edu.in

This is to confirm that neither Dr H R Nagendra nor any staff participating in this study were involved in the voting procedures and decision making.

The Institutional Review Board / Institutional Ethics Committee (IEC) are expected to be informed about the progress of the study / any changes in the protocol and patient information / informed consent. The investigators are also expected to submit a copy of the final report to IEC for records.

This approval is valid up to the completion of the study at the site.

Please submit to the IEC, the status report of the study as per the SOPs.

The IEC is organized & operates according to the requirements of ICH-GCP, Indian Council of Medical Research Guidelines & Schedule Y.

Best Wishes,

Subramanya P.

Dr. Subramanya P,
 Member Secretary,
 Institutional Ethics Committee,
 S-VYASA, Bengaluru.



To
~~29/8/18~~ *Dean of Academics, SVYASA*
 The Member Secretary,
 Institutional Ethical Committee,
 Swami Vivekananda Yoga Anusandhana Samsthana,
 Bangalore

Date:

From:
 Astha Choukse
 PhD scholar [PhD/Cat2/05/Jan12]

Respected Sir

Subject: Request for permission to change the title of my thesis

With reference to the above mentioned subject, I intend to bring to your kind notice that, that I prefer to change the title of my thesis as per the opinion of my guide and subject experts.

I have made significant progress in the study over a period of time which has widened the scope of my study. It is highly relevant to change the title of the thesis so as to include the various aspects which have been covered in the study.

The details of change of title are mentioned below for your kind perusal

Present Title	Revised title
Effect of a seven day evidence based Yoga program for emotional intelligence in Indian adolescents	A study on impact of Yoga in improvement of Physical, Psychological and Social fitness among adolescents

I request you to permit me to incorporate the revised title and oblige.

Thanking you
 Best regards
 Astha Choukse

Sankar
 4/09/18

*Permitted to
 change the title
 Sankar
 10/10/18*

OK
 21
 4/9



स्वामी विवेकानन्द योग अनुसंधान संस्थान
Swami Vivekananda Yoga Anusandhāna Samsthāna

(Declared as Deemed-to-be University under Section 3 of the UGC Act, 1956)

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Ph: 080 - 2661 2669, Telefax: 080 - 2660 8645

E-mail: svyasa@svyasa.org Website: www.svyasa.org

RES/IEC-SVYASA/64/2015

03 November 2018

To,
Dr. H R Nagendra,
Chancellor,
S-VYASA University,
Bengaluru.

Reference:

"A study on impact of Yoga in improvement of Physical. Psychological and Social fitness among adolescents". - Committee Approval of the above-mentioned study.

Dear Dr. H R Nagendra,

We have received from you the following study related documents vide your letter dated 19 March 2015

1	Project Proposal
2	Informed consent form

Ethics committee meeting was held on **25 April 2015** between 2:00 PM and 5:00 PM at Eknath Bhavan, Bengaluru. Above documents were examined and discussed in the meeting. After due consideration, the committee has decided to approve conducting the aforementioned study.





स्वामी विवेकानन्द योग अनुसंधान संस्थान Swami Vivekananda Yoga Anusandhāna Samsthāna

(Declared as Deemed-to-be University under Section 3 of the UGC Act, 1956)

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This is to confirm that neither Dr. H R Nagendra nor any staff participating in this study was involved in the voting procedures and decision making.


The Institutional Review Board / Institutional Ethics Committee (IEC) is expected to be informed about the progress of the study / any changes in the protocol and patient information / informed consent. The investigators are also expected to submit a copy of the final report to IEC for records.

This approval is valid up to the completion of the study at the site.

Please submit to the IEC, the status report of the study as per the SOPs.

The IEC is organized & operates according to the requirements of ICH-GCP, Indian Council of Medical Research Guidelines & Schedule Y.

Best Wishes,


Dr. Sanjib Kumar Patra,
Member Secretary,
Institutional Ethics Committee,
S-VYASA, Bengaluru.

APPENDIX - V

CTRI (Clinical Trials Registry - India) REGISTRATION

FULL DETAILS (Read-only) -> Click Here to Create PDF for Current Dataset of Trial					
CTRI Number	CTRI/2018/02/011709 [Registered on: 05/02/2018] Trial Registered Retrospectively				
Last Modified On:	31/01/2018				
Post Graduate Thesis	No				
Type of Trial	Interventional				
Type of Study	Yoga & Naturopathy Behavioral				
Study Design	Single Arm Trial				
Public Title of Study	Improving holistic personality of adolescents with Integrated Yoga Program.				
Scientific Title of Study	Effect of a 7 day Evidence Based Yoga Program for Emotional Intelligence in Indian adolescents.				
Secondary IDs if Any	<table border="1"> <thead> <tr> <th>Secondary ID</th> <th>Identifier</th> </tr> </thead> <tbody> <tr> <td>NIL</td> <td>NIL</td> </tr> </tbody> </table>	Secondary ID	Identifier	NIL	NIL
	Secondary ID	Identifier			
NIL	NIL				
Details of Principal Investigator or overall Trial Coordinator (multi-center study)	Name	Astha Choukse			
	Designation	PhD Scholar			
	Affiliation	S-VYASA Yoga University, Bangaluru			
	Address	S-VYASA Yoga University, Eknath Bhawan, No. 19, Govipurum Circle Kempegowda Nagar, Bangaluru			
		Bangalore KARNATAKA 560019 India			
	Phone	9663307706			
	Fax				
Email	asthachoukse@yahoo.co.uk				
Details of Contact Person Scientific Query	Name	Astha Choukse			
	Designation	PhD Scholar			
	Affiliation	S-VYASA Yoga University, Bangaluru			
	Address	S-VYASA Yoga University, Eknath Bhawan, No. 19, Govipurum Circle Kempegowda Nagar, Bangaluru			
		Bangalore KARNATAKA 560019 India			

APPENDIX - VI

ADOLESCENTS ASSESSMENT SHEETS

SEIS

Full Name	Today's Date
Registration Number	Date of Birth

INSTRUCTIONS

Each of the following items asks you about your emotions or reactions associated with emotions. After deciding whether a statement is generally true for you, use the 5-point scale to respond to the statement. Please circle the "1" if you strongly disagree that this is like you, the "2" if you somewhat disagree that this is like you, "3" if you neither agree nor disagree that this is like you, the "4" if you somewhat agree that this is like you, and the "5" if you strongly agree that this is like you.

There are no right or wrong answers. Please give the response that best describes you.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree			
	1	2	3	4	5			
1	I know when to speak about my personal problems to others			1	2	3	4	5
2	When I am faced with difficulties, I remember times I faced similar difficulties and overcame them.			1	2	3	4	5
3	I expect that I will do well on most things I try			1	2	3	4	5
4	Other people find it easy to tell me about them			1	2	3	4	5
5	I find it hard to understand the non-verbal messages of other people			1	2	3	4	5
6	Some of the major events of my life have made me rethink of what is important and not important			1	2	3	4	5
7	When my mood changes, I see new possibilities			1	2	3	4	5
8	Emotions are one of the things that make my life worth living			1	2	3	4	5
9	I am aware of my emotions as I experience them			1	2	3	4	5
10	I expect good things to happen			1	2	3	4	5
11	I like to share my emotions with others			1	2	3	4	5

12	When I experience a positive emotion, I know how to make it last	1	2	3	4	5
13	I can arrange events that others enjoy	1	2	3	4	5
14	I find activities that make me happy	1	2	3	4	5
15	I am aware of the non-verbal messages I send to others	1	2	3	4	5
16	I present myself in a way that makes a good impression on others.	1	2	3	4	5
17	When I am in a positive mood, solving problems is easy for me	1	2	3	4	5
18	By looking at their facial expressions, I recognize the emotions people are experiencing	1	2	3	4	5
19	I know why my emotions change	1	2	3	4	5
20	When I am in a positive mood, I am able to come up with new ideas	1	2	3	4	5
21	I have control over my emotions	1	2	3	4	5
22	I easily recognize my emotions while I experience them	1	2	3	4	5
23	I motivate myself by imagining a good result to tasks I take on	1	2	3	4	5
24	I compliment others when they have done something well	1	2	3	4	5
25	I am aware of the non-verbal messages other people send	1	2	3	4	5
26	When another person tells me about an important event in his or her life, I almost feel as though I experienced this event myself	1	2	3	4	5
27	When I feel a change in emotions, I tend to come up with new ideas.	1	2	3	4	5
28	When I am faced with a challenge, I give up because I believe I will fail	1	2	3	4	5
29	I know what other people are feeling just by looking at them	1	2	3	4	5
30	I help other people feel better when they are upset	1	2	3	4	5
31	I use good moods to help me keep trying in the face of difficulties	1	2	3	4	5
32	I can tell how people are feeling by listening to the tone of their voice	1	2	3	4	5
33	It is difficult for me to understand why people feel the way they do	1	2	3	4	5

CERQ

Full Name	Today's Date
Registration Number	Date of Birth

INSTRUCTIONS

How do you cope with events?
 Sometimes nice things happen in your life and sometimes unpleasant things might happen.
 When something unpleasant happens, you can think about it for a long time.
 When something unpleasant happens to you, what do you usually think?

	(almost) never	some- times	regu- larly	Often	(almost) always
1. I think that I have to accept it	1	2	3	4	5
2. Again and again, I think of how I feel about it	1	2	3	4	5
3. I think that I can learn from it	1	2	3	4	5
4. I think that I have made the mistake	1	2	3	4	5
5. It just happened; there is nothing I can do about it	1	2	3	4	5
6. I often think of what I am thinking and feeling about it	1	2	3	4	5
7. I think of nicer things that have nothing to do with it	1	2	3	4	5
8. I think that it makes me feel 'older and wiser'	1	2	3	4	5
9. Again and again, I think about how the events are	1	2	3	4	5
10. I think that others have made the mistake	1	2	3	4	5
11. I think of something nice and not about what happened	1	2	3	4	5
12. I think of how I can change it	1	2	3	4	5
13. I think that it's not as bad as other things that could happen	1	2	3	4	5
14. I think that it's all caused by me	1	2	3	4	5
15. I think of what I can do best	1	2	3	4	5
16. I think that there are worse things in the world	1	2	3	4	5
17. I often think about how horrible the situation was	1	2	3	4	5
18. I think that it's all caused by others	1	2	3	4	5

SELF-CONCEPT

Full Name	Today's Date
Registration Number	Date of Birth

INSTRUCTIONS

Please use this list of sentences to describe yourself as accurately as possible. Describe yourself as you see yourself at the present time, not as you wish to be in the future. Describe yourself as you are generally or typically, as compared with other persons you know of the same sex and of roughly your same age. There is no right or wrong answer. Please choose the number that best describes you.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5
Athletic Competence				SCORE
1. I think that I can do well at any new sports that I haven't tried before.				
2. I do very well at all kinds of sports.				
3. I feel that I am better than others my age at sports.				
4. I wish that I could be a lot better at sports.*				
5. I don't do well at new outdoor games.*				
6. In games and sports, I usually watch instead of play.*				
Conduct/Morality				
1. I behave very well most of the time.				
2. I usually do the right thing.				
3. I do things that I know I shouldn't do.*				
4. I usually act the way that I am supposed to.				
5. I usually get into trouble because of the things that I do.*				
6. I often do not like the way that I behave.*				
Peer Acceptance				
1. I would like to have a lot more friends.*				
2. I am well known with others my age.				
3. I am always doing things with a lot of kids.				
4. I wish that more people my age like me.*				
5. I have lots of friends.				
6. I find it hard to make friends.*				

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5
Physical Appearance				
1. I am happy with my height and weight.				
2. I am happy with the way that I look.				
3. I wish my physical appearance (how I look) were different.*				
4. I wish my body were different.*				
5. I wish that something about my face or hair looked different.*				
6. I think that I am good-looking.				
Scholastic Competence				
1. I feel that I am very good at my schoolwork.				
2. I often forget what I learn.*				
3. I feel like I am as smart as other kids my age.				
4. I do very well in my classwork.				
5. I am pretty slow in finishing my schoolwork.*				
6. I have trouble figuring out the answers in school.*				

CAS

Full Name	Today's Date
Registration Number	Date of Birth

INSTRUCTIONS

The group of questions below inquire about the types of feelings you have. Each of the 21 groups of items has four options. For each cluster of items, read and identify the statement that best reflects how you feel. Now go ahead and answer the questions on the answer sheet. Be sure to answer every question, even if you're not sure. Make sure you select only one statement from each of the 21 statements.

PLEASE BE HONEST IN RESPONDING TO THE STATEMENTS

1	A. I do not feel angry.
	B. I feel angry.
	C. I am angry most of the time now.
	D. I am so angry and violent all the time that I can't stand it.

2	A. I am not particularly angry about my future.
	B. When I think about my future, I feel angry.
	C. I feel angry about what I have to look forward to.
	D. I feel intensely angry about my future, since it cannot be improved.

3	A. It makes me angry that I feel like such a failure.
	B. It makes me angry that I have failed more than the average person.
	C. As I look back on my life, I feel angry about my failures.
	D. It makes me angry to feel like a complete failure as a person.

4	A. I am not all that angry about things.
	B. I am becoming more hostile about things than I used to be.
	C. I am pretty angry about things these days.
	D. I am angry and hostile about everything.

5	A. I don't feel particularly hostile at others.
	B. I feel hostile a good deal of the time.
	C. I feel quite hostile most of the time.
	D. I feel hostile all of the time.

6	A. I don't feel that others are trying to irritate me.
	B. At times I think people are trying to irritate me.

	C. More people than usual are beginning to make me feel angry.
	D. I feel that others are constantly and intentionally making me angry.
7	A. I don't feel angry when I think about myself.
	B. I feel more angry about myself these days than I used to.
	C. I feel angry about myself most of the time.
	D. When I think about myself, I feel very angry.
8	A. I don't have angry feelings about others having made my life worse.
	B. It's beginning to make me angry that others are making my life worse.
	C. I feel angry that others prevent me from having a good life.
	D. I am constantly angry because others have made my life totally miserable.
9	A. I don't feel angry enough to hurt someone.
	B. Sometimes I am so angry that I feel like hurting others, but I would not really do it.
	C. My anger is so intense that I sometimes feel like hurting others.
	D. I'm so angry that I would like to hurt someone.
10	A. I don't shout at people any more than usual.
	B. I shout at others more now than I used to.
	C. I shout at people all the time now.
	D. I shout at others so often that sometimes I just can't stop.
11	A. Things are not more irritating to me now than usual.
	B. I feel slightly more irritated now than usual.
	C. I feel irritated a good deal of the time.
	D. I'm irritated all the time now.
12	A. My anger does not interfere with my interest in other people.
	B. My anger sometimes interferes with my interest in others.
	C. I am becoming so angry that I don't want to be around others.
	D. I'm so angry that I can't stand being around people.
13	A. I don't have any persistent angry feelings that influence my ability to make decisions.
	B. My feelings of anger occasionally undermine my ability to make decisions.
	C. I am angry to the extent that it interferes with my making good decisions.
	D. I'm so angry that I can't make good decisions anymore.

14	A. I'm not so angry and hostile that others dislike me.
	B. People sometimes dislike being around me since I become angry.
	C. More often than not, people stay away from me because I'm so hostile and angry.
	D. People don't like me anymore because I'm constantly angry all the time.
15	A. My feelings of anger do not interfere with my work.
	B. From time to time my feelings of anger interfere with my work.
	C. I feel so angry that it interferes with my capacity to work.
	D. My feelings of anger prevent me from doing any work at all.
16	A. My anger does not interfere with my sleep.
	B. Sometimes I don't sleep very well because I'm feeling angry.
	C. My anger is so great that I stay awake 1—2 hours later than usual.
	D. I am so intensely angry that I can't get much sleep during the night.
17	A. My anger does not make me feel any more tired than usual.
	B. My feelings of anger are beginning to tire me out.
	C. My anger is intense enough that it makes me feel very tired.
	D. My feelings of anger leave me too tired to do anything.
18	A. My appetite does not suffer because of my feelings of anger.
	B. My feelings of anger are beginning to affect my appetite.
	C. My feelings of anger leave me without much of an appetite.
	D. My anger is so intense that it has taken away my appetite.
19	A. My feelings of anger don't interfere with my health.
	B. My feelings of anger are beginning to interfere with my health.
	C. My anger prevents me from devoting much time and attention to my health.
	D. I'm so angry at everything these days that I pay no attention to my health and well-being.
20	A. My ability to think clearly is unaffected by my feelings of anger.
	B. Sometimes my feelings of anger prevent me from thinking in a clear-headed way.
	C. My anger makes it hard for me to think of anything else.
	D. I'm so intensely angry and hostile that it completely interferes with my thinking.

TEEN EMPATHY

Full Name	Today's Date
Registration Number	Date of Birth

INSTRUCTIONS

Please indicate how much these statements describe you.

1. I feel bad when someone gets their feelings hurt.				
Not at all like me	A little like me	Somewhat like me	A lot like me	Exactly like me
2. I understand how those close to me feel.				
Not at all like me	A little like me	Somewhat like me	A lot like me	Exactly like me
3. It is important for me to understand how other people feel.				
Not at all like me	A little like me	Somewhat like me	A lot like me	Exactly like me
4. I am happy when others succeed.				
Not at all like me	A little like me	Somewhat like me	A lot like me	Exactly like me

TEEN ALTRUISM

Full Name	Today's Date
Registration Number	Date of Birth

INSTRUCTIONS

Please indicate how much these statements describe you.

1. I go out of my way to help others.				
Not at all like me	A little like me	Somewhat like me	A lot like me	Exactly like me
2. I help others even if it requires a lot of my time.				
Not at all like me	A little like me	Somewhat like me	A lot like me	Exactly like me
3. I help others even if the person is a total stranger.				
Not at all like me	A little like me	Somewhat like me	A lot like me	Exactly like me
4. I help others even if it's hard for me.				
Not at all like me	A little like me	Somewhat like me	A lot like me	Exactly like me

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SOCIAL COMPETENCE

Full Name	Today's Date
Registration Number	Date of Birth

INSTRUCTIONS

Please indicate how much these statements describe you.

1. I avoid making other kids look bad.				
Not at all like me	A little like me	Somewhat like me	A lot like me	Exactly like me
2. If two of my friends are fighting, I find a way to work things out.				
Not at all like me	A little like me	Somewhat like me	A lot like me	Exactly like me
3. When I work in a group, I do my share of work				
Not at all like me	A little like me	Somewhat like me	A lot like me	Exactly like me
Please indicate how often this happens. How often...				
4. Do you get along well with people of different races, cultures, and religions?				
None of the time	A little of the time	Some of the time	Most of the time	All of the time
5. Do you listen to other students' ideas?				
None of the time	A little of the time	Some of the time	Most of the time	All of the time
6. Do you control your anger when you have a disagreement with a friend?				
None of the time	A little of the time	Some of the time	Most of the time	All of the time
7. Can you discuss a problem with a friend without making things worse?				
None of the time	A little of the time	Some of the time	Most of the time	All of the time
8. Do you follow the rules at a park, theater, or sports event?				
None of the time	A little of the time	Some of the time	Most of the time	All of the time
9. Do you respect what other have to say, even if you don't agree?				
None of the time	A little of the time	Some of the time	Most of the time	All of the time

POSITIVE PARENT RELATIONSHIP

Full Name	Today's Date
Registration Number	Date of Birth

INSTRUCTIONS

Please indicate how often this happens.

1. My father/mother shows me that he/she is proud of me.				
None of the time	A little of the time	Some of the time	Most of the time	All of the time
2. My father/mother takes an interest in my activities.				
None of the time	A little of the time	Some of the time	Most of the time	All of the time
3. My father/mother listens to me when I talk to him/her.				
None of the time	A little of the time	Some of the time	Most of the time	All of the time
4. I can count of on my father/mother to be there when I need him/her.				
None of the time	A little of the time	Some of the time	Most of the time	All of the time
5. My father/mother and I talk about the things that really matter.				
None of the time	A little of the time	Some of the time	Most of the time	All of the time
6. I am comfortable sharing my thoughts and feelings with my father/mother.				
None of the time	A little of the time	Some of the time	Most of the time	All of the time

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PEER FRIENDSHIPS

Full Name	Today's Date
Registration Number	Date of Birth

INSTRUCTIONS

Please indicate how much these statements describe you.

1. I support my friends when they do the right thing.				
Not at all like me	A little like me	Somewhat like me	A lot like me	Exactly like me
2. I encourage my friends to be the best they can be.				
Not at all like me	A little like me	Somewhat like me	A lot like me	Exactly like me
3. I help close friends feel good about themselves.				
Not at all like me	A little like me	Somewhat like me	A lot like me	Exactly like me
4. I am there when my friends need me.				
Not at all like me	A little like me	Somewhat like me	A lot like me	Exactly like me
5. I would stand up for my friend if another kid was causing them trouble.				
Not at all like me	A little like me	Somewhat like me	A lot like me	Exactly like me

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CHECKLIST - DATA COLLECTION (EUROFIT BATTERY)

Height	Centimeters	
Weight	Kilograms	
Waist	Centimeters	
Hip	Centimeters	
Hand Grip	Right Hand	Left Hand
Flamingo	Times out of balance	
10mX5 relay	Seconds	
Standing Jump	Centimeters	
Plate Tapping	Seconds	
Sit Ups	Times	
Sit and Reach	Centimeters	
Sign of Researcher		

APPENDIX - VII

PARENTAL DATA SHEETS

NAME: _____ [FIRST, LAST]

Date _____

PARENT OF: _____ [FIRST, LAST]

Birth date of your son _____ [MONTH, DAY, YEAR]

Altruism – Parent Survey

Please indicate how much these statements describe your child.

1. My goes out of his/her way to help others.
 - Not at all like my child
 - A little like my child
 - Somewhat like my child
 - A lot like my child
 - Exactly like my child
2. My child helps others even if it requires a lot of his/her time.
 - Not at all like my child
 - A little like my child
 - Somewhat like my child
 - A lot like my child
 - Exactly like my child
3. My child helps others even if the person is a total stranger.
 - Not at all like my child
 - A little like my child
 - Somewhat like my child
 - A lot like my child
 - Exactly like my child
4. My child helps others even if it's hard for him/her.
 - Not at all like my child
 - A little like my child
 - Somewhat like my child
 - A lot like my child
 - Exactly like my child

NAME: _____ [FIRST, LAST]

Date _____

PARENT OF: _____ [FIRST, LAST]

Birth date of your son _____ [MONTH, DAY, YEAR]

Empathy – Parent Survey

Please indicate how much these statements describe your child.

1. My child feels bad when someone gets their feelings hurt.
 - Not at all like my child
 - A little like my child
 - Somewhat like my child
 - A lot like my child
 - Exactly like my child
2. My child feels happy when others succeed.
 - Not at all like my child
 - A little like my child
 - Somewhat like my child
 - A lot like my child
 - Exactly like my child
3. My child understands how those close to him/her feel.
 - Not at all like my child
 - A little like my child
 - Somewhat like my child
 - A lot like my child
 - Exactly like my child
4. It is important to my child to understand how other people feel.
 - Not at all like my child
 - A little like my child
 - Somewhat like my child
 - A lot like my child
 - Exactly like my child

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NAME: _____ [FIRST, LAST]

Date _____

PARENT OF: _____ [FIRST, LAST]

Birth date of your son _____ [MONTH, DAY, YEAR]

Peer Friendships – Parent Survey

Please indicate how much these statements describe your child.

1. My child finds it hard to make friends.
 - Not at all like my child
 - A little like my child
 - Somewhat like my child
 - A lot like my child
 - Exactly like my child
2. My child finds it hard to keep friends.
 - Not at all like my child
 - A little like my child
 - Somewhat like my child
 - A lot like my child
 - Exactly like my child
3. My child would stand up for his/her friend.
 - Not at all like my child
 - A little like my child
 - Somewhat like my child
 - A lot like my child
 - Exactly like my child
4. My child takes advantage of his/her friends.
 - Not at all like my child
 - A little like my child
 - Somewhat like my child
 - A lot like my child
 - Exactly like my child

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NAME: _____ [FIRST, LAST]

Date _____

PARENT OF: _____ [FIRST, LAST]

Birth date of your son _____ [MONTH, DAY, YEAR]

Positive Relationship with Parents – Parent Survey

Please indicate how often this happens.

1. I show my child that I am proud of him/her.
 - None of the time
 - A little of the time
 - Some of the time
 - Most of the time
 - All of the time
2. I take an interest in my child's activities.
 - None of the time
 - A little of the time
 - Some of the time
 - Most of the time
 - All of the time
3. I listen to my child when he/she talks to me.
 - None of the time
 - A little of the time
 - Some of the time
 - Most of the time
 - All of the time
4. My child can count of on me to be there when he/she needs me.
 - None of the time
 - A little of the time
 - Some of the time
 - Most of the time
 - All of the time

5. My child and I talk about the things that really matter.
- None of the time
 - A little of the time
 - Some of the time
 - Most of the time
 - All of the time
6. My child is comfortable sharing his/her thoughts and feelings with me.
- None of the time
 - A little of the time
 - Some of the time
 - Most of the time
 - All of the time
7. Even if my child knows I'd be disappointed, he/she can come to me for help with a problem.
- None of the time
 - A little of the time
 - Some of the time
 - Most of the time
 - All of the time

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APPENDIX - VIII

ANTI-PLAGIARISM REPORT



Urkund Analysis Result

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EFFECT OF YOGAON PHYSIOLOGICAL VARIABLE.doc (D27932891)
chapter-1,2,3m.phil.docx (D37198300)
EFFECT OF UJJAYAI PRANAYAMA AND YOGIC PRACTICE ON SELECTED PHYSIOLOGICAL AND PHYSICAL FITNESS VARIABLES AMONG COLLEGE STUDENTS by SUNIL SHANKRRAO JONDALE
Ph.D. Physical education.docx (D36126169)
RAJKUMAR, Research Scholar.docx (D25219819)
Shambulal PhD Thesis v3.docx (D41604776)
https://en.wikipedia.org/wiki/Bhagavad_Gita
<http://www.theyogicjournal.com/pdf/2016/vol1issue1/PartA/1-1-10-956.pdf>

Instances where selected sources appear:

18

APPENDIX - IX

RAW DATA

Grade	Grps	Code	SN	Age Grp	Sex	Age	Hght	Wt Pre	Wt Pst	BMI Pre	BMI Pst	SEIS Pre	SEIS Pst
1J	gp1	1JE1	1	J	M	10	133	28	27	15.83	15.26	120	121
1J	gp1	1JE2	2	J	M	9	129	24	23	14.42	13.82	124	94
1J	gp1	1JE3	3	J	M	11	158	47	46	18.83	18.43	120	121
1J	gp1	1JE4	4	J	F	12	132	28	27	16.07	15.50	131	136
1J	gp1	1JE5	5	J	F	10	152	37	35.5	16.01	15.37	143	138
1J	gp1	1JE6	6	J	M	11	152	42	40	18.18	17.31	140	152
1J	gp1	1JE7	7	J	M	12	155	54	53	22.48	22.06	135	139
1J	gp1	1JE8	8	J	M	11	148	42	41	19.17	18.72	124	123
1J	gp1	1JE9	9	J	M	10	143	31	31	15.16	15.16	117	122
1J	gp1	1JE10	10	J	M	12	138	36	34.5	18.90	18.12	124	125
1J	gp1	1JE11	11	J	M	12	140	29	28.5	14.80	14.54	123	124
1J	gp1	1JE12	12	J	M	12	153	40	37.5	17.09	16.02	143	149
1J	gp1	1JF1	13	J	F	10	132	25.5	24.5	14.63	14.06	139	157
1J	gp1	1JF2	14	J	M	12	138	30	30	15.75	15.75	84	91
1J	gp1	1JF3	15	J	M	11	149	37	35.5	16.67	15.99	133	140
1J	gp1	1JF4	16	J	M	10	139	48	48	24.84	24.84	100	133
1J	gp1	1JF5	17	J	M	10	135	34.5	32	18.93	17.56	113	113
1J	gp1	1JF6	18	J	F	10	132	25	24	14.35	13.77	104	117
1J	gp1	1JF7	19	J	M	12	136	38	39	20.54	21.09	121	99
1J	gp1	1JF8	20	J	M	11	139	56	54.5	28.98	28.21	93	99
1J	gp1	1JF9	21	J	F	10	135	29	28	15.91	15.36	123	127
1J	gp1	1JF10	22	J	M	12	142	35	31.5	17.36	15.62	142	145
1J	gp1	1JF11	23	J	F	11	150	47.5	47	21.11	20.89	117	131
1J	gp1	1JF12	24	J	M	9	125	25	25	16.00	16.00	121	125
1J	gp1	1JB1	25	J	M	10	133	32	29.5	18.09	16.68	140	145
1J	gp1	1JB2	26	J	F	11	144	40	39	19.29	18.81	129	99
1J	gp1	1JB3	27	J	F	12	147	45	44	20.82	20.36	131	137
1J	gp1	1JB4	28	J	F	10.5	140	49	47	25.00	23.98	141	133
1J	gp1	1JB5	29	J	M	11	131	30	28.5	17.48	16.61	110	115
1J	gp1	1JB6	30	J	M	10.5	131	27	26	15.73	15.15	135	146
1J	gp1	1JB7	31	J	F	12	151	37.5	37	16.45	16.23	143	147
1J	gp1	1JB8	32	J	M	11	145	35	34	16.65	16.17	143	143
1J	gp1	1JB9	33	J	F	11	137	29	28	15.45	14.92	139	155
1J	gp1	1JB10	34	J	M	10	132	34	31	19.51	17.79	138	147
1J	gp1	1JB11	35	J	M	11	144	35	35	16.88	16.88	146	162
1J	gp1	1JC1	36	J	M	9	132	27	26	15.50	14.92	125	103
1J	gp1	1JC2	37	J	F	10	137	40	40	21.31	21.31	136	148
1J	gp1	1JC3	38	J	F	13	161	53	50	20.45	19.29	98	105
1J	gp1	1JC4	39	J	M	11	142	38	37	18.85	18.35	104	114
1J	gp1	1JC5	40	J	F	11	131	34	32	19.81	18.65	104	153
1J	gp1	1JC6	41	J	F	11	139	34	34	17.60	17.60	72	106

1J	gp1	1JC7	42	J	F	9.5	140	38	38	19.39	19.39	120	132
1J	gp1	1JC8	43	J	M	8	140	43.5	43	22.19	21.94	132	153
1J	gp1	1JC9	44	J	M	11	150	33.5	32	14.89	14.22	127	137
1J	gp1	1JC10	45	J	F	10	134	34	32.5	18.94	18.10	116	119
1J	gp1	1JC11	46	J	M	11	158	60	59	24.03	23.63	124	132
1J	gp1	1JC12	47	J	M	9			27.5			94	107
1J	gp1	1JH1	48	J	M	11	138	36	34.5	18.90	18.12	105	109
1J	gp1	1JH2	49	J	M	11	137	35	31.5	18.65	16.78	110	125
1J	gp1	1JH3	50	J	M	10	140	27	26.5	13.78	13.52	114	117
1J	gp1	1JH4	51	J	M	12	155	54	52	22.48	21.64	125	134
1J	gp1	1JH5	52	J	F	12	160	65.5	62.5	25.59	24.41	130	144
1J	gp1	1JH6	53	J	M	11	145	38	36.5	18.07	17.36	129	133
1J	gp1	1JH7	54	J	M	10	142	44	41.5	21.82	20.58	123	135
1J	gp1	1JH8	55	J	F	11	146	29	27.5	13.60	12.90	130	133
1J	gp1	1JH9	56	J	F	11	129	26	24.5	15.62	14.72	130	133
1J	gp1	1JH10	57	J	F	10	138	43	42	22.58	22.05	113	130
1J	gp1	1JH11	58	J	M	10	131	28	25.5	16.32	14.86	97	101
1J	gp1	1JH12	59	J	F	10			24			120	123
1J	gp1	1JH13	60	J	F	10	144	37	37	17.84	17.84	145	151
1J	gp1	1JH14	61	J	M	12	141	29	28.5	14.59	14.34	115	120
1J	gp1	1JG1	62	J	F	10	126	20	19	12.60	11.97	128	151
1J	gp1	1JG2	63	J	M	11	152	41	39.5	17.75	17.10	124	104
1J	gp1	1JG3	64	J	F	11	143	28	29	13.69	14.18	119	105
1J	gp1	1JG4	65	J	M	11	138	32	31	16.80	16.28	137	142
1J	gp1	1JG5	66	J	M	12.5	163	46	44.5	17.31	16.75	149	156
1J	gp1	1JG6	67	J	M	10	143	42.5	41	20.78	20.05	140	147
1J	gp1	1JG7	68	J	M	11	154	39	38	16.44	16.02	109	122
1J	gp1	1JG8	69	J	M	10	134	28	27.5	15.59	15.32	101	129
1J	gp1	1JG9	70	J	F	14	144	57	57	27.49	27.49	109	110
1J	gp1	1JG10	71	J	M	10	135	28	27	15.36	14.81	95	143
1J	gp1	1JG11	72	J	M	10	128	25	24	15.26	14.65	141	126
1J	gp1	1JG12	73	J	F	11	156	56	51	23.01	20.96	132	139
1J	gp1	1JG13	74	J	M	9	120	16.5	16	11.46	11.11	78	86
1J	gp1	1JD1	75	J	M	11	154	48	47.5	20.24	20.03	110	141
1J	gp1	1JD2	76	J	F	10	145	33	31	15.70	14.74	145	150
1J	gp1	1JD3	77	J	F	11	156	57	55	23.42	22.60	123	126
1J	gp1	1JD4	78	J	F	11	150	38.5	37	17.11	16.44	100	139
1J	gp1	1JD5	79	J	F	12	151	60	59.5	26.31	26.10	131	140
1J	gp1	1JD6	80	J	F	12	151	50	47	21.93	20.61	138	151
1J	gp1	1JA1	81	J	F	9	131	26	26	15.15	15.15	90	111
1J	gp1	1JA2	82	J	F	9	129	31.5	31.5	18.93	18.93	139	144
1J	gp1	1JA3	83	J	F	10	146	38	35.5	17.83	16.65	118	141
1J	gp1	1JA4	84	J	F	11.5	160	54	52.5	21.09	20.51	140	158
1J	gp1	1JA5	85	J	M	9	134	34.5	33.5	19.21	18.66	128	131
1J	gp1	1JA6	86	J	M	11	138	26.5	25	13.92	13.13	122	145
1J	gp1	1JA7	87	J	M	12	142	28	26.5	13.89	13.14	106	32
1J	gp1	1JA8	88	J	M	9	126	25	23	15.75	14.49	81	153

1J	gp1	1JA9	89	J	M	10	149	30	30	13.51	13.51	112	116
1J	gp1	1JA10	90	J	M	11	145	33	31.5	15.70	14.98	139	114
1J	gp1	1JA11	91	J	M	13	156	55	52.5	22.60	21.57	131	137
1J	gp1	1JA12	92	J	M	11	130	38	36	22.49	21.30	92	103
1J	gp1	1JA13	93	J	M	10	128	37	36.5	22.58	22.28	122	137
1S	gp1	1SZ1	94	S	F	14	154	57	57.5	24.03	24.25	125	130
1S	gp1	1SZ2	95	S	F	13	161	46	44	17.75	16.97	138	140
1S	gp1	1SZ3	96	S	M	13	147	47	46	21.75	21.29	141	160
1S	gp1	1SZ4	97	S	F	15	159	58	56.5	22.94	22.35	139	152
1S	gp1	1SZ5	98	S	M	14	165	54	53	19.83	19.47	138	150
1S	gp1	1SZ6	99	S	M	13	166	57	57.5	20.69	20.87	123	129
1S	gp1	1SZ7	100	S	M	15	172	90	88	30.42	29.75	125	112
1S	gp1	1SZ8	101	S	M	13	156	41	42	16.85	17.26	126	109
1S	gp1	1SZ9	102	S	M	14	189	62	62	17.36	17.36	128	135
1S	gp1	1SZ10	103	S	M	13	165	50	49	18.37	18.00	140	145
1S	gp1	1SZ11	104	S	M	13		45	43			137	99
1S	gp1	1SZ12	105	S	F	15	157	45	45	18.26	18.26	127	145
1S	gp1	1SW1	106	S	F	13	168	63	60	22.32	21.26	139	149
1S	gp1	1SW2	107	S	M	13	142	40	39	19.84	19.34	106	110
1S	gp1	1SW3	108	S	M	14	164	43	42	15.99	15.62	124	119
1S	gp1	1SW4	109	S	M	13	157	57.5	56.5	23.33	22.92	118	122
1S	gp1	1SW5	110	S	M	15	166	44	44.5	15.97	16.15	132	108
1S	gp1	1SW6	111	S	F	13	157	60	58.5	24.34	23.73	129	141
1S	gp1	1SW7	112	S	F	14	165	48	47	17.63	17.26	125	134
1S	gp1	1SW8	113	S	F	14	160	50	48	19.53	18.75	138	145
1S	gp1	1SW9	114	S	F	13	150	45.5	45	20.22	20.00	151	156
1S	gp1	1SW10	115	S	M	15	156	65	62.5	26.71	25.68	112	118
1S	gp1	1SW11	116	S	F	15	165	48.3	44	17.74	16.16	134	147
1S	gp1	1SW12	117	S	M	15	167	67.5	67	24.20	24.02	131	108
1S	gp1	1SW13	118	S	M	13	153	55	56	23.50	23.92	133	142
1S	gp1	1SW14	119	S	M	13	145	57.5	57	27.35	27.11	118	122
1S	gp1	1SW15	120	S	F	14	161	45	44	17.36	16.97	138	149
1S	gp1	1SW16	121	S	M	13			53			108	111
1S	gp1	1SY1	122	S	F	14	163	65	63.5	24.46	23.90	121	133
1S	gp1	1SY2	123	S	M	14	163	53.5	51.5	20.14	19.38	121	115
1S	gp1	1SY3	124	S	F	13	147	40	38.5	18.51	17.82	116	120
1S	gp1	1SY4	125	S	M	15	173	70	71.5	23.39	23.89	104	108
1S	gp1	1SY5	126	S	M	13	167	67.5	68	24.20	24.38	127	128
1S	gp1	1SY6	127	S	M	14	160	47	44.5	18.36	17.38	152	132
1S	gp1	1SY7	128	S	F	13	153	63	62	26.91	26.49	153	148
1S	gp1	1SY8	129	S	F	13	160	66	66	25.78	25.78	140	150
1S	gp1	1SY9	130	S	F	13	154	65	62.5	27.41	26.35	135	157
1S	gp1	1SY10	131	S	M	12	153	51	49	21.79	20.93	125	146
1S	gp1	1SY11	132	S	F	13	150	40	42	17.78	18.67	122	127
1S	gp1	1SY12	133	S	M	13	167	63	63.5	22.59	22.77	129	136
1S	gp1	1SX1	134	S	F	13	161	54	54	20.83	20.83	127	161
1S	gp1	1SX2	135	S	M	15	171	70	70	23.94	23.94	142	107

1S	gp1	1SX3	136	S	M	14	157	57	55	23.12	22.31	123	141
1S	gp1	1SX4	137	S	M	15	162	57.5	56.5	21.91	21.53	134	153
1S	gp1	1SX5	138	S	F	13	169	49	47.5	17.16	16.63	137	149
1S	gp1	1SX6	139	S	M	14	168	53	50	18.78	17.72	130	141
1S	gp1	1SX7	140	S	F	15	161	65	63	25.08	24.30	131	
1S	gp1	1SX8	141	S	F	14	161	56	55	21.60	21.22	128	138
1S	gp1	1SX9	142	S	F	16	162	50	49.5	19.05	18.86	130	139
1S	gp1	1SX10	143	S	F	13	152	35	37.5	15.15	16.23	134	134
1S	gp1	1SX11	144	S	M	13	139	28	28.5	14.49	14.75	115	118
1S	gp1	1SX12	145	S	M	13	155	45	44	18.73	18.31	89	114
1S	gp1	1SX13	146	S	M	13	142	37	38	18.35	18.85	121	110
1S	gp1	1SX14	147	S	F	13	159	62	60	24.52	23.73	101	133
1S	gp1	1SX15	148	S	F	16	166	55	54.5	19.96	19.78	93	89
2J	gp2	2JF1	149	J	F	10	110	30	31	24.79	25.62	117	112
2J	gp2	2JF2	150	J	M	8	138	30	30	15.75	15.75	107	114
2J	gp2	2JF3	151	J	M	8	128	29	29	17.70	17.70	90	106
2J	gp2	2JF4	152	J	M	10	133	26	25	14.70	14.13	121	129
2J	gp2	2JF5	153	J	M	11	123	34	33	22.47	21.81	151	151
2J	gp2	2JF6	154	J	F	11	122	49	46	32.92	30.91	148	152
2J	gp2	2JF7	155	J	F	9	129	24	22	14.42	13.22	143	149
2J	gp2	2JF8	156	J	M	10	144.5	35	34	16.76	16.28	130	123
2J	gp2	2JF9	157	J	M	12	143	28	28	13.69	13.69	121	124
2J	gp2	2JF10	158	J	M	10	136	23	20	12.44	10.81	114	140
2J	gp2	2JB1	159	J	M	10	131	31	30	18.06	17.48	109	114
2J	gp2	2JB2	160	J	M	13	163	44	42	16.56	15.81	130	134
2J	gp2	2JB3	161	J	M	10	141	45	45	22.63	22.63	99	102
2J	gp2	2JB4	162	J	M	12	156	70	68	28.76	27.94	130	131
2J	gp2	2JB5	163	J	F	11	151	32	31	14.03	13.60	125	141
2J	gp2	2JB6	164	J	M	11	137	25	25	13.32	13.32	123	128
2J	gp2	2JB7	165	J	F	11	138	25.5	26	13.39	13.65	124	133
2J	gp2	2JB8	166	J	M	12	153	51.5	49	22.00	20.93	115	100
2J	gp2	2JB9	167	J	F	11	147	43	40	19.90	18.51	145	154
2J	gp2	2JB10	168	J	M	12	143	40	40	19.56	19.56	83	94
2J	gp2	2JB11	169	J	M	10	137	27	28	14.39	14.92	97	134
2J	gp2	2JB12	170	J	M	12	161	41	40	15.82	15.43	122	123
2J	gp2	2JB13	171	J	M	13	154	42.5	42	17.92	17.71	88	103
2J	gp2	2JE1	172	J	M	11	142	26	25	12.89	12.40	120	80
2J	gp2	2JE2	173	J	M	10	146	37	38	17.36	17.83	121	125
2J	gp2	2JE3	174	J	F	12	162	52.5	50	20.00	19.05	134	154
2J	gp2	2JE4	175	J	M	12	117	31	32	22.65	23.38	118	118
2J	gp2	2JE5	176	J	M	12	155	51	47	21.23	19.56	122	126
2J	gp2	2JE6	177	J	M	10	138	29	27	15.23	14.18	106	107
2J	gp2	2JE7	178	J	M	11	145	30	30	14.27	14.27	104	107
2J	gp2	2JE8	179	J	F	10	137	27	27	14.39	14.39	140	144
2J	gp2	2JE9	180	J	M	10	137	29	28	15.45	14.92	113	114
2J	gp2	2JE10	181	J	M	12	156	46	45	18.90	18.49	116	121
2J	gp2	2JE11	182	J	M	12	146	35	34.5	16.42	16.19	104	90

2J	gp2	2JA1	183	J	M	11	153	39	38	16.66	16.23	139	146
2J	gp2	2JA2	184	J	M	13	146	33	33	15.48	15.48	139	143
2J	gp2	2JA3	185	J	F	11	153	63	61.4	26.91	26.23	124	129
2J	gp2	2JA4	186	J	F	12	165	72	69	26.45	25.34	145	91
2J	gp2	2JA5	187	J	M	12	144	39	38	18.81	18.33	106	124
2J	gp2	2JA6	188	J	M	12	152	33	33	14.28	14.28	134	137
2J	gp2	2JA7	189	J	M	13	144	31.5	33	15.19	15.91	128	134
2J	gp2	2JA8	190	J	M	12	145	29	29	13.79	13.79	120	132
2J	gp2	2JA9	191	J	M	13	155	35	35	14.57	14.57	148	146
2J	gp2	2JA10	192	J	M	11	140	29.5	29	15.05	14.80	98	139
2J	gp2	2JD1	193	J	F	10	136	30	30	16.22	16.22	111	120
2J	gp2	2JD2	194	J	M	10	130.5	27	25	15.85	14.68	112	119
2J	gp2	2JD3	195	J	M	9	151	36	35	15.79	15.35	110	122
2J	gp2	2JD4	196	J	M	10	133.5	24	22	13.47	12.34	149	157
2J	gp2	2JD5	197	J	M	10	136	34	31	18.38	16.76	106	114
2J	gp2	2JD6	198	J	M	9	130	21	21	12.43	12.43	132	135
2J	gp2	2JD7	199	J	M		147	48	46	22.21	21.29	120	135
2J	gp2	2JD8	200	J	M	7	122	24	22.5	16.12	15.12	100	152
2J	gp2	2JD9	201	J	M	11	147	32	34	14.81	15.73	119	135
2J	gp2	2JD10	202	J	M	11	150	37	36	16.44	16.00	129	124
2J	gp2	2JD11	203	J	M	11	133.5	29	30	16.27	16.83	119	123
2J	gp2	2JD12	204	J	M	9	115	27	25	20.42	18.90	153	126
2J	gp2	2JH1	205	J	M	12	145	28	26	13.32	12.37	135	125
2J	gp2	2JH2	206	J	M	11	140	32	31	16.33	15.82	133	135
2J	gp2	2JH3	207	J	M	11	156	59	57	24.24	23.42	138	145
2J	gp2	2JH4	208	J	M	11	145	49	47	23.31	22.35	125	128
2J	gp2	2JH5	209	J	F	10	133	33	30	18.66	16.96	119	127
2J	gp2	2JH6	210	J	M	11	141	43	45	21.63	22.63	132	129
2J	gp2	2JH7	211	J	F	11	142	34	33	16.86	16.37	126	120
2J	gp2	2JH8	212	J	M	11	155	56	53	23.31	22.06	118	124
2J	gp2	2JH9	213	J	M	10	136	35.5	33	19.19	17.84	99	98
2J	gp2	2JH10	214	J	M	11	144	39	35.5	18.81	17.12	103	109
2J	gp2	2JH11	215	J	F	11	143	36	33	17.60	16.14	119	129
2J	gp2	2JC1	216	J	F	12	160	59	60	23.05	23.44	150	137
2J	gp2	2JC2	217	J	M	11	142	46	45	22.81	22.32	126	127
2J	gp2	2JC3	218	J	M	10	137	30	30	15.98	15.98	130	131
2J	gp2	2JC4	219	J	M	12	152	50	48	21.64	20.78	130	105
2J	gp2	2JC5	220	J	M	12	149	39	37	17.57	16.67	131	115
2J	gp2	2JC6	221	J	M	11	140	43	40.5	21.94	20.66	143	107
2J	gp2	2JC7	222	J	M	10	148	40	38	18.26	17.35	124	106
2J	gp2	2JC8	223	J	F	11	146	40	39	18.77	18.30	122	132
2J	gp2	2JC9	224	J	M	11	143	36	34	17.60	16.63	138	141
2J	gp2	2JC10	225	J	M	12	148	30	29	13.70	13.24	134	114
2J	gp2	2JC11	226	J	M	11	149	35	34	15.77	15.31	148	133
2J	gp2	2JC12	227	J	M	11	148	34	32	15.52	14.61	146	132
2J	gp2	2JC13	228	J	F	9	133	24	23	13.57	13.00	128	129
2J	gp2	2JG1	229	J	M	12	151.5	33	32	14.38	13.94	128	142

2J	gp2	2JG2	230	J	M	10	143	29	29	14.18	14.18	109	144
2J	gp2	2JG3	231	J	M	12	160	44	45	17.19	17.58	122	123
2J	gp2	2JG4	232	J	M	11	140	28	27	14.29	13.78	109	118
2J	gp2	2JG5	233	J	M	10	136	25	24	13.52	12.98	123	109
2J	gp2	2JG6	234	J	M	12	135	45	42	24.69	23.05	93	111
2J	gp2	2JG7	235	J	M	10	132	28	28	16.07	16.07	96	102
2J	gp2	2JG8	236	J	F	10	130.5	23	25	13.51	14.68	92	101
2J	gp2	2JG9	237	J	M	10	127	20	20	12.40	12.40	83	85
2J	gp2	2JG10	238	J	M	12	158	25	24	10.01	9.61	96	106
2S	gp2	2SW1	239	S	M	14	154	37	35	15.60	14.76	150	143
2S	gp2	2SW2	240	S	M	14	175	57	57	18.61	18.61	142	137
2S	gp2	2SW3	241	S	M	16	181	70	67	21.37	20.45	109	100
2S	gp2	2SW4	242	S	M	14	171	45	46	15.39	15.73	137	142
2S	gp2	2SW5	243	S	M	13	159	49	48	19.38	18.99	130	127
2S	gp2	2SW6	244	S	F	13	151	36	36	15.79	15.79	140	145
2S	gp2	2SW7	245	S	F	13	165	48	46	17.63	16.90	112	120
2S	gp2	2SW8	246	S	F	13	156	45	44	18.49	18.08	133	133
2S	gp2	2SW9	247	S	M	13	154	44.5	44	18.76	18.55	115	122
2S	gp2	2SW10	248	S	M	13	158	53	51	21.23	20.43	122	136
2S	gp2	2SW11	249	S	F	14	153	52	52	22.21	22.21	129	119
2S	gp2	2SW12	250	S	F	15	158	64	61	25.64	24.44	133	142
2S	gp2	2SW13	251	S	M	14	148	45.5	45	20.77	20.54	109	88
2S	gp2	2SW14	252	S	M	13	164	40.5	40	15.06	14.87	136	140
2S	gp2	2SW15	253	S	M	12	153	50	50	21.36	21.36	90	100
2S	gp2	2SW16	254	S	F	13	160	49	47	19.14	18.36	132	129
2S	gp2	2SW17	255	S	M	12	148	41	40	18.72	18.26	97	96
2S	gp2	2SY1	256	S	F	14	159	47	47	18.59	18.59	138	142
2S	gp2	2SY2	257	S	F	15	158	41.5	41	16.62	16.42	115	131
2S	gp2	2SY3	258	S	M	15	168	61	61	21.61	21.61	131	95
2S	gp2	2SY4	259	S	F	13	154	57	55	24.03	23.19	116	150
2S	gp2	2SY5	260	S	M	14	177	59	58	18.83	18.51	124	127
2S	gp2	2SY6	261	S	M	15	181	61	61	18.62	18.62	133	136
2S	gp2	2SY7	262	S	F	13	164	47	46	17.47	17.10	144	122
2S	gp2	2SY8	263	S	M	15	164	43.5	44	16.17	16.36	123	107
2S	gp2	2SY9	264	S	F	14	150	51	51	22.67	22.67	121	134
2S	gp2	2SY10	265	S	M	15	156	41	39	16.85	16.03	135	151
2S	gp2	2SY11	266	S	M	15	165	39.5	40	14.51	14.69	140	145
2S	gp2	2SY12	267	S	F	16	152	74	75	32.03	32.46	124	127
2S	gp2	2SY13	268	S	M	15	161	65	63	25.08	24.30	126	92
2S	gp2	2SY14	269	S	M	15	151	44	44	19.30	19.30	114	120
2S	gp2	2SY15	270	S	M	14	156	45.5	45	18.70	18.49	120	120
2S	gp2	2SY16	271	S	M	15	164	41	41	15.24	15.24	115	135
2S	gp2	2SY17	272	S	M	14	177	67	66	21.39	21.07	155	158
2S	gp2	2SY18	273	S	M	13	162	45	45	17.15	17.15	127	137
2S	gp2	2SY19	274	S	M	15	158	42	41	16.82	16.42	109	139
2S	gp2	2SY20	275	S	M	14	142	32	30	15.87	14.88	97	90
2S	gp2	2SY21	276	S	F	13	160	57.5	56	22.46	21.88	126	151

2S	gp2	2SX1	277	S	M	14	171	67	68	22.91	23.26	131	143
2S	gp2	2SX2	278	S	M	14	168	53	53	18.78	18.78	126	141
2S	gp2	2SX3	279	S	M	12	159	44	43	17.40	17.01	141	131
2S	gp2	2SX4	280	S	M	14	154	65	66	27.41	27.83	113	141
2S	gp2	2SX5	281	S	M	12	148	35	36	15.98	16.44	100	118
2S	gp2	2SX6	282	S	M	15	154	40.5	40	17.08	16.87	134	149
2S	gp2	2SX7	283	S	F	13	150	40	40	17.78	17.78	127	155
2S	gp2	2SX8	284	S	M	13	148	24	25	10.96	11.41	129	116
2S	gp2	2SX9	285	S	M	13	153	37.5	37	16.02	15.81	129	129
2S	gp2	2SX10	286	S	F	15			55			113	115
2S	gp2	2SX11	287	S	F	13	159	51.5	51	20.37	20.17	115	151
2S	gp2	2SX12	288	S	M	13	147	44.5	44	20.59	20.36	113	124
2S	gp2	2SX13	289	S	F	15	168	52.5	54	18.60	19.13	121	97
2S	gp2	2SX14	290	S	F	13	152	44	44	19.04	19.04	143	152
2S	gp2	2SX15	291	S	M	13	141	36.5	35	18.36	17.60	126	131
2S	gp2	2SX16	292	S	M	15	176	69	67	22.28	21.63	116	97
2S	gp2	2SX17	293	S	F	13	156	42	40	17.26	16.44	114	118
2S	gp2	2SZ1	294	S	M	14	164	50	49	18.59	18.22	106	115
2S	gp2	2SZ2	295	S	M	13	151	35	34	15.35	14.91	130	110
2S	gp2	2SZ3	296	S	M	14	153	39.5	38	16.87	16.23	117	152
2S	gp2	2SZ4	297	S	F	14	150	37.5	37	16.67	16.44	113	127
2S	gp2	2SZ5	298	S	F	15	167	70.5	69	25.28	24.74	136	141
2S	gp2	2SZ6	299	S	M	15	154.5	44	43	18.43	18.01	98	115
2S	gp2	2SZ7	300	S	F	13	150	55	54	24.44	24.00	113	125
2S	gp2	2SZ8	301	S	F	13	157	43	42.5	17.44	17.24	141	158
2S	gp2	2SZ9	302	S	M	15	158.5	45	44	17.91	17.51	92	78
2S	gp2	2SZ10	303	S	M	13	167	54.5	53	19.54	19.00	108	122
2S	gp2	2SZ11	304	S	M	13	157	35.5	37	14.40	15.01	103	114
2S	gp2	2SZ12	305	S	M	15	161	53.5	53	20.64	20.45	118	128
2S	gp2	2SZ13	306	S	M	13	160	51	49	19.92	19.14	139	149
2S	gp2	2SZ14	307	S	M	13	144	29	27	13.99	13.02	144	146
2S	gp2	2SZ15	308	S	F	15	158	38	37	15.22	14.82	134	149
2S	gp2	2SZ16	309	S	M	13	154	52	50	21.93	21.08	137	146
2S	gp2	2SZ17	310	S	M	13	140	27	28	13.78	14.29	99	102
2S	gp2	2SZ18	311	S	M	15	158	46	46	18.43	18.43	127	123
2S	gp2	2SZ19	312	S	F	12	140	26.5	25	13.52	12.76	116	142
2S	gp2	2SZ20	313	S	M	13	152	62.5	60	27.05	25.97	117	105
2S	gp2	2SZ21	314	S	F	13	156	49.5	50	20.34	20.55	134	165
2S	gp2	2SZ22	315	S	F	14	159	39	39	15.43	15.43	138	122
3J	gp3	3JE1	316	J	M	11	144	39	37	18.81	17.84	109	97
3J	gp3	3JE2	317	J	M	10	135	30.2	27	16.57	14.81	132	135
3J	gp3	3JE3	318	J	F	11	132	28.5	26	16.36	14.92	131	156
3J	gp3	3JE4	319	J	M	10	142	35	35	17.36	17.36	120	103
3J	gp3	3JE5	320	J	M	11	146	32	30	15.01	14.07	138	138
3J	gp3	3JE6	321	J	M	13	150	40.5	39	18.00	17.33	119	123
3J	gp3	3JE7	322	J	M	12	142	30	29	14.88	14.38	86	92
3J	gp3	3JE8	323	J	F	10	140	45	41	22.96	20.92	125	140

3J	gp3	3JE9	324	J	F	10	138	26	26	13.65	13.65	138	144
3J	gp3	3JE10	325	J	F	11	132	36	35	20.66	20.09	115	121
3J	gp3	3JE11	326	J	F	11	147	35	34	16.20	15.73	152	154
3J	gp3	3JE12	327	J	F	10	136	25	24	13.52	12.98	96	121
3J	gp3	3JE13	328	J	F	9	139	30	28	15.53	14.49	120	147
3J	gp3	3JE14	329	J	M	10	124	24	22	15.61	14.31	125	111
3J	gp3	3JF1	330	J	F	10	147	50	49	23.14	22.68	150	159
3J	gp3	3JF2	331	J	M	10	143	37	36	18.09	17.60	123	132
3J	gp3	3JF3	332	J	M	9	136	28	26	15.14	14.06	133	131
3J	gp3	3JF4	333	J	M	13	160	39	39	15.23	15.23	122	146
3J	gp3	3JF5	334	J	M	12	150	39	38	17.33	16.89	119	103
3J	gp3	3JF6	335	J	F	11	121	42	41	28.69	28.00	99	106
3J	gp3	3JF7	336	J	M	10	129	29	27	17.43	16.22	85	127
3J	gp3	3JF8	337	J	F	11	145	42	39	19.98	18.55	157	161
3J	gp3	3JF9	338	J	M	10	140	42	41	21.43	20.92	137	123
3J	gp3	3JF10	339	J	F	10	143	28	26	13.69	12.71	124	112
3J	gp3	3JF11	340	J	F	12	156	55	52.5	22.60	21.57	132	134
3J	gp3	3JF12	341	J	F	12	156	57	55	23.42	22.60	134	152
3J	gp3	3JF13	342	J	M	12	152	40	40	17.31	17.31	107	118
3J	gp3	3JF14	343	J	F	11	139	30	29	15.53	15.01	141	110
3J	gp3	3JF15	344	J	M	13	149	29	28.5	13.06	12.84	102	108
3J	gp3	3JB1	345	J	F	12	151	37	36	16.23	15.79	126	135
3J	gp3	3JB2	346	J	M	11	148	56	55	25.57	25.11	124	118
3J	gp3	3JB3	347	J	M	12	155	45	42.5	18.73	17.69	126	134
3J	gp3	3JB4	348	J	M	11.5	153	48	46	20.50	19.65	143	140
3J	gp3	3JB5	349	J	F	12	149	32	31	14.41	13.96	126	127
3J	gp3	3JB6	350	J	M	10	140	30	29	15.31	14.80	59	129
3J	gp3	3JB7	351	J	F	11	142	54	52.5	26.78	26.04	141	127
3J	gp3	3JB8	352	J	F	11	157	64	64	25.96	25.96	105	103
3J	gp3	3JB9	353	J	F	12	154	40	40	16.87	16.87	121	130
3J	gp3	3JB10	354	J	M	12	155	45	42.5	18.73	17.69	112	126
3J	gp3	3JB11	355	J	F	12	156	49	46	20.13	18.90	119	131
3J	gp3	3JC1	356	J	M	12	135	24	23.5	13.17	12.89	126	122
3J	gp3	3JC2	357	J	M	12	143	36	36	17.60	17.60	129	80
3J	gp3	3JC3	358	J	M	10	135	25	24	13.72	13.17	126	114
3J	gp3	3JC4	359	J	F	11	143	36	34	17.60	16.63	138	149
3J	gp3	3JC5	360	J	M	11	151	39	37	17.10	16.23	118	42
3J	gp3	3JC6	361	J	M	12	137	34	32	18.11	17.05	99	131
3J	gp3	3JC7	362	J	M	11	150	45	44	20.00	19.56	126	100
3J	gp3	3JC8	363	J	M	12	157	40	39.5	16.23	16.02	122	136
3J	gp3	3JC9	364	J	F	10	138	40	38	21.00	19.95	134	122
3J	gp3	3JC10	365	J	M	12	160	55	55	21.48	21.48	125	131
3J	gp3	3JC11	366	J	F	9	139	30	29.5	15.53	15.27	126	122
3J	gp3	3JC12	367	J	M	13	149	32	31	14.41	13.96	95	100
3J	gp3	3JC13	368	J	F	6	126	20	20	12.60	12.60	104	107
3J	gp3	3JC14	369	J	F	12	160	32	33	12.50	12.89	146	150
3J	gp3	3JC15	370	J	F	10	139	32	30	16.56	15.53	140	143

3J	gp3	3JC16	371	J	F	12	162	65	64	24.77	24.39	126	129
3J	gp3	3JC17	372	J	F	10	146	42	42	19.70	19.70	100	107
3J	gp3	3JC18	373	J	M	12	141	51	49	25.65	24.65	110	110
3J	gp3	3JC19	374	J	M	11	143	45	42.5	22.01	20.78	100	94
3J	gp3	3JC20	375	J	M	9	130	31	29	18.34	17.16	132	92
3J	gp3	3JH1	376	J	F	10	156	48	45	19.72	18.49	72	133
3J	gp3	3JH2	377	J	F	9	129	23	18	13.82	10.82	129	155
3J	gp3	3JH3	378	J	F	12	122	29	26	19.48	17.47	98	130
3J	gp3	3JH4	379	J	F	12	160	46	45	17.97	17.58	132	124
3J	gp3	3JH5	380	J	M	10	141	39	37	19.62	18.61	111	113
3J	gp3	3JH6	381	J	M	9	144	35	34.5	16.88	16.64	115	129
3J	gp3	3JH7	382	J	M	8	107	20	19	17.47	16.60	107	108
3J	gp3	3JH8	383	J	M	12	153	52	50.5	22.21	21.57	122	125
3J	gp3	3JH9	384	J	M	12	159	40	41	15.82	16.22	96	101
3J	gp3	3JH10	385	J	M	12	149	37	39	16.67	17.57	133	133
3J	gp3	3JH11	386	J	M	11	144	41		19.77		126	132
3J	gp3	3JH12	387	J	M	11	144	49	49	23.63	23.63	139	109
3J	gp3	3JH13	388	J	F	10	144	41	40	19.77	19.29	116	127
3J	gp3	3JG1	389	J	M	11	147	38.5	36	17.82	16.66	72	97
3J	gp3	3JG2	390	J	F	10	138	36.5	36	19.17	18.90	117	117
3J	gp3	3JG3	391	J	M	11	130	28	25	16.57	14.79	95	96
3J	gp3	3JG4	392	J	M	12	150	37	36	16.44	16.00	102	90
3J	gp3	3JG5	393	J	M	9	133	39	38	22.05	21.48	111	111
3J	gp3	3JG6	394	J	F	11	145	31	29	14.74	13.79	133	93
3J	gp3	3JG7	395	J	M	11	151	44.5	41	19.52	17.98	104	123
3J	gp3	3JG8	396	J	M	11	157	39	38	15.82	15.42	114	103
3J	gp3	3JG9	397	J	F	9	132	19	18	10.90	10.33	119	129
3J	gp3	3JG10	398	J	F	12	152	46	44	19.91	19.04	115	143
3J	gp3	3JG11	399	J	M	13	149	44	40	19.82	18.02	146	150
3J	gp3	3JG12	400	J	M	11	152	35	33	15.15	14.28	109	105
3J	gp3	3JG13	401	J	M	11	148	46	43	21.00	19.63	117	123
3J	gp3	3JD1	402	J	F	11	143	37	35.5	18.09	17.36	95	107
3J	gp3	3JD2	403	J	M	12	152	37	36	16.01	15.58	134	141
3J	gp3	3JD3	404	J	F	6.5	131	29	28	16.90	16.32	148	136
3J	gp3	3JD4	405	J	M	11	142	31	30	15.37	14.88	119	153
3J	gp3	3JD5	406	J	F	10.5	150	47	44	20.89	19.56	157	165
3J	gp3	3JD6	407	J	F	10	134	28	26	15.59	14.48	143	149
3J	gp3	3JD7	408	J	F	10	133	35	33	19.79	18.66	116	119
3J	gp3	3JD8	409	J	M	10	135	24	22.5	13.17	12.35	134	144
3J	gp3	3JD9	410	J	M	10	129	39	38	23.44	22.84	94	98
3J	gp3	3JD10	411	J	M	12	152	44	42	19.04	18.18	160	165
3J	gp3	3JD11	412	J	M	12	168	69	66	24.45	23.38	129	119
3J	gp3	3JA1	413	J	F	10	143	34	30	16.63	14.67	106	113
3J	gp3	3JA2	414	J	F	11	143	42	40.5	20.54	19.81	137	111
3J	gp3	3JA3	415	J	M	10	137	27	26	14.39	13.85	93	98
3J	gp3	3JA4	416	J	F	12	135	29	27	15.91	14.81	128	129
3J	gp3	3JA5	417	J	M	10	135	27	26	14.81	14.27	101	102

3J	gp3	3JA6	418	J	M	8	127	28	26	17.36	16.12	101	108
3J	gp3	3JA7	419	J	M	10	149	49	46	22.07	20.72	137	147
3J	gp3	3JA8	420	J	M	11	152	51	49.5	22.07	21.42	128	123
3J	gp3	3JA9	421	J	M	12	143	30	27	14.67	13.20	127	148
3J	gp3	3JA10	422	J	M	11	142	45	45	22.32	22.32	123	128
3J	gp3	3JA11	423	J	M	9	132	34	30	19.51	17.22	131	133
3J	gp3	3JA12	424	J	F	11	143	51	50	24.94	24.45	122	128
3J	gp3	3JA13	425	J	F	12	160	49	46.5	19.14	18.16	136	138
3J	gp3	3JA14	426	J	M	10	140	36	35	18.37	17.86	104	121
3J	gp3	3JA15	427	J	F	11	149	56	54	25.22	24.32	150	154
3S	gp3	3SZ1	428	S	M	15	173	58	56	19.38	18.71	112	123
3S	gp3	3SZ2	429	S	M	15	167	71	68	25.46	24.38	95	96
3S	gp3	3SZ3	430	S	M	13	176	50	49.5	16.14	15.98	109	115
3S	gp3	3SZ4	431	S	F	14	166	56	56	20.32	20.32	117	123
3S	gp3	3SZ5	432	S	F	15	151	46	46.5	20.17	20.39	141	142
3S	gp3	3SZ6	433	S	M	13	140	41	39	20.92	19.90	127	98
3S	gp3	3SZ7	434	S	F	14	152	38	37	16.45	16.01	126	135
3S	gp3	3SZ8	435	S	M	13	133	29	27	16.39	15.26	140	151
3S	gp3	3SZ9	436	S	M	15	160	46	45.6	17.97	17.81	134	137
3S	gp3	3SZ10	437	S	M	13	156	54	53	22.19	21.78	152	152
3S	gp3	3SZ11	438	S	M	15	174	44	45	14.53	14.86	98	102
3S	gp3	3SZ12	439	S	F	13	153	50	49	21.36	20.93	125	113
3S	gp3	3SZ13	440	S	M	13	159	54	52.5	21.36	20.77	100	103
3S	gp3	3SZ14	441	S	M	13	160	43	44	16.80	17.19	131	120
3S	gp3	3SZ15	442	S	M	15	172	50	50	16.90	16.90	121	112
3S	gp3	3SZ16	443	S	M	14	165	55	53	20.20	19.47	116	111
3S	gp3	3SZ17	444	S	F	15	157	57	56	23.12	22.72	124	115
3S	gp3	3SZ18	445	S	M	15	167	69	67	24.74	24.02	113	95
3S	gp3	3SZ19	446	S	M	13	168	45	45	15.94	15.94	126	123
3S	gp3	3SZ20	447	S	F	13	160	57	55	22.27	21.48	144	153
3S	gp3	3SZ21	448	S	M	14	148	40	39	18.26	17.80	92	118
3S	gp3	3SW1	449	S	M	14	170	56	54	19.38	18.69	132	161
3S	gp3	3SW2	450	S	M	14	153	61	61.5	26.06	26.27	128	145
3S	gp3	3SW3	451	S	F	14	158	43	39.5	17.22	15.82	139	142
3S	gp3	3SW4	452	S	F	13	149	40	36.5	18.02	16.44	111	108
3S	gp3	3SW5	453	S	F	14	165.5	51	49.5	18.62	18.07	120	135
3S	gp3	3SW6	454	S	M	13	157	61	60	24.75	24.34	158	148
3S	gp3	3SW7	455	S	M	14	168.5	40	40	14.09	14.09	131	137
3S	gp3	3SW8	456	S	M	13	147.5	55	52	25.28	23.90	93	114
3S	gp3	3SW9	457	S	M	13	163.5	54	52.5	20.20	19.64	137	135
3S	gp3	3SW10	458	S	M	15	160	68	65	26.56	25.39	114	122
3S	gp3	3SW11	459	S	M	13	175	59	56	19.27	18.29	132	138
3S	gp3	3SW12	460	S	M	13	171	57	55	19.49	18.81	139	142
3S	gp3	3SW13	461	S	F	14	149.5	55	52.5	24.61	23.49	118	142
3S	gp3	3SW14	462	S	M	13	158.5	52	50	20.70	19.90	111	142
3S	gp3	3SW15	463	S	M	14	155	45	42	18.73	17.48	129	109
3S	gp3	3SW16	464	S	F	15	155	55	51	22.89	21.23	119	142

3S	gp3	3SW17	465	S	M	15	169	60	60	21.01	21.01	124	118
3S	gp3	3SW18	466	S	F	13	155	58	55	24.14	22.89	114	121
3S	gp3	3SW19	467	S	M	14	167	47	47	16.85	16.85	123	129
3S	gp3	3SW20	468	S	M	13	158.5	50	48	19.90	19.11	124	136
3S	gp3	3SW21	469	S	M	15	177	51	53	16.28	16.92	153	164
3S	gp3	3SY1	470	S	F	12	153	43	42.5	18.37	18.16	148	147
3S	gp3	3SY2	471	S	M	13	171	65	65	22.23	22.23	135	136
3S	gp3	3SY3	472	S	M	15	181	80.5	79.5	24.57	24.27	136	118
3S	gp3	3SY4	473	S	M	14	165	42.5	43.5	15.61	15.98	149	143
3S	gp3	3SY5	474	S	M	14	157	42	43	17.04	17.44	133	143
3S	gp3	3SY6	475	S	M	13	168	53	52.5	18.78	18.60	147	132
3S	gp3	3SY7	476	S	M	15	176	78	76	25.18	24.54	140	140
3S	gp3	3SY8	477	S	F	15	156	42	42	17.26	17.26	127	114
3S	gp3	3SY9	478	S	F	13	152	43	43	18.61	18.61	149	157
3S	gp3	3SY10	479	S	F	13	139	39	39	20.19	20.19	111	114
3S	gp3	3SY11	480	S	M	13	153	43	42	18.37	17.94	131	133
3S	gp3	3SY12	481	S	F	13	152	71	71	30.73	30.73	115	110
3S	gp3	3SY13	482	S	F	13	156	59.5	59.5	24.45	24.45	135	134
3S	gp3	3SY14	483	S	M	13	171	60	59.5	20.52	20.35	133	137
3S	gp3	3SY15	484	S	M	14	168	50	50	17.72	17.72	144	91
3S	gp3	3SY16	485	S	M	15	109	80	78.5	67.33	66.07	136	151
3S	gp3	3SY17	486	S	F	13	176	52	51	16.79	16.46	145	150
3S	gp3	3SY18	487	S	F	14	152	44	44	19.04	19.04	154	153
3S	gp3	3SY19	488	S	M	13	160	44	44	17.19	17.19	124	126
3S	gp3	3SY20	489	S	M	13	176	70	69	22.60	22.28	146	146
3S	gp3	3SY21	490	S	M	13	146	43	42	20.17	19.70	130	131
3S	gp3	3SY22	491	S	M	14	169	56	55	19.61	19.26	144	133
3S	gp3	3SY23	492	S	M	13	146	36	35	16.89	16.42	134	118
3S	gp3	3SX1	493	S	M	14	164	56	55	20.82	20.45	127	142
3S	gp3	3SX2	494	S	M	14	157	40	40	16.23	16.23	144	136
3S	gp3	3SX3	495	S	M	14	168	55	55	19.49	19.49	122	137
3S	gp3	3SX4	496	S	F	15	156	46	45	18.90	18.49	137	129
3S	gp3	3SX5	497	S	M	13	158	41	39.5	16.42	15.82	106	110
3S	gp3	3SX6	498	S	M	15	167	43	43	15.42	15.42	138	152
3S	gp3	3SX7	499	S	M	14	155	40	41	16.65	17.07	112	117
3S	gp3	3SX8	500	S	F	13	158	55	52.5	22.03	21.03	133	134
3S	gp3	3SX9	501	S	F	14	160	61	60.5	23.83	23.63	131	136
3S	gp3	3SX10	502	S	M	14	177	84	80	26.81	25.54	124	124
3S	gp3	3SX11	503	S	F	15	160	44	45	17.19	17.58	124	133
3S	gp3	3SX12	504	S	F	13	145	40	39	19.02	18.55	125	119
3S	gp3	3SX13	505	S	M	12	152	39	38.5	16.88	16.66	124	134
3S	gp3	3SX14	506	S	M	14	171	56	54.5	19.15	18.64	112	103
3S	gp3	3SX15	507	S	F	13	152	44.5	45	19.26	19.48	127	121
3S	gp3	3SX16	508	S	F	14	151	60	59	26.31	25.88	98	106
3S	gp3	3SX17	509	S	F	15	158	37	36	14.82	14.42	144	147
3S	gp3	3SX18	510	S	F	12	155	48	48	19.98	19.98	143	135

CERQ Pre	CERQ Pst	Tee Emp Pre	Tee Emp Pst	Tee Alt Pre	Tee Alt Pst	Soc Com Pre	Soc Com Pst	PosPar RelPre	PosPar RelPst	PosPee RelPre	PosPee RelPst
56	58	10	15	12	14	34	35	23	24	24	25
74	48	15	14	14	14	29	34	22	21	16	20
55	56	11	12	12	11	24	23	29	30	18	21
47	62	14	16	10	12	32	28	20	21	20	23
36	36	14	13	14	15	26	34	30	30	25	25
64	63	18	18	13	13	41	43	28	25	24	25
58	62	15	16	8	9	33	36	22	26	21	21
56	63	14	16	10	14	28	33	23	24	24	19
51	59	13	11	15	8	29	30	26	26	15	18
44	40	10	11	7	8	19	18	13	12	10	10
61	62	16	10	13	14	30	35	20	26	14	17
57	63	19	20	20	16	45	32	30	23	25	19
41	52	17	19	16	18	40	41	22	26	24	25
48	59	12	14	10	14	27	30	20	17	16	14
47	65	8	12	15	9	34	30	30	30	22	24
36	50	12	11	14	20	28	27	29	28	17	21
56	59	8	11	8	8	20	23	20	22	16	17
56	60	18	17	14	13	28	29	19	18	14	20
44	45	12	12	10	12	29	23	14	22	11	16
48	61	18	9	10	10	32	29	21	16	20	15
53	50	8	8	9	10	22	26	23	24	15	22
55	67	12	20	16	20	44	45	28	30	24	25
53	63	14	14	13	13	34	36	22	22	21	24
61	63	12	14	12	10	36	27	24	26	13	16
51	50	16	17	15	18	36	38	25	26	24	24
51	62	13	11	10	15	26	30	17	18	23	14
63	61	17	18	19	14	36	35	29	23	24	23
39	75	17	15	12	13	27	32	28	23	21	18
37	50	15	11	17	11	27	23	20	21	22	14
60	68	20	20	20	20	45	44	19	23	25	25
42	67	19	19	16	18	42	41	30	30	25	25
64	62	17	16	16	14	35	39	24	24	23	23
58	50	20	20	20	19	38	44	27	28	25	25
50	71	12	14	14	17	37	38	29	29	20	23
52	54	17	20	20	20	42	45	30	30	24	25
90	54	20	20	20	20	38	33	28	18	25	25
82	71	20	20	20	20	44	45	23	20	25	25
51	57	11	10	20	10	35	20	29	19	25	15
47	57	9	14	12	15	28	24	18	21	18	17
70	90	20	20	18	20	45	45	15	30	13	25
28	35	8	10	8	9	19	37	13	15	8	16
47	46	14	15	13	11	29	27	23	16	20	15
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56	55	12	15	12	15	27	33	26	24	20	23

58	50	8	9	9	10	27	31	14	20	16	14
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60	47	15	10	10	12	26	29	17	22	15	21
44	50	8	7	8	8	17	26	23	25	20	21
52	64	15	13	14	15	37	31	24	21	23	17
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68	45	17	15	18	14	37	38	23	22	19	20
30	49	11	12	12	17	24	33	22	20	24	19
53	72	13	14	11	10	39	37	27	28	19	18
35	47	16	8	14	18	28	33	23	20	21	21
66	56	13	18	15	15	32	27	25	25	18	21
56	62	12	14	12	12	24	27	19	15	16	14
33	37	15	17	12	18	36	38	21	27	23	24
52	42	16	16	13	11	31	35	25	28	22	23
63	67	17	17	16	18	34	33	23	27	14	17
56	72	12	20	18	13	34	32	27	26	24	20
43	57	13	17	7	10	32	37	25	23	19	25
52	58	14	12	14	14	27	29	18	21	16	18
60	59	18	19	20	20	40	42	25	24	23	23
50	64	19	20	16	19	42	43	30	30	24	25
56	66	14	13	15	15	33	33	28	23	24	19
57	67	14	12	11	12	29	37	24	24	19	19
46	64	20	19	12	15	36	32	25	29	24	24
58	58	12	18	15	16	35	40	19	25	23	20
43	75	15	20	14	17	26	45	30	27	25	23
39	38	11	11	8	6	30	17	25	26	19	22
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45	54	14	15	12	12	33	32	23	29	25	25
54	82	15	18	16	18	35	42	26	29	22	24
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51	57	16	14	8	12	37	33	21	24	19	18
76	82	18	15	10	6	32	38	29	29	20	20
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68	81	16	18	16	16	42	39	23	29	22	25
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68	55	13	10	14	10	23	22	30	17	16	15
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Sel Con Pre	Sel Con Pst	CAS Pre	CAS Pst	10mR Pre	10mR Pst	SJ Pre	SJ Pst	PT Pre	PT Pst	SU Pre	SU Pst	SAR Pre	SAR Pst
97	94	10	7	14.21	15.14	144	145	11.5	12.00		15	28	30
87	96	3	6	17.89	18.4	115	118	15.0	15.00	9	9	31	32
84	99	14	10	16.46	13.9	131	145		11.00	19	19	27	30
112	116	6	4	17.72	15.46	115	120	10.0	12.00	14	12	30	34
91	94	8	3	15.58	19.6	128	105	15.5	13.50	8	14	23	23
127	134	10	4	14.78	15.09	130	183	9.5	8.50	28	23	27	34
98	101	12	8	15.07	12.96	108	120	11.0	11.50		5	35	39
104	96	31	25	14.44	15.18	122	136	10.5	9.50	14	17	35	34
98	97	18	17	14.38	15.38	134	130		9.50	12	14		30
88	85	17	20	15.26	16.16	129	140	11.0	11.50	12	16	34	35
99	98	22	17	15.65	17.32	152	145	12.0	9.00	17	16	39	37
127	105	15	24	15.93	15.37	148	150	11.5	11.50	19	19	30	34
100	101	3	1	17.76	15	99	124	12.0	11.50	15	18	36	37
98	89	28	20	14.78	14.47	136	130	10.0	9.50	13	16	35	37
128	121	8	0	15.03	14.38	158	172	11.5	11.50	23	19	29	38
107	102	16	1	16.71	15.97	79	92	10.5	9.00	11	11	21	24
87	82	25	12	14.4	15.58	92	115	12.0	15.00	3	7	32	31
83	96	0	0	16.5	15.65	133	147	14.0	16.00		15	31	34
93	99	26	30	16.41	18.54	122	115	11.5	12.50	15	10	28	33
86	98	35	25	17.39	17.72	110	105	11.0	13.50	1	10	31	27
110	110	8	3	17.97	14	84	105	13.0	9.00	13	15	28	31
114	132	1	0	14.21	14.55	176	164	11.0	9.00	23	24	28	30
107	110	17	15	16.87	16	77	128	12.0	11.50	10	10	30	27
120	110	15	15	14.64	15.64	147	145	11.5	13.00	20	20	41	43
92	98	17	17	21.59	15.72	138	127	11.5	11.00	16	17	33	34
109	88	30	20	16.9		80	105	11.0	11.00	10	12	30	41
105	90	30	28	15		111	118	11.0	13.00	15		22	24
93	87	0	6	18.83	18.57	80	98	11.5	13.00	0	0	28	34
89	72	34	18	13.27	13.78	175	180	11.5	10.50	24	27	40	43
116	117	6	4	20.4	21.2	66	90	11.0	11.50	2	12	33	29
121	110	5	7	15.9	15.57	141	140	11.5	10.50	6	9	23	30
110	118	10	6	15.52	13	160	150	12.0	10.50	23	19	36	46
131	129	20	6	15.4	15	117	140	12.0	7.50	22	22	37	37
119	110	1	1	16.52	18	85	69	12.0	13.50	13	15	33	40
114	131	1	0	15.01	14.96	163	145	12.0	10.50	15	10	37	37
86	90	14	7	17.01	16.08	138	125	12.0	12.00		13	28	31
96	89	35	29	18.02	18	91	100	12.0	9.50	2	2	34	37
110	98	17	26	16	15.08	133	125	12.5	11.00	22	24	32	32
113	98	24	32	16.1	15.12	117	138	12.0	8.50	18	19	26	24
90	90	20	15	15.27	15.62	126	132	11.0	9.00	23	24	41	42
87	92	19	40		14	63	87	14.5	20.00		11	37	39
105	86	28	24	14.71	14	145	132	12.0	10.00	20	21	37	38
116	90	12	36	21.26	19	99	105	12.0	13.00	1	1	24	23
105	109	16	8		14.89	148	145	11.0	8.50		15		17

104	99	37	31	17.77	16.83	97	116	12.5	14.00	6	3		30
120	108	2	12	17.4	16.02	103	117	12.5	12.50	10	6	26	29
84	78	39	34	16.95	16.51	124	120		9.50	12	16	37	42
90	94	21	18	16.27	15.63	111	118	12.0	10.50	12	10	35	34
108	110	19	26	15.25	14.71	138	140	10.5	10.00	12	11	37	39
103	97	33	26	15.2	17.39	121	115	13.5	11.00	9	8	31	32
91	101	8	5	17.4	17.01	100	102	10.5	13.00	0	0	23	29
95	98	18	8	16.32	15	114	100	10.5	10.50	9	15	36	39
108	118	8	1	15.03	17.01	111	128	12.5	9.00	16	11	35	39
103	106	13	6	16.28	16.56	106	110	11.5	9.50	11	8	39	37
110	117	16	10	15.7	14.97	130	135	12.0	15.50	20	24	34	35
105	103	11	15	16.34	15	91	122	14.0	10.00	17	18	35	33
103	98	9	14	16.78	16	112	123	13.5	14.50	16	16	29	27
110	92	31	23	17.94	15	80	122	12.0	10.50	16	13	33	35
82	93	3	1		15.75		127		11.50		6		40
118	126	4	0	15.34	14.53	153	165	10.0	7.00	23	25	40	41
110	78	7	22	15.34	15	142	148	12.0	10.00	17	24	36	37
105	88	4	6	16.71	15.75	115	112	13.5	15.50	8	12	37	38
107	119	6	6	14.81	15.64	130	145	10.5	12.00	12	19	40	40
90	97	31	24	16.38	19.53	110	110	13.0	14.50	0	9	27	21
117	123	4	3	13.57	14.82	132	150	12.5	11.50	1	18	26	27
142	145	3	3	14.28	13.31	196	200	10.0	7.50	18	23	51	50
109	107	8	12	14.91	15.96	123	132	11.0	10.50	4	14	33	34
101	107	12	6	15.27	15.71	111	150	11.5	11.50	12	18	27	36
107	116	19	9	14.28	15.46	137	130	10.5	9.00	12	17	36	38
102	74	28	9	17.19	16.65	107	115	12.0	9.50	11	9	23	29
87	105	0	0	14.78	17.2	121	110	13.0	12.00	16	16	26	23
123	120	3	3	14.94	14.4	149	138	11.5	9.50	17	21	39	58
126	119	8	7	15.12		107	14	11.5	9.00	17	10	21	18
97	95	0	0	18.52	21.52	90	104	13.5	15.50	0	2	30	37
91	98	8	0	17.06	18.84	100	99	11.5	12.50		12	29	27
113	117	7	4	17.5	17.52	95	105	13.0	12.00	17	11	34	37
119	104	30	17	16.94	15.14	110	135	12.5		16	14		36
109	134	14	7	15.44	14.53	125	142	13.0	13.50	12	16	35	33
98	100	9	8	15.81	16.4	106	112	13.0	10.50	2		30	38
101	129	6	1	13.88	15.6	138	120	11.0	9.50	20	21	39	40
85	97		18	14.65	16.65	114	132	12.5	14.00	8	13	26	29
95	116	13	8	18.97	18.2	102	110	12.5	11.00	17	13	34	40
107	114	29	14	18.91	18.4	124	118	12.5	12.50	8	10	36	41
126	142	1	3	16.31	16	145	120	12.0	11.50	9	11	33	30
105	110	11	7	17.14	15.39	89	110	13.5	11.00	20	13	31	29
103	118	34	23	14.65	14.52	195	190	11.5	11.50	19	20	41	43
80	82	17	12		18.69	94	79	11.5	13.50	0	2	33	34
90	76	3	59	15.01	16.16	143	140	13.5	16.50	16	12	27	31
96	99	15	12	14.33	13.56	142	158	10.5	9.50	17	14		25
103	95	13	0	14.5	14.71	158	138	10.5	12.00	13	15	27	33
93	97	12	5	15.71	15.26	147	135	10.5	7.00	16	20	33	38

97	93	32	25	16.35	16.64	134	150	11.5	10.00	14	18	32	48
106	94	10	6	15.53	16.5	117	128	12.5	10.50	16	15	38	40
96	91	7	7	15.9	15.4	107	110	12.5	11.50	15	16	34	31
94	100	3	4	16.21	15.28	131	143	11.7	11.00	14	10	35	33
104	99	16	29	15.2	14.75	155	165		11.50	21	22	40	42
110	128	9	0	15.3	14.46	157	170	11.3	10.50	17	15	36	34
117	115	8	4	16.6	16.89	115	115	13.0	10.00		7	41	41
106	110	14	19	15.25	15.35	142	150	14.5	11.00	6	8	31	24
105	89	4	4		13.94		148		8.00	8	15	27	20
99	95	15	17	14.72	15.14	130	150	17.8	9.00	22	19	34	32
96	78	34	17	13.68	15.06	133	162		9.00	11	19	39	38
112	110	9	7	14.3	13.56	192	180	11.3	10.08	23	30	28	25
103	100	14	27	14.6	14.78	142	162	12.0	10.00	26	23	39	40
101	106	7	4	16.25	14.09	129	122	11.6	11.00	14	14	27	27
106	104	7	4		17	112	110	11.2	9.50	7	13		40
87	84	32	32	12.94	13.6	155	179	12.5	9.00	27	28	33	32
99	112	1	0	13.97	15.33	159	152	14.0	8.00	24	24	35	35
84	98	12	2		14.56	133	136	10.6	11.50	11	20	33	31
78	109	32	30	14.53	14.9	121	166	12.5	9.00	6	12	19	23
100	98	10	9	18.53	20.96	95	97	12.5	11.50	12	12	24	26
94	106	18	5	13.72	14.88	113	110	11.3	10.50	15	17	21	23
106	107	6	4		16	119	125	12.0	10.50	10	13		23
100	121	4	2	16.15	17.15	113	108	10.3	11.00	13	14	30	34
101	92	29	23	13	13.83	187	185		9.50	21	22	36	39
110	102	3	0	14.35	14	106	116	10.6	8.00	10	11	21	19
106	102	11	7	13.06	12.46	204	195	11.0	7.50	10	11	43	44
120	126	0	3	15.78	16.72	138	136	11.5	10.00	16	15	23	19
81	94	27	22	17.28	18.07	121	142	5.0	10.50	19	12	38	40
106	106	8	4		15	113	125	11.9	9.00	14	14	45	46
80	82	40	16	15.12	15.84	150	145	14.0	10.00		17		35
120	110	0	0	16.97	16.3	131	135	12.1	10.00	19	22	37	39
99	98	11	7	12.21	12.63	198	202	11.5	6.50	17	21	35	40
86	85	10	13	15.8	14.96	101	110	11.1	7.50	10	15	25	26
113	118	11	9	13.9	14.06	158	160	10.9	11.56	15	17	38	36
99	104	10	7	16.09	16.97	122	134	10.5	6.00	20	18	28	28
113	114	0	2	13.68	13.3	155	178	10.3	9.00	20	25	21	24
122	109	0	0	16.6	17	129	112	12.2	10.91	10	11	35	31
135	122	0	0	17.12	16.28	111	115	11.0	8.84	12	14	21	22
111	122	17	1	18.3	19	101	95	15.4	14.90	7	7	21	21
99	106	13	7	15.64	15.52	153	144	13.5	12.03		9	34	32
68	81	28	20	15.15	14	94	100	11.1	11.50	16	16	34	33
114	146	8	0	14.5	15	158	135	15.6	9.00	23	23	33	40
92	121	9	0	17.6	16	116	130	11.9	12.00	13	15	37	32
106	89	7	11		14.72	150	146	9.9	9.50		10	21	18
120	117	8	5	14.6	19.75	130	150	11.5	9.50	21	17	36	38
128	115	11	5	12.9	12.86	209	200	9.8	8.50	25	29	20	20
122	108	14	1		15		112	12.3	9.00	0	2	19	20

110	115	8	7	12.6	12.9	140	155	9.5	8.50	18	22	28	32
122	90	10	0	16.75	16	119	108	11.4	10.00	5	4	44	45
105	114	2	0	15.35	16.9	123	118	11.2	7.50	10	5	25	23
103	106	2	1	15.46	15	159	145	10.9	9.00	18	13	42	40
109	116	3	0	15.94	15.59	106	120	12.2	9.50	17	17	37	37
82	87	27	22		15.39		135	13.0	12.00	17	19	35	34
101	89	11	10	14.78	14.71	121	155	13.6	12.00	18	20	28	30
85	78	7	1	14.48	15	146	146	10.3	7.00	15	10	26	28
101	118	1	0	14.78	14.81	141	128	12.8	8.50	19	13	29	30
105	95	34	29	18.15	17.63	81	95	11.9	10.00	13	6	16	17
115	101	19	10	16.96	16.53	102	130	13.0	15.44	6	7	24	28
111	106	6	8	15.51	16.14	125	134	12.9	16.51	9	16	32	34
64	63	33	28	18.38	18.77	104	110	12.7	18.02	0	1	33	30
94	101	33	31	17.37	17.5	102	102	12.1	19.27	12	9	31	36
122	112	12	2	15.33	15.27	145	133	11.1	16.91	10	17	31	34
123	133	4	2	17.08	16.13	104	111	10.6	15.38	0	6	39	39
124	132	4	3	17.1	17.52	106	112	15.2	17.00	3	6	42	45
97	107	29	27	15.56	15.09	143	146	12.1	17.00	25	26	27	29
90	82	40	28	14.33	14.53	140	157	11.8	14.10	16	26	26	27
99	97	22	42	16.58	15.76	142	162	12.1	15.50	20	25	35	34
103	108	26	23	17.22	17.94	123	122	9.5	13.57	14	10	35	39
88	108	15	9	15.16	13.71	157	178	7.8	15.44	18	20	20	23
100	70	29	22	17.03	17.21	107	120	15.4	16.22	15	16	25	24
79	88	26	16	18.26	19.12	102	115	12.8	17.20	11	9	33	37
93	96	8	4	18.46	17.82	107	123	11.7	16.03	10	13	31	27
115	100	15	32	15.46	15.25	105	126	12.5	13.71	12	14	32	29
88	94	5	11	16.59	15.71	111	121	14.1	15.50	4	6	26	26
103	100	12	9	15.38	14.63	128	145	7.9	14.33	14	18	25	24
92	94	2	0	17.27	17.68	109	113	12.4	12.25	0	0	31	32
88	88	27	0	16.64	16.88	106	106	13.0	18.94	11	13	33	29
88	79	39	33	16.47	16.51	139	125	13.4	17.50	12	12	20	19
78	94	13	26	15.03	14.53	155	156	12.4	12.11	24	23	36	34
114	86	24	34	16.25	15.51	138	149	14.9	14.40	13	13	34	31
88	89	22	28	16.26	15.69	139	131	10.6	12.56	25	23	31	36
86	94	14	28	15.75	15.4	30	116	12.2	12.00	15	20	38	36
112	118	10	4	15.53	17.95	153	173	6.9	12.98	17	13	33	33
103	104	26	16	16.5	15.03	124	131	9.0	10.50	23	25	37	40
100	103	13	9	19.03	17.45	107	111	10.4	15.04	16	18	37	37
108	85	24	34	18.97	17.77	109	111	12.8	12.48	7	7	36	34
80	83	13	9	15.56	14.7	142	171	14.0	14.94	19	22	38	38
115	107	25	2	17.76	16.91	107	106	12.8	14.52	8	13	35	38
91	101	28	21	15.87	16.06	147	153	11.8	12.57	18	16	38	38
102	94	4	15	15.52	14.14	143	145	10.4	13.61	21	24	33	39
108	89	21	16	17.57	16.09	85	124	11.6	12.52	30	19	33	34
116	117	1	1	14.89	15.13	156	150	9.3	15.96	21	26	30	36
110	102	7	3	15.16	14.39	132	148	8.9	11.31	25	25	37	37
98	95	20	27	18.44	16.72	106	102	13.0	18.38	7	13	23	21

106	101	28	26	16.31	17.27	114	101	13.0	12.28	0	12	31	31
90	100	16	7	16.22	16.71	133	135	11.1	14.43	13	11	30	30
93	105	13	13	15.32	15.2	111	123	12.2	13.98	14	21	26	28
118	120	8	5	16.43	18.02	116	132	9.5	14.93	17	15	25	28
107	100	1	24	14.96	14.96	120	133	17.4		15	17	31	32
109	107	1	1	14.44	13.4	141	148	9.8	11.33	14	22	30	35
91	91	6	10	18.07	19.01	124	118	13.1	14.60	13	8	36	38
105	119	2	4	18.51	18.57	102	104	11.2	17.40	10	7	31	31
90	104	31	21	16.66	17.14	120	108	13.6	13.92	14	19	30	30
107	94		22	15.9	16.58	140	140		14.00	12	20	29	31
130	130	8	23	15.63	14.94	31	161	10.0	16.37	23	25	33	37
102	77	6	36		17.69	111	108	11.5	17.03	20	23	27	25
115	88	17	28	21.18		75	101	15.5		11	10	29	28
123	119	6	5	16.4	16.51	103	120	11.4	14.19	0	4	24	27
96	90	26	17	16.28	17.87	110	117	15.3	16.88	12	15	32	31
117	101	6	7	17.45	15.32	127	137	13.4	14.24	18	16	23	29
99	111	2	28	16.28	16.26	145	139	13.2	13.77	13	10	35	34
117	118	5	5	17	16.28	110	122	15.4	14.72	1	14	25	30
90	107	17	6	17.84	17.33	101	116	13.1	16.32	7	12	27	30
103	114	15	26	16.71	15.97	115	124	12.4	13.68	8	10	23	26
95	93	2	2	15.96	16.31	135	148	16.0	14.78	14	9	26	24
118	123	1	0	15.83	14.59	144	147	7.7	11.17	17	16	38	39
110	104	5	8	16.75	15.44	115	116	8.6	12.20	25	21	32	33
99	83	3	13	19.94	17.77	111	102	19.0	16.46	15	11	30	31
95	88	15	12	18.22	17.52	110	126	14.5	13.42	12	15	15	22
96	101	7	17	15.69	17.7	132	96	9.8	16.65	18	16	37	40
106	92		24	16.33	15.44	107	143	12.8	14.02	13	16	25	31
90	102	0	7	16.52	16.47	137	133	10.8	13.23	20	26	38	41
117	117	8	3	15.08	16.15	164	142	12.8	15.78	29	33	35	33
114	90	32	14	19.6	15.88	101	117	14.4	18.05	10	7	22	26
119	121	4	2	19.08	19	125	104	11.1	18.93	19	20	32	32
82	96	17	34	18.52	18.03	110	113	18.2	15.11	5	9	40	41
123	112	3	1	15.97	15.83	104	118	14.2	14.85	12	12	24	27
83	82	27	21	19.58	19.4	95	101	17.6	11.91	14	9	26	24
95	107	21	11	15.69	16.03	108	116	11.9	15.05	13	18	29	31
127	119	20	28	17.7	17.71	115	101	13.2	13.83	10	12	21	25
112	96	21	30	19.58	18.26	101	105	13.5	13.85	5	1	27	26
123	115	9	6	16.4	18	119	104	17.4	13.79	10	10	34	35
142	145	1	1	15.21	14.64	139	136	12.4	15.06	16	23	24	24
108	100	24	19	15.72	13.77	163	179	13.2	14.08	25	25	24	27
112	94	20	17	16.78	16.94	107	132	13.9	18.21	10	10	30	32
141	145	4	2	15	14.66	126	158	11.4	16.87	16	20	39	37
114	115	13	2	17.65	15	114	101	14.7	13.50	13	7	33	34
88	92	9	24	15.64	14.13	135	147	8.3	13.17	20	20	28	26
88	78	28	31	18.72	18.4	149	142	15.8	14.00	9	9	33	39
107	109	11	2	18.19	17.38	141	142	12.5	13.25	15	17	40	38
83	87	22	18	16.83	15.37	117	146	12.0	14.44	17	22	39	37

114	86	19	36	17.32	16	100	110	9.4	13.05	14	10	42	41
95	94	24	22	17.55	16.87	109	119	9.4	15.53	18	18	38	39
84	101	28	23	16.65	14.71	131	147	7.2	10.94	16	17	31	30
98	95	30	34	18.66	17.78	93	98		16.24	16	15	29	33
81	85	31	37	16.13	15.44	147	133	12.3	16.82	14	18	36	40
84	82	27	18	16.52	18.27	139	140	11.1	11.92	12	15	33	34
80	83	21	20	14.38	14.09	149	170	10.1	11.33	20	20	22	21
111	115	10	17	15.4	14.21	137	150	11.5	11.02	18	22	32	33
101	99	27	28	14.26	14.35	142	152	11.9	15.51	17	20	25	23
120	128	7	7	12.15	12.94	178	202	11.1	9.96	22	26	33	35
108	91	8	0	14.59	13.94	128	145	12.3	10.56	20	22	28	28
129	126	6	3	15.53	15.5	143	144	10.1	9.93	21	25	31	35
94	110	12	9	14.88	15.72	111	150	11.7	11.56	18	20	30	27
106	113	5	6	14.19	14.15	135	150	12.7	11.61	19	20	41	41
112	111	10	1	13.78	12.75	135	142	11.0	9.26	22	25	21	27
92	92	26	0	14.75	14.58	140	150	11.8	10.63	25	27	31	31
117	109	18	10	14.59	15.3	122	142	10.9	10.52	21	20	31	35
82	83	15	7	16.66	17.09	107	110	10.5	10.76	12	15	43	48
97	96	9	41	15.19	15.84	121	126	13.1	10.67	19	20	30	31
93	102	27	17	13.88	13.8	121	143	12.3	10.35	20	21	28	30
90	90	40	30	15.15	17.86	149	121	13.7	11.93	14	12	17	20
95	100	23	10	15.21	15.28	121	136	11.8	10.39	17	19	22	27
89	119	37	4	15.14	16	112	110	13.2	11.98	22	20	23	20
107	106	17	17	15.28	15.03	118	147	10.9	9.54	13	13	30	34
98	90	28	24	15.58	15.5	141	138	11.7	10.54	17	17	33	33
92	98	28	22	12.77	13.33	104	216	5.1	10.58	28	28	36	40
107	88	25	0	18.5	17	119	118	13.4	12.22	16	17	34	37
105	108	14	9	13.34	12.96	142	171	11.5	10.23	27	25	40	40
102	93	16	29	13.13	13.42	159	154	12.0	9.79	23	24	20	22
106	95	30	14	15.41	15.12	126	110	11.1	10.21	19	15	29	35
96	89	25	34	15.26	14.68	162	170	11.6	11.46	17	17	40	41
98	103	12	9	15.32	15.68	124	128	9.8	9.15	20	18	41	40
87	99	10	3	14.38	13.97	190	176	9.0	9.01	25	19	31	31
94	109	15	0	13.46	13.64	186	180	11.4	9.76	21	22	31	28
90	95	6	6	17.34	18.25	104	110	11.1	11.23	17	10	43	44
88	90	17	33	16.12	13.84	141	181	10.0	9.96	21	28	42	45
99	95	25	20	13.28	13.28	164	182	11.5	9.44	24	28	35	38
93	95	31	25	14.5	15.12	125	148	10.9	10.54	12	16	25	32
88	106	12	0	16.3	15.94	119	112	15.4	11.55	15	16	26	32
142	138	2	0	14.4	15.35	194	204	11.3	9.05	21	21	41	42
117	123	9	9	13.91	13.84	120	138	11.0	11.83	23	23	22	26
89	90	22	12	15.21	13.84	130	152	12.0	11.71	17	12	41	33
94	87	40	31	13.95	14.35	148	151	11.2	10.77	17	22	26	32
107	102	8	1	16.64	16.28	134	142	11.5	12.82	18	10	34	37
105	117	25	10	13.6	14.12	197	186	11.6	10.57	22	23	40	43
106	121	23	3	13.39	13.25	186	186	10.9	9.25	26	29	32	31
122	121	3	0	15.32	14.94	116	127	13.3	11.63	11	10	27	32

107	121	27	1	17.63	19.9	121	112	12.4	11.43	15	13	34	32
93	96	34	21	13.72	13.38	157	172	12.9	10.28	20	20	26	23
108	94	15	12	16.65	14.75	128	163	11.9	10.71	11	12	34	37
130	120	3	0	16.48	16.15	120	126	14.5	11.58	15	17	46	47
89	88	18	27	13.56	14.42	173	168	13.0	11.77	29	28	29	30
106	106	7	5	13.14	14.15	156	150	12.1	11.11	21	20	22	24
90	86	15	11		16.97		107		9.69		19		44
115	117	2	1	17.53	17.5	111	100	15.4	14.87	10	17	33	35
83	92	27	23	14.4	14.9	117	140	12.0	11.47	16	20	31	32
80	68	32	18	17.97	16.05	103	110	11.4	11.13	11	19	36	35
101	101	10	4	16.76	15.86	120	129	10.6	11.11	17	20	36	40
113	101	15	13	15.26	14.33	154	154	12.0	11.06	5	16	30	34
80	85	14	11	14.14	15.25	148	160	11.1	9.72	20	22	20	24
83	89	18	16	15.43	16	121	138	12.0	10.13	19	15	26	28
100	125	28	25	12.35	13	164	170	15.4	9.82	18	20	30	35
109	110	15	13	12.69	13.75	151	161	15.1	10.36	20	23	34	37
98	130	14	2	13.4	12.28	179	155	10.7	10.28	21	25	34	37
75	102	29	8	15.38	19.5	124	152	10.7	11.86	5	16	30	31
101	111	2	2	19.2	19.5		104	13.8	12.73	13	15	38	33
102	96	30	23	13.75	15.03	142	152	12.8	9.80	26	28	41	39
108	80	7	27	17.51	20.15	121	138	11.3	12.97	20	18	33	37
113	112	3	3	18.56	17.33	123	118	11.6	11.46	11	15	40	41
96	105	13	12	12.89	14.21	163	176	12.6	9.87	23	26	43	43
98	92	7	9	15.22	15.86	139	138	13.2	11.26	20	18	33	30
82	81.5	7	1	12.34	13.03	177	190	10.2	9.47	22	26	24	21
85	86	51	42	13.77	14.56	142	142	13.2	10.23	13	17	30	34
122	128	0	0	14.52	15.8	126	115	11.8	11.25	23	21	26	23
126	96	0	0	13.65	16.56	133	112	13.8	11.77	24	30	29	30
105	114	9	3	14.25	15.33	133	150	10.7	9.74	13	18	18	23
120	123	4	0	14.94	15.58	126	128	12.1	12.16	18	20	37	39
89	93	31	26	14.02	14.12	186	180	11.9	11.87	29	30	35	35
111	117	13	11	13.34	13.18	199	218	9.1	8.10	23	22	24	28
96	90	28	25	16.08	17.09	115	108	12.8	12.26	17	16	31	37
114	109	8	4	17.58	16.56	104	112	10.4	11.15	13	17	17	14
90	97	26	3	15.57	16.28	102	121	11.2	15.10	13	15	36	41
113	112	1	2	15.62	15.58	126	112	11.9	11.89	15	16	25	28
94	87	31	29	18.25	16.22	129	111	15.5	16.73	16	10	22	26
111	124	3	0	16.58	17.82	116	130	17.5	14.30	5	6	29	35
117	122	0	0	17.18	17.08	107	116	11.0	11.98	17	17	38	35
107	108	6	20	16.09	16.53	137	130	12.5	12.09	18	13	39	38
123	120	1	1	16.02	15.84	148	114	13.9	11.74	18	21	34	37
88	88	32	24	15.5	14.82	123	125	12.5	12.64	15	15	38	35
81	111	33	28	15.44	15.94	163	150	14.5	13.84	20	17	22	26
82	83	27	20	18.03	18.14	133	115	13.0	13.85	15	17	30	26
131	134	6	5	15.41	15.58	120	115	13.5	12.11	12	7	34	34
94	108	31	27	19.07	19.89	111	106	15.0	13.97	2	1	30	25
122	131	4	4	16.01	16.63	125	135	12.5	13.50	23	19	21	37

112	108	15	27	16.15	16	102	114	14.5	12.51	4	4	31	30
100	80	7	31	17.76	18.38	117	120	14.5	13.90	16	16	36	35
107	109	7	7	15.34	15.09	133	136	13.0	11.25	13	22	37	39
110	113	6	8	22.52	19.35	107	108	14.0	12.98	9	12		
107	108	16	15	15.47	15.78	122	114	16.5	14.00	21	26	27	26
105	114	3	6	13.94	13.84	182	165	14.3	14.11	17	16	27	32
106	112	12	9	13.46	14.12	166	166	10.3	10.14	24	31	35	37
101	94	26	20	15.21	14.82	115	148	15.2	12.84	23	25	30	28
88	91	17	14	18.33	18.38	110	103	13.0	13.79	8	9	27	39
98	95	30	13	14.69	15.41	142	139	13.4	14.18	18	17	31	30
109	109	12	5	18.87	18.21	107	103	10.8	11.45	2	5	30	28
114	105	8	26	16.15	15.02	147	146	14.1	14.08	21	24	36	34
102	92	4	26	18	17.06	114	119	13.0	13.23	5	1	26	23
99	96	9	5	17.78	17.9	124	120	14.3	14.96	21	15	25	34
120	132	9	3	16.22	15.02	137	135	12.9	13.30	20	24	31	29
103	106	7	2	16.22	15.9	150	143	12.8	9.96	13	14	28	32
116	91	7	28	16.97	17.91	119	102	13.5	13.33	13	9	26	21
84	87	32	24	15.25	15.53	150	139	12.5	12.12	13	7	33	31
83	90	17	13	17.21	17.34	88	107	12.2	12.67	16	14	31	33
102	100	13	10	17.08	17.53	117	102	12.2	13.38	8	10		29
99	104	13	7	14.27	14.71	168	157	10.0	11.73	26	25	37	38
108	117	11	7	16.39	14.4	115	135	12.8	11.02	12	9	15	17
125	120	4	0	18.25	17.64	115	113	12.8	12.51	16	13	33	33
104	106	45	35	14.53	15	174	175	15.7	13.67	14	20	43	43
102	107	31	23	18.96	18.45	184	194	15.8	15.66	4	3	41	41
83	76	18	28	20.33	20.51	194	197	11.5	13.80	12	15	28	33
100	97	35	24	15.51	15.33	122	122	13.4	13.34	18	20	45	47
99	90.5	1	16	16.15	16.8	144	144	12.5	12.77	15	13	20	22
97	102	12	5	16.46	15.65	131	128	11.9	10.86	16	20	33	36
101	91	8	2	14.01	14.03	168	180	10.3	12.75	17	20	33	33
124	95	15	31	16.2	15.5	155	146	11.9	10.93	11	5	24	20
100	90	36	25	15.9	15.41	134	142	13.5	13.90	24	33	29	29
118	89	31	13	16.58	18.46	121	113	11.0	12.15	11	16	33	33
124	145	0	0	16.38	17.18	120	121	11.0	13.31	15	19	22	20
83	109	18	15	16.26	17.9	137	136	15.0	10.74	19	16	41	40
94	103	23	31	17.25	16.56	113	110	12.5	12.66	16	17	27	29
96	114	10	6	15.06	15.03	152	133	13.5	11.99	14	18	36	38
102	103	11	10	16.82	15.69	107	112	12.4	11.31	11	13	26	26
92	95	3	3	15.56	15.81	141	137	12.9	12.55	5	16	18	25
101	99	9	0	18.02	13.84	109	165	15.0	12.66	10	13	27	25
94	89	20	36	16.6	15.86	144	181	14.2	12.04	15	17	33	36
96	87	0	3	16.44	16	125	117	13.5	15.00	6	16	37	25
128	91	4	12	15.21	16.8	148	101	12.6	12.33	19	12	29	30
130	82	3	15	16.77	16.4	120	112	13.0	12.80	16	17	38	42
94	103	13	25	16.31	17.03	124	117	12.2	12.60	7	9	28	40
88	96	30	30	18.66	17.42	141	129	15.5	15.14	3	6	32	31
106	91	6	1	14.93	16.72	124	123	11.3	10.96	14	18	39	39

76	76	21	26	16.27	17.56	121	113	15.5	17.36	6	8	22	20
138	88	4	23	17.66	17.5	128	120	15.5	14.99	17	14	32	32
92	107	4	5	15.46	14.6	163	163	13.0	12.91	23	23	20	28
118	117	3	2	16.78	17.33	116	124	13.0	12.94	17	20	39	25
105	120	4	5	19.26		192		14.0		1		27	26
105	105	7	4	16.13	15.53	128	124	12.2	13.52	16	16	32	32
104	86	6	20	17.21	18.53	133	138	16.0	13.16	11	10	30	30
105	102	5	11	17	16.56	138	130	15.5		17	18	30	37
76	91	28	18	16.08	16.02	125	121	13.0	12.53	13	16	40	40
97	101	15	6	14.81	13.56	142	166	11.4	11.24	14	20	28	28
92	89	22	31	14	14.2	151	169	11.0	11.21	20	21	25	26
127	122	13	8	15.93	15.18	116	120	12.0	11.73	14	14	26	28
101	106	7	6	18.01	17.42	110	103	11.5	13.90	17	15	30	28
106	100	29	24	14.97	15.27	160	145	15.1	10.77	21	18	35	35
106	122	0	1	18.44	17.4	112	105	15.0	12.33	18	17	38	41
98	76	22	0	17.3	16.5	109	121	20.5	16.43	9	12	31	28
98	115	8	6	17.64	16.86	125	119	13.5	12.69	15	12	19	23
76	75	12	18	17.13	17.12	120	125	14.0	13.23	5	9	32	30
102	100	19	24	14.63	15.09	125	119	16.0	12.72	15	9	29	30
94	100	15	3	15.76	16.03	128	122	13.5	14.15	17	21	33	34
92	103	30	21	16.59	15.76	102	102	14.5	15.52	6	8	33	35
106	107	15	6	14.64	15.59	154	141	10.0	12.71	18	20	31	32
99	90	23	29	14.96	14.15	170	167	13.0	13.04	17	13	38	40
103	98	3	3	17.77	18.4	114	114	13.5	14.41	4		30	28
113	113	8	4	14.82	14.97	151	134	13.5	11.75	18	19	34	35
125	133	2	0	18.81	20.06	101	115	15.5	13.13	10	13	28	30
99	92	17	25	17.03	18.58	142	136	16.0	16.45	10	14	17	17
99	109	16	7	16.76	15.7	124	131	15.0	12.83	12	16	31	32
93	88	23	20	18.19	19.22	104	101	15.5	16.78	0	8	36	36
106	90	9	28	13.69	13.42	165	166	12.4	11.97	22	21	23	22
85	81	25	0	16.87	17.8	105	100	14.7	14.01	14	14	28	28
143	150	9	1	17.16	15.09	107	126	9.5	11.75	21	33	27	27
126	135	3	0	17.2	18.13	127	118	11.9	10.33	18	19	39	43
98	103	8	5	17.44	16.77	124	127	14.3	13.67	3	11	37	40
81	89	29	25	18.06	20.03	103	102	16.3	15.84	13	18	19	21
126	93	6	20	17.2	17.9	146	125	16.6	11.38	11	10	25	20
92	76	34	28	19.41	20.97	110	115	20.0	13.40	7	10	39	36
136	142	0	2	15.46	15.38	146	131	12.5	10.59	24	26	30	35
139	112	39	10	13.91	14	92	103	13.1	9.26	29	34	39	37
106	85	16	4	16.77	17.33	121	118	15.5	15.20	11	16	35	33
91	81	20	14	18.58	19.68	98	103	14.0	14.31	11	7	20	26
90	91	10	3	16.45	16.86	127	124	15.0	14.86	15	15	19	16
113	120	18	15	15.22	15.28	145	129	11.0	13.32	20	23	41	36
93	89	28	25	17.44	17.3	137	133	7.6	13.25	20	23	35	30
101	84	16	12	18.65	20.6	106	102	17.0	14.22	9	5	31	27
121	127	3	3	14.33	13.51	144	146	11.2	11.29	21	29	36	32
109	108	5	4	17.7	16.97	126	112	13.6	14.66	7	10	29	30

109	103	11	5	16.15	16.64	128	137	15.2	11.60	24	19	28	29
101	94	5	3	15.5	17.2	122	118	11.9	12.26	16	23	15	21
114	111	18	11	15.81	16.78	133	131	16.2	15.78	9	17	36	39
99	103	14	12	19.39	20.84	92	101	10.5	14.16	10	10	26	36
110	118	6	1	16.64	16.5	116	110	10.7	11.21	16	13	36	39
90	120	27	12	15.22	15.64	170	176	16.0	13.25	20	21	38	32
122	88	6	30	17.7	17.59	120	106	11.0	12.66	11	13	30	30
93	90	27	23	14.35	14.15	165	164	8.9	9.45	30	31	36	33
104	94	30	27	13.72	15	139	176	9.3	9.44	22	23	27	24
101	92	8	9	14.12	13.02	172	189	12.1	11.44	18	20	42	44
106	112	12	11	14.6	14.19	150	144	10.4	10.55	17	23	39	37
110	114	1	1	17.28	16.01	100	128	13.6	10.56	16	21	37	41
99	77	11	19	18.38	18.59	98	106	20.3	17.75	10	12	26	30
98	107	16	2	15.6	15.39	118	118	12.9	11.25	18	18	26	25
115	105	7	0	15.38	15.8	103	117	12.4	10.72	18	19	29	31
115	118	4	0	14.84	14.44	177	170	13.0	12.29	15	25	16	17
117	102	27	22	18.38	16	100	113	15.2	12.97	10	12	19	27
87	96	32	26	13.18	12.83	186	191	12.2	10.76	19	23	24	29
91	91	6	2	17.38	17.82	98	95	13.3	12.04	6		38	37
97	95	11	8	16.97	15.45	131	135	13.0	10.90	14	17	21	33
108	96	13	10	14.56	13	157	150	13.6	11.45	20	24	32	38
98	96	34	29	15.15	15.38	143	163	14.1	11.50	21	24	34	34
104	99	2	2	16.12	15.27	134	128	10.9	9.38	12	18	36	34
110	113	3	2	17.28	16.07	107	113	15.6	12.93	10	19	37	36
94	96	31	33	13.53	12.91	180	170	9.9	8.65	26	30	32	28
99	69	35	29	14.94	14.84	158	164	12.6	11.08	20	19	22	24
96	93	6	1	15.75	15.56	112	110	11.8	10.61	20	23	38	37
96	90	28	30	16.35	17.44	135	128	13.6	13.72	15	22	25	31
124	123	2	1	13.9	14.01	193	180	13.9	10.77	20	27	40	40
85	91	3	3	20.25	21.71	72	100	13.8	11.10	10	14	29	29
109	113	11	9	16.68	16.96	116	119	12.6	10.67	16	20	39	25
84	91	38	9	16.58	16.4	103	118	12.0	10.08	4	19	39	30
108	125	10	8	19.46	19.4	122	125	13.9	11.70	4	21	22	32
101	103	14	10	15.78	16.19	117	120	11.6	10.64	17	24	19	17
121	108	17	12	14.64	13.4	161	184	13.1	10.48	13	21	22	33
97	75	19	24	17.6	16.9	111	110	15.4	13.21	14	19	20	19
106	99	14	6	14.33	14.76	161	168	13.3	13.67	21	17	24	28
81	103	23	40	15.5	16.13	121	117	10.4	8.87	12	20	19	18
102	110	12	12	13.5	12.96	177	170	13.7	11.31	21	26	42	47
104	93	13	30	14.46	13.2	164	198	12.1	10.68	15	25	44	51
102	112	16	8	16.35	15.78	125	127	12.6	10.62	7	15	49	43
119	125	21	19	14.5	14.33	154	145	11.5	10.83	25	30	28	30
85	85	30	22	16.64	16.27	115	130	13.1	13.60	7	21	29	32
100	99	18	13	18.8	16.16	104	128	13.2	10.07	13	16	37	33
102	112	7	33	14.64	14.09	137	176	12.0	9.27	17	24	40	33
93	89	7	7	17.84	18.22	115	101	14.0	12.89	8	18	40	34
107	101	13	23	13.33	13.71	161	185	9.9	9.39	24	29	41	44

95	106	20	18	14.06	13.88	161	165	14.3	11.84	22	24	20	20
131	143	1	3	14.42	13.2	181	207	9.0	8.42	22	29	39	34
116	118	7	0	18.12	16.06	97	114	12.6	10.18	11	20	24	29
104	102	20	16	15.6	15.62	123	137	11.8	10.02	21	24	27	32
93	101	9	4	14.94	14.46	124	172	11.8	10.04	19	28	19	26
122	138	3	1	14.12	14.33	195	188	9.8	9.90	24	27	34	33
86	81	15	24	14.3	14.64	152	170	12.2	11.19	21	24	21	20
96	84	10	4	14.9	13.63	178	180	14.3	12.09	20	19	27	26
109	107	6	0	15.9	14.65	135	164	11.6	9.56	25	28	38	36
99	104	24	19	17.53	17.27	100	115	19.2	18.20	13	18	38	36
108	115	10	4	16.53	15.25	124	114	13.9	11.45	18	25	39	39
86	90	35	6	17.8	18.19	107	101	13.5	12.02	8	15	30	30
119	88	2	10	14.6	14.39	130	148	13.5	13.31	23	20	37	38
86	90	35	5	17.72	18.03	92	102	12.9	11.36	10	15	41	41
112	113	3	1	17.58	16.85	117	111	13.1	11.19	17	19	50	48
119	112	11	10	14.9	14.71	162	172	10.3	10.19	12	14	18	26
96	95	9	27	13.8	13.43	164	168	11.1	10.32	22	27	40	44
93	92	10	12	17.72	16.71	90	120	13.6	15.77	16	21	26	35
105	100	4	0	17.75	17	121	33	13.9	11.72	16	17	40	33
104	112	4	4	17.9	17.7	95	102	12.8	12.13	11	18	34	38
111	109	4	3	14.21	13.96	146	180	12.9	11.35	20	27	30	33
110	116	14	13	15.64	14.76	146	170	12.3	11.85	17	19	30	29
115	104	5	8	14.5	15.57	147	140	11.9	12.10	23	22	33	35
99	106	12	2	14.84	14.08	166	166	10.4	12.53	25	25	33	35
113	89	12	0	15.8	16.71	135	112	12.8	12.63	13	17	25	25
77	86	13	1	16.35	15.37	140	145	12.3	12.11	13	17	25	21
106	108	38	5	14.58	13.75	160	190	11.7	9.50	23	28	34	40
85	100	5	3	14.98	14.64	141	157	12.6	10.77	11	22	23	20
92	89	27	21	18.33	17.43	100	104	14.3	12.39	12	17	40	34
97	93	14	7	14.15	14.32	145	143	11.5	10.49	20	22	37	32
105	107	36	22	15.64	14.09	139	161	11.4	10.14	20	20	32	32
85	110	32	15	17.06	15.96	120	154	11.5	10.85	14	21	28	26
96	122	16	0	16.78	15.89	127	135	12.2	11.70	14	21	35	33
100	100	19	3	17.03	15.57	123	150	13.3	10.53	14	16	40	40
95	102	5	3	15.58	14.7	135	122	11.0	9.88	17	20	25	25
127	120	7	4	17.21	16.76	110	112	11.5	10.66	9	24	37	40
104	107	4	0	16.03	16.4	145	152	12.6	11.02	11	15	34	34
105	102	10	8	15.12	15.7	113	134	14.4	14.17	20	25	29	31
94	87	37	27	13.33	12.69	172	120	10.1	12.25	17	23	50	55
98	107	27	24	16.84	16.64	127	115	11.7	10.90	11	27	22	22
89	93	16	11	17.38	15.94	103	127	12.7	11.35	13	16	41	42
92	99	25	32	17.33	16.97	100	103	13.3	12.96	12	19	31	26
100	102	13	2	16.38	16	114	127	11.5	11.79	16	21	23	18

APPENDIX - X

PUBLICATIONS

LIST OF PUBLICATIONS FROM THIS DOCTORAL WORK:

S. No.	<i>Title of the Manuscripts published/accepted</i>	<i>Name of Journal</i>	<i>Indexing data base</i>
1	Effect of Residential Yoga Camp on Psychological Fitness of Adolescents: A Cohort Study Astha Choukse, Amritanshu Ram, H R Nagendra	Journal of Clinical and Diagnostic Research (JCDR)	SCOPUS, Directory of Open Access Journals(DOAJ), Google Scholar, Index Copernicus
2	Effect of Residential Integrated Yoga on Physical Fitness of Adolescents using EUROFIT battery Astha Choukse, Amritanshu Ram, H R Nagendra	International Journal of Adapted Physical Education & Yoga (IJAPEY)	Scientific Indexing Services (SIS), UGC, Open access journal
3	Effect of Residential Yoga Camp on Psychosocial Fitness of Adolescents Astha Choukse, Amritanshu Ram, H R Nagendra	International Journal of Yoga (IJOY)	DOAJ, Index Copernicus, Indian Science Abstracts, PubMed Central

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Effect of Residential Yoga Camp on Psychological Fitness of Adolescents: A Cohort Study

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ABSTRACT

Introduction: Discovering and promoting ways that improve adolescents' psychological fitness has been a recurrent concern in the field of health and psychology. Adolescence, as a period of transition, is highly prone to have mental health risks and unhealthy behaviour patterns. Thus, it is the right time to promote healthy practices to prevent problems of health and behaviour in adulthood. As Yoga provides practical solutions for mental health, we anticipated that exposure to it should improve psychological fitness among adolescents.

Aim: To evaluate the effectiveness of short term residential yoga intervention on psychological constructs in adolescents.

Materials and Methods: A pre, post-yoga interventional study was carried out in a 10 day residential camp. Three independent cohorts of adolescents from India, in three batches (1, 2 and 3), with sample size of 148 (87 boys and 61 girls), 167 (122 boys and 45 girls) and 195 (121 boys and 74 girls), respectively were examined. A holistic integrated yoga module with eight hours of

yoga sessions per day was given as an intervention. Emotional Intelligence (EI), emotional regulation strategies, Clinical anger and self-concept parameters were studied using psychometric scales like Schutte Emotional Intelligence Scale (SEIS), Cognitive Emotion Regulation Questionnaire (CERQ-short), Clinical Anger Scale (CAS) and Self-concept Scale respectively. Authorised scales and software were used for assessments and analyses.

Results: Significant ($p < 0.05$) improvements in EI, emotional regulation and anger management were observed in all the three batches. However, no significant improvement was found in self-concept in either of the cohorts. The observation of the results of assessed outcome measures in all the three batches confirms the positive effect of Yoga intervention on psychological fitness. The pattern of changes was consistent across all three batches.

Conclusion: Residential Yoga camp improves the psychological fitness among adolescents. Even short term courses are effective and induce positive behavioural signatures.

Keywords: Anger, Emotional intelligence, Emotional regulation, Self-concept

INTRODUCTION

According to World Health Organisation, 1.2 billion of the world population is between the age of 10 and 19 years and are classified as adolescents [1]. This group of individuals are undergoing a stage of distinct and formative biological, physiological and social transition [2].

Especially in low and middle-income countries, many psychological and substance-use disorders reach a peak in this stressful time span of adolescence [3]. According to National Survey on Child and Adolescent Well-being (NSCAW II) in USA, high rates of mental health problems are seen in teens of all ages [4], increasing health problems among young adults [5]. Academic pressures, peer pressure, problems with bullying, addiction to social media has serious implications for mental and physical well-being of adolescents, leading to impaired performance and may contribute to the overall growth retention [6-8]. Improving the transition during adolescence is one of the priority areas to enhance health care for young adults [9].

Adolescence is the best time for teaching strategies of self-control and self-regulation [3]. It is also a phase that is more amenable to learning and more receptive to corrective changes if provided by intervention programs to improve their mental health.

Yoga as holistic intervention in which each pupil can find his/her unique trajectory of change and improvement is now considered as an important intervention for promoting psychological health [10]. Yoga shows a reduction in anxiety, depression, psychological distress in high risk adolescents [11]. Studies also report positive

correlation of yoga with self-concept and well-being in adolescents [12,13]. Residential yoga program for young adults has shown positive effects on perceived stress and quality of life [14]. Meditation sessions in schools have beneficial effects across physiological, psychosocial, and behavioural outcomes [15]. Additional studies of school-based yoga interventions also suggest positive effects of yoga on several factors such as concentration, attention, mood, anxiety, working memory, anger and self-esteem [16-21]. Many reviews suggests that yoga is generally effective at improving physical and mental health in children and adolescents [22-25].

In the available yoga research studies on adolescents, the yoga intervention of 3-4 months duration is used in the school setting as part of curriculum or before/after school hours with yoga sessions ranging from 2 to 3 hours per week for a homogeneous sample. Most of them were conducted with special education, high-risk samples, and small sample size. According to a literature review, residential yoga intervention studies are very few [26].

An important research question in this area relates to whether yoga offers any benefits for student psychological fitness in a setting different than school setting. Thus, the present study is to explore effect of short term residential yoga intervention program on psychological fitness of adolescents. An objective was also to examine the effects of residential yoga on psychological fitness across different age groups. The present study is a part of a mega study to assess overall fitness among adolescents registered in the Clinical Trials Registry of India bearing the trail number CTRI/2018/02/011709.

MATERIALS AND METHODS

Design: It is a pre-post yoga interventional study carried out in a residential setting (Residential Yoga Camp for high school children). Three independent cohorts (Batch 1, 2 and 3) of adolescents underwent yoga intervention program in the same setting with same guidelines as consecutive studies during April 1-10 (batch 1), April 11-20 (Batch 2) and April 21-30 (Batch 3) in year 2016. The duration of the study was 10 days with 8 hours per day of classroom yoga sessions. All other components were kept consistent and similar as far as possible like teachers, living conditions, daily routine and dietary plan. This study was conducted in the campus of Swami Vivekananda Yoga Anusandhana Samsthana (SVYASA) Yoga University, Bengaluru, India.

Participants: The participants of the study included adolescent children studying in English Medium Schools who registered for a yoga camp in summer holidays. Healthy adolescents of both genders, between the age of 9 and 16 years participated in the study. The participants were divided into three batches depending on the registration. Batch wise sample size was 148 (87 boys and 61 girls), 167 (122 boys and 45 girls) and 195 (121 boys and 74 girls) in batch 1, 2, and 3 respectively. Since, the Age range 9-16 is wide considering the rapid changes during adolescents, the participants were divided into juniors (9-12 years) and seniors (13-16 years) to evaluate changes. Age wise sample were (93 juniors and 55 seniors), (90 juniors and 77 seniors) and (112 juniors and 83 seniors) in batch 1, 2 and 3 respectively.

They were further randomly divided into smaller groups of 12-15 participants which made it easy to implement the intervention. Each smaller group was supervised by two teachers for better monitoring. All teachers have bachelor degree in yoga and were trained on the implementation of the intervention to ensure uniformity.

Since, the study was conducted as a yoga camp during summer holidays, the sample was heterogeneous representative sample in nature with subjects from different family backgrounds, socio-economic status, cultures and traditions, faiths and different academic status (school boards such as state, ICSC, CBSE etc.), Subjects with single parents, acute or chronic health problems, on medication, having attended any residential yoga program in the last three months were excluded.

Ethical approval was obtained from the Institutional Ethical Committee of S-VYASA with reference number RES/IEC-SVYASA/64/2015. A signed informed consent from parents and a signed informed assent from all participants were obtained after explaining the study in detail prior to screening.

Intervention: The modified version of Integrated Yoga Module (IYM), based on Pancha kosha model (five layers of existence) as explained in Taittiriya Upanishad, comprised of yogic techniques that benefit each of the koshas (Gross body-Annamaya Kosha, Energy body - Pranamaya Kosha, Emotional Body - Manomaya Kosha, Intellectual Body - Vijnanamaya Kosha and Bliss Body-Anandamaya Kosha). The module was designed referring to various yogic texts on yoga for children and in consultation with subject experts. The module was specially designed for the retreat with suitably modified yogic techniques to address the needs of psychological health development.

The yoga module included Asana, Pranayama, Relaxation, Meditation and also Jnana Yoga (yama niyama concepts) and Bhakti Yoga (prayers and chantings). The bhakti yoga sessions included chanting and singing while jnana yoga sessions included lectures, creativity like role-playing, story-telling, parables, journaling-diary entry etc., to drive yama niyama concepts and yogic concept of food. Few friendly competitions were kept between groups to encourage participation and team building.

The 8 hour class room yoga sessions consisted of roughly 2 hours of Asana practices, 2 hours of Jnana Yoga sessions, 1 hour each

of Pranayama (breathing exercises coupled with body movements), Meditation, Relaxation and Bhakti Yoga. The sessions were designed with a mix of events to make the program interesting. Detailed schedule is given below in [Table/Fig-1].

Time	Session	Details
5am	-	Wake Up
5:30am to 5:45am	Session 1	Morning prayer
5:45am to 6:45am	Session 2	Asana practice (physical postures)
6:45am to 7:30am	Session 3	Meditation (om meditation, cyclic meditation)
7:30am to 8:15am	-	Breakfast
8:15am to 9.00am	Session 4	Social works (altruistic group activities)
9.00am to 10:00 am	-	Bath and wash
10:00am to 11:00am	Session 5	Lectures on concepts of Yoga (yama niyama concepts)
11:00am to 12:00pm	Session 6	Pranayama practice
12:00pm to 1:00pm	-	Lunch
1:00pm to 2:00pm	Session 7	Relaxation (Deep relaxation technique, Quick relaxation technique, Instant relaxation technique)
2:00pm to 3:30pm	Session 8	Indoor activities (parables, creativity, chanting)
3:30pm to 4:30pm	Session 9	Asana practice
4:30pm to 5.00pm	-	Evening tea, snacks
5.00pm to 6:15pm	-	Free time
6:15pm to 7:15pm	-	Dinner
7:15pm to 8:30pm	Session 10	Happy assembly
8:30pm to 9.00pm	Session 11	Tranquilling pranayama and meditation
9.00pm to 9.15pm	-	Milk, snacks
9.15pm to 9:30pm	Session 12	Diary writing
9:30pm	-	Sleep

[Table/Fig-1]: Daily schedule of intervention.

Assessment: Assessment of psychological fitness parameters were done using following psychometric tools:

- Schutte Emotional Intelligence Scale (SEIS): This self-reported scale is based on Salovey and Mayer's (1990) original model of EI. This is a 33-item scale with test-retest reliability of 0.78 for total scale scores. Each item has a 5-point Likert's rating from 1 (strongly disagree) to 5 (strongly agree). Some item has reverse coding. The total score ranges between 33 to 165, high score indicates more characteristic EI [27].
- Cognitive Emotion Regulation Questionnaire (CERQ-short): This 18 item self-report questionnaire comprises of nine domains (Self-blame, Other-blame, Rumination, Catastrophising, Positive refocusing, Refocus on planning, Positive reappraisal, Putting into perspective and Acceptance) independent from one another. Each item has a 5-point Likert's rating from 1 (almost never) to 5 (almost always). Each domain has different scoring, high score represents often used of cognitive coping strategy. Cronbach's alpha reliability coefficient ranged from 0.73 to 0.81 [28].
- Clinical anger Scale (CAS): This 21 item scale is designed to measure different symptoms of clinical anger. Each item has a 4-point Likert's rating from 0 (I feel fine) to 3 (I feel completely miserable). The total score ranges between 0 to 63, high score represents high clinical anger. This scale has reliability coefficients of 0.94 (males and females together) [29].
- Self-Concept: This 30 item self-report scale comprises of five domains that make up an adolescent's self-concept: 1) Athletic Competence; 2) Conduct/Morality; 3) Peer Acceptance; 4) Physical Appearance; 5) Scholastic Competence. Each item has a 5-point rating from 1 (strongly disagree) to 5 (strongly agree).

agree). Some item has reverse coding. High score indicates positive self-concept [30].

Socio-Demography Measures: Children and parents completed a short demographic questionnaire in order to obtain descriptive data for the sample. Screening sheet was filled by parents and children. Variables included are age group, gender, handedness, family type, sibling hierarchy, father's age, mother's age etc.

Data collection was done on the first (pre-data) and last day (post-data) of the program, in small group settings by trained staff. The investigator and two teachers were available to clear doubts and provide unbiased guidance during the data collection.

STATISTICAL ANALYSIS

To maintain the confidentiality, the data sheets were coded and names and other personal identifiers were omitted during data entry. Analysis was done using SPSS (Version 19.0). Change over time was evaluated using the paired sample t-test. The results of the tests were deemed to be significant if probability values were less than 0.05 whereas trends ($p < 0.1$) have also been highlighted.

RESULTS

The recruited study sample included adolescents with a mean age of 11.84 ± 1.77 , 12.22 ± 1.82 and 12.06 ± 1.82 in Batches 1, 2 and 3 respectively. Gender ratio in Batch 1 of 148 {87 (58.78%) boys and 61 (41.22%) girls}, Batch 2 of 167 {122 (73.05%) boys and 45 (26.94%) girls} and Batch 3 of 195 {121 (62.05%) boys and 74 (37.94%) girls}. All three batches were evaluated for the effects of a ten day holistic IYM on SEIS, CERQ-short-form, CAS and Self-Concept scale.

In the present study, overall scores of SEIS in Batch 1 (123.59 to 129.86 with $p < 0.001$), Batch 2 (122.27 to 126.04 with $p = 0.002$) and Batch 3 (123.63 to 126.15 with $p = 0.032$) increased significantly in all three batches. Scores of CERQ kids in Batch 1 (51.83 to 57.11 with $p < 0.001$), Batch 2 (55.79 to 60.10 with $p < 0.001$) and Batch

3 (54.15 to 58.62 with $p < 0.001$) increased significantly in all three batches. Self-Concept has not shown significant change in any of the batches. Significant decrease was seen in the scores of CAS in Batch 1 (13.59 to 10.94 with $p < 0.001$), Batch 2 (16.23 to 14.09 with $p = 0.008$) and Batch 3 (14.61 to 12.51 with $p = 0.003$) which was a positive change [Table/Fig-2].

The analysis was also carried out separately for juniors and seniors in each batch as detailed below.

The sub-factor analyses within juniors in different batches indicate, significant increase in scores of SEIS in Batch 1 juniors, and trend of increase was seen in Batch 2 juniors and Batch 3 juniors. Scores of CERQ kids in juniors increased significantly in all three batches. Self-Concept has not shown significant change in juniors in any of the batches. Significant decrease was seen in the scores of CAS in Batch 1 juniors and decrease was seen in juniors of Batch 2 and Batch 3 but not significant. Reduction in clinical anger was a positive change [Table/Fig-3].

The sub-factor analyses within seniors in different batches indicates, there was a significant increase in the scores of SEIS in seniors in Batch 1 and Batch 2 and non-significant increase was seen in Batch 3 seniors. Scores of CERQ in seniors increased significantly in all three batches. Self-Concept has not shown significant change in seniors in any of the batches. Significant decrease was seen in the scores of CAS in seniors in all the three batches. Reduction in clinical anger was a positive change [Table/Fig-4].

DISCUSSION

The present study demonstrated the positive effects of short term integrated yoga module program on psychological fitness in residential setting within summer break. Results suggest that yoga is an acceptable practice in residential camp by adolescents.

Present study showed significant improvement in EI. Yoga practices may significantly influence the process of self-awareness and self-control [31]. Previous research indicates improved EI through

Variables	Batch 1 (n=148) Mean±SD		p-value	Batch 2 (n=167) Mean±SD		p-value	Batch 3 (n=195) Mean±SD		p-value
	Pre-	Post-		Pre-	Post-		Pre-	Pos-	
Emotional Intelligence	123.59±16.09	129.86±19.30	<0.001*	122.27±15.62	126.04±17.98	0.002*	123.63±17.40	126.15±18.98	0.032*
Emotional regulation strategies	51.83±10.68	57.11±13.59	<0.001*	55.79±10.15	60.10±11.02	<0.001*	54.15±10.47	58.62±12.47	<0.001*
Self-concept	103.36±12.99	103.64±14.70	0.766	101.89±14.10	101.58±14.66	0.724	103.04±13.06	102.13±14.67	0.315
Clinical anger	13.59±10.44	10.94±10.68	<0.001*	16.23±10.77	14.09±11.52	0.008*	14.61±10.59	12.51±10.54	0.003*

[Table/Fig-2]: Paired sample t-test for three cohorts.

*indicates $p < 0.05$; SD: Standard deviation

Variables	Batch 1 (n=93) Mean±SD		p-value	Batch 2 (n=90) Mean±SD		p-value	Batch 3 (n=112) Mean±SD		p-value
	Pre-	Post-		Pre-	Post-		Pre-	Post-	
Emotional Intelligence	121.46±17.21	128.77±20.33	<0.001*	121.32±16.77	124.21±16.76	0.078	120.52±18.50	123.76±20.30	0.068
Emotional regulation strategies	52.20±11.52	58.65±13.31	<0.001*	55.09±10.97	59.02±10.87	0.002*	52.48±10.66	58.42±13.59	<0.001*
Self-concept	103.51±12.86	103.26±15.16	0.836	102.62±14.75	100.72±15.10	0.115	104.02±14.26	102.35±15.81	0.209
Clinical anger	14.74±10.56	12.48±11.18	0.023*	15.58±10.49	15.31±11.68	0.759	14.17±10.60	13.23±10.55	0.308

[Table/Fig-3]: Paired sample t-test for juniors.

*indicates $p < 0.05$; SD: Standard deviation

Variables	Batch 1 (n=55) Mean±SD		p-value	Batch 2 (n=77) Mean±SD		p-value	Batch 3 (n=83) Mean±SD		p-value
	Pre-	Post-		Pre-	Post-		Pre-	Post-	
Emotional Intelligence	127.26±13.29	131.74±17.42	0.026*	123.38±14.18	128.18±19.21	0.007*	127.82±14.88	129.39±16.60	0.265
Emotional regulation strategies	51.20±9.18	54.53±13.79	0.049*	56.61±9.11	61.35±11.13	<0.001*	56.41±9.82	58.88±10.84	0.040*
Self-concept	103.11±13.29	104.31±14.02	0.480	101.03±13.36	102.58±14.16	0.218	101.71±11.18	101.82±13.07	0.926
Clinical anger	11.67±10.06	8.36±9.32	<0.001*	16.97±11.10	12.01±11.06	<0.001*	15.19±10.63	11.53±10.50	0.001*

[Table/Fig-4]: Paired sample t-test for seniors.

*indicates $p < 0.05$; SD: Standard deviation

20 minutes of meditation over eight weekly sessions in graduate students [32]. Evidence suggests increased self-awareness, EI, and social skills in response to sitting meditation in youth [33].

Significant change was seen in overall emotion regulation and strategies. Pranayama, breathing practices, chanting and meditation, yama-niyama concept driven creativity and games especially designed for emotional development may have accounted for these positive changes and enhanced coping abilities in the present study. Results of present study on emotion regulation is in line with previous study done on 159 students with yoga based intervention in classroom setting [34].

Self-concept didn't change although, some sub-domains of it did change. Long and more periodic intervention maybe required to change self-concept.

In the present study, significant reduction in CAS in Batch 1 (13.59 to 10.94 with $p < 0.001$), Batch 2 (16.23 to 14.09 with $p = 0.008$) and Batch 3 (14.61 to 12.51 with $p = 0.003$) shows reduction in cognitive, physiological, social, and behavioural symptoms due to anger. In present study, specially designed yoga module given in residential setting may have accounted for significant improvement in anger management and other significant positive psychological changes. Improved anger control through yoga module while in one previous RCT, insignificant changes in anger control and many of the psychological parameters were seen within groups and between groups with semester long intervention in school curriculum in adolescents [13]. In another RCT, no changes were seen in emotional and behavioral functions within yoga group as well as between groups [35]. Small sample size and inadequate dose of intervention (only 18 hours in 12 weeks) may be reason for no changes. All these limitations were well taken care in present study in the form of well-organised integrated yoga module and the intervention was repeated with three independent cohorts with large sample sizes (Batch 1-148, Batch 2-167, Batch 3- 195) . Positive findings of another study on psychological measures done in adults with 5 day residential yoga program supports the positive findings in the present study [36].

The sub-factor analysis between age groups indicates similar changes in EI in both juniors and seniors. Similar positive significant changes were seen in emotion regulation in both juniors and seniors and consistent in all three batches. Self-concept has not shown any significant changes in both juniors and seniors in any of the batches. Clinical anger scores were reduced in both age groups but more (significant) in seniors showing better anger control in seniors. Results of all parameters are consistent in all the three batches showing the consistency and confirmed effect of the Yoga intervention. Pranayama, meditation and Jnana Yoga activities may help them to look for the positive side of events, think positive and respond responsibly. Multi-component nature of yoga and intervening effect of each technique on various koshas makes it complex to precisely assign the effect on any particular parameter. According to sage Patanjali, practice of yogic postures leads to expansion of mind and ceasing of dualities [37]. Practice of pranayama gives better clarity on thoughts. Meditation and Relaxation work on cellular activity or metabolic activities. Jnana Yoga sharpens the mind while Bhakti yoga calms down the mind.

The positive outcomes in the study are generally consistent with previous studies of yoga, meditation in school settings, although the use of different outcome measures and research designs precludes a precise comparison [38,39]. The results showed significant improvement in all assessed outcome measures except self-concept in all three consecutive studies and reflects a positive change. Since, this is residential setting and participants were from many different cities (diverse data), it was not practically feasible to have active control group. So, three independent cohorts with large and matched sample size were done with same intervention to test the repeatability and consistency of the effect. Consistent similar

trend of results in all three cohorts confirms the positive effect of given integrated yoga module in adolescents.

The strength of the study lies in including heterogeneous representative samples with relatively bigger sample size. Multiple components in the yoga module can be seen as limitation as well as the strength. Limitation in terms of not able to assign the effect to any particular component of module. It is a strength because of strictly following the comprehensive integrated holistic approach of Yoga as said in the classical texts. The integrated approach to yoga comprises of yogic postures (asanas), breathing techniques (pranayama), relaxations (guided relaxation techniques), meditations (guided meditations), knowledge points (Jnana Yoga) and prayers and chanting (Bhakti Yoga). Guided relaxation techniques such as deep relaxation technique, quick relaxation technique and instant relaxation technique also include postures and body movements and breathing techniques that provide flexion and extension to muscles. Guided meditations include different postures and concepts of focusing which warrants establishing certain physical postures with hand gestures (mudras).

In Yogic parlance, concept of human existence comprises of five layers-the gross body, the energy body, the emotional body, the intellectual body and the bliss body. Integrated approach to yoga is employing specific yogic techniques to address all the layers of existence in order to get holistics or overall health.

The integrated module of yoga especially designed for yoga camp for adolescence was very well accepted by the children and received complements from the parents too. Maintaining uniformity in execution of intervention and overall conducting of program across the three batches acts as a replication of the study. The similar results/trends in each batch not only confirm the effectiveness of the program in establishing the psychological fitness among adolescents but also nullifies the lacuna arising due to absence of active control group.

LIMITATION

The absence of control may act as a limitation of the study. However, by repeating the intervention thrice with three different batches, this limitation was tried to overcome. As there were no indigenous scales available to study the psychological parameters in the Indian setting, the psychometric scales that were developed by Westerners, used in the study. This may also be considered as another limitation of the study.

CONCLUSION

The 10 day Residential Yoga camp is effective in improving the psychological fitness among adolescent children especially EI, cognitive emotional regulation strategies and anger management. The findings also highlight the potential of short term integrated yoga in bringing significant improvements in psychological constructs among adolescents. Further the study also demonstrates the feasibility and effectiveness of residential integrated yoga program for adolescents.

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Research article

EFFECT OF RESIDENTIAL INTEGRATED YOGA ON PHYSICAL FITNESS OF ADOLESCENTS USING EUROFIT BATTERY

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Abstract

Decrease in physical activity and sedentary behavior in adolescents is very prevalent today. These factors can constitute risks in physical and mental health. It is important to promote physical fitness in adolescence to prevent health problems and to minimize sedentary life style in adulthood. Yoga, which includes asana, pranayama, yogic diet and relaxation, is considered an important intervention that provides the right dose of activities to promote physical fitness. To evaluate the effectiveness of short term residential integrated yoga intervention on physical fitness among adolescents. A single group pre-post yoga interventional study was carried out in three independent cohorts, batches 1, 2, and 3, in a residential setting. Sample comprised of 145 (41.38% girls), 166 (27.11% girls) and 194 (38.14% girls) respectively. A 7-day holistic integrated yoga program was given as an intervention. Physical fitness tasks such as body mass index (BMI), plate-taping test (PLT), sit and reach (SAR), standing broad jump (SBJ), sit-ups (SUP) and 10x5m Shuttle run (10x5mR) were assessed using Eurofit battery and relevant analyses were carried out. Significant (p value < 0.05) positive changes were observed in BMI, SBJ, SAR and SUP in all the cohorts. The study concludes that even a short term residential yoga intervention is an effective tool to enhance physical fitness in adolescents.

Keywords: Yoga; adolescents; Physical fitness; Residential

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INTRODUCTION

There is steady decline in physical activity in children and adolescents as they spend majority of their time in classrooms (indoor) and less time for activity (physical education) (Ahn & Fedewa, 2011; Brodersen, Steptoe, Boniface, Wardle, & Hillsdon, 2007). The amount of physical activity is further reduced by limited use of active means of transport (i.e., biking, walking) and outdoor play due to perceived safety risks, distance, child's age, and parents' travel mode (Merom, Tudor-Locke, Bauman, & Rissel, 2006; Stevens, To, Stenvenson, & Lochbaum, 2008). Easily available technology has given rise to opportunities to watch TV, play video games or browse the Internet during and after school hours, resulting in more sedentary lifestyle (Atkin, Gorely, Biddle, Marshall, & Cameron, 2008). Physical inactivity is a leading cause of juvenile obesity (Leech, McNaughton, & Timperio, 2014) as well as in increasing public health costs across all age groups (An, Xiang, Yang, & Yan, 2016; Kohl et al., 2012; World Health Organization, 2010). Reduced physical activity among adolescence not only troubling the implications related to health but also their academic performance (Stevens et al., 2008) and mental health (Ahn & Fedewa, 2011). The risk for adult inactivity was significantly lower for those who were physically active in adolescence (Huotari,

Nupponen, Mikkelsson, Laakso, & Kujala, 2011).

Physical fitness is an important factor that influences daily routine activities and sportive productivity of an individual (Erİkođlu, Güzel, & Pense, 2015; Houwen, Visscher, Hartman, & Lemmink, 2006). Physical fitness refers to the full range of physical qualities, i.e. muscular strength, flexibility, coordination, speed, agility and cardiorespiratory fitness (Ruiz et al., 2006). Physical fitness assessments for each child help to get information about their physical status (Erİkođlu et al., 2015). Development of a positive attitude towards their bodies and physical fitness may help children to improve positive re-appraisal and thereby several psychological constructs. EUROFIT (European Test of Physical Fitness) battery is helpful tool to measure and evaluate the physical fitness of school age children and to motivate them to enjoy taking regular exercise and promote the importance of children's sport and fitness (Council of Europe. Committee for the Development of Sport.; Committee of Experts on Sports Research., 1988).

Effective intervention programs, along with nutritional education are found effectively helpful in promoting physical fitness in children and adolescents (Poitras et al., 2016). Physical fitness can be achieved through right nourishment, exercise and rest (de Groot &

Fagerström, 2011; Malina, 2010). Physical fitness is closely associated with health and skills. It is also very closely linked to mind state or mental health (Lang et al., 2018; University of Tsukuba, 2015). Corroborating this concept, review studies recommend multi-component intervention programs for improving physical fitness among children and adolescents (Camacho-Minano, LaVoi, & Barr-Anderson, 2011) (Kriemler et al., 2011).

Any physical activity could be considered an exercise, usually when one does it deliberately for fitness or training, rather than something that's part of daily routine. Similarly any physical activity or an exercise is considered as yoga when the body, breath and mind are synchronized with it in a harmonious way.

Yoga, which is a holistic multi-component program that includes asana, pranayama, yogic diet and relaxation, is considered as an effective intervention that provides perfect combination of activities for promoting physical fitness. Review studies suggest that yoga is generally effective in improving physical and mental health in children and adolescents (Birdee et al., 2009) (Greenberg & Harris, 2012) (J. Davidson et al., 2012). Yoga promotes psychological fitness in adolescents (Choukse, Ram, & Nagendra, 2018), cardiopulmonary fitness (Bhutkar, Bhutkar, Taware, & Surdi, 2011) (Chen, Mao, Lai, Li, & Kuo, 2009) and weight

loss in obese children (Benavides & Caballero, 2009). Yoga is found effective in improving posture among children with physical malformations (Savić, Pfau, Skorić, Pfau, & Spasojević, 1990) and many behavioral issues (Harrison, Manocha, & Rubia, 2004). Yoga is beneficial for improving the fitness among children with visual impairment (Telles & Srinivas, 1998) and to increase their exercise capacity (Jain et al., 1991). Yoga as a therapy is effective in alleviating many disease conditions in adolescents and children (Kuttner et al., 2006), (Kaley-Isley, Peterson, Fischer, & Peterson, 2010). Studies on yoga and adolescents are generally conducted in school setting, with yoga as part of curriculum, or before / after school hours on homogeneous sample.

An important research question in this field relates to whether yoga offers any positive effects on physical fitness of children in a different setting other than school. Thus, the present study was done to explore the efficacy of short term integrated residential yoga intervention on physical fitness of adolescents. This study is part of bigger study done on overall fitness of adolescents registered in the Clinical Trials Registry of India bearing the trail number CTRI/2018/02/011709.

METHODS AND MATERIALS

The aim of this study was to examine the effects of an integrated yoga intervention on physical fitness

parameters in adolescents, and across different age groups within adolescence.

Experimental Design

This pre-post residential yoga interventional study was done during the summer holidays at the campus of Yoga University, Bengaluru, India. Three independent cohorts of adolescents underwent similar yoga intervention program with same guidelines. The consecutive studies were conducted in the month of April between 1st and 10th (batch 1), 11th and 20th (batch 2) and 21st and 30th of April (batch 3) in the year 2016. The duration of the intervention was 7 days with 8 hours of yoga based sessions per day. All the components were similar and consistent as far as possible like living conditions, teachers, daily routine and dietary plan.

Participants

The sample of the study comprised of healthy adolescents, between the age of 9 and 16 years, studying in English Medium schools, who registered for the yoga camp. The participants were divided into three batches as per the registration and selected time slot. And they were grouped into juniors (9-12years) and seniors (13-16years) to evaluate changes, as the age range 9-16 is wide considering the rapid changes during adolescents. Sample were 145 (91 juniors and 54 seniors), 166 (90 juniors and 76 seniors) and 194 (111 juniors and 83 seniors) in batch 1, 2 and 3 respectively.

For easier implementation of the intervention, participants were further randomly divided into smaller groups of 12-15. Each smaller group was under supervision of two teachers for better monitoring. Teachers were trained on the implementation of the intervention to ensure uniformity and all of them possessed bachelor degree in yoga.

Sample was heterogeneous in nature, with subjects from different socio-economic strata, cultures, ethnicity and different academic status, as the study was conducted in a residential yoga camp. Subjects with single parents, acute or chronic health problems, on medication, those who attended any yoga program in the last three months were excluded.

Ethical approval was obtained from the Institutional Ethical Committee with reference number RES/IEC-SVYASA/64/2015. After explaining the study, written informed consent from parents, and informed assent from all participants, were obtained prior to screening.

INTERVENTION

The intervention was a 7-day residential yoga program, with sessions running from 5.00 am till 9.30 pm each day, based on multilevel approach of yoga. The contents of this holistic integrated yoga intervention program were based on concept of Pancha kosha model (five layers of existence) as explained in Taitairya Upanishad. The specially designed and modified version

of Integrated Yoga Module had multiple components of yoga to ensure its effectiveness at all the five koshas (Gross body – Annamaya Kosha, Energy body – Pranamaya Kosha, Emotional Body – Manomaya Kosha, Intellectual Body – Vijnanamaya Kosha and Bliss body – Anandamaya Kosha). The yoga module was customized to the target age group, interactive and children friendly, referring to various yogic texts on yoga for children. Further the module was reviewed by yoga experts. The yoga module included Asana, Pranayama, Relaxation, Meditation and also Jnana Yoga (Yama Niyama Concepts) and Bhakti Yoga. The yogic techniques

/activities were designed to inculcate/drive the Yama-Niyama concepts. Jnana yoga sessions included lectures, creativity - like role-playing, parables, journal/diary writing etc., while bhakti yoga sessions included chanting and singing. Yogic games (Krida yoga) were played in free time. Several friendly competitions and events were arranged during the study between groups to encourage the participation and team cohesiveness. They were spread over the day with mixing of events to make the program interesting. Daily schedule is given in table 1. Details of asana and pranayama practice sessions are provided in table 2.

**TABLE-I
DAILY SCHEDULE OF INTEGRATED YOGA INTERVENTION**

Time	Session	Details
5am		Wake Up
5:30am to 5:45am	Session 1	Morning Prayer
5:45am to 6:45am	Session 2	Asana practice (Physical postures)
6:45am to 7:30am	Session 3	Meditation (Om meditation, Cyclic meditation)
7:30am to 8:15am		Breakfast
8:15am to 9.00am	Session 4	Social works (altruistic group activities)
9.00am to 10:00 am		Bath & Wash
10:00am to 11:00am	Session 5	Lectures on concepts of Yoga (Yama Niyama concepts)
11:00am to 12:00pm	Session 6	Pranayama practice
12:00pm to 1:00pm		Lunch
1:00pm to 2:00pm	Session 7	Relaxation (IRT,QRT, DRT)
2:00pm to 3:30pm	Session 8	Indoor activities (parables, creativity, chanting)
3:30pm to 4:30pm	Session 9	Asana practice
4:30pm to 5.00pm		Evening Tea, Snacks
5.00pm to 6:15pm		Free time

6:15pm to 7:15pm		Dinner
7:15pm to 8:30pm	Session 10	Happy assembly (Cultural programs)
8:30pm to 9.00pm	Session 11	Tranquilling Pranayama and Meditation
9.00pm to 9.15pm		Milk, Snacks
9.15pm to 9:30pm	Session 12	Diary Writing
9:30pm		Good Night Sleep

TABLE-II
CONTENT OF ASANA AND PRANAYAMA SESSIONS

Component	Content details	
Prayer	Opening and closing prayer (Taitairya Upanishad 2.1 Shanti Mantra)	
Warm up and loosening practices	Warm up	Jogging, jumping, forward & backward bending, Side bends, Twisting
	Anga-sanchalana	Loosening for toes, ankle, knee, hips, fingers, wrist, elbow and neck
	Stretching with breathing	Hands stretch, Ankle stretch, Back stretch, Tiger stretch, Lumber stretch
	Shakti-chalana	Cycling, Rowing, Rocking and rolling
Asana	Standing postures	Half wheel posture (<i>Ardhacakrasana</i>)
		Foot palm posture (<i>Padahastasana</i>)
		Half waist rotation posture (<i>Ardhaticakrasana</i>)
		Triangle posture (<i>Trikonasana</i>)
		Tree posture (<i>Vrkshasana</i>)
	Sitting postures	Bolt posture (<i>Vajrasana</i>)
	Rabbit posture (<i>Shashankasana</i>)	

		Spinal twist posture (<i>Vakrasana / Ardhamatsyendrasana</i>)
		Camel posture (<i>Ustrasana</i>)
		Posterior stretch (<i>Paschimottanasana</i>)
Prone postures		Cobra posture (<i>Bhujangasana</i>)
		Grasshopper posture (<i>Salabhasana</i>)
		Bow posture (<i>Dhanurasana</i>)
Inverted postures		Shoulder stand (<i>Sarvangasana</i>)
		Plough posture (<i>Halasana</i>)
		Variation of head stand (<i>Viparitamakarni</i>)
Supine postures		Boat posture (<i>Naukasana</i>)
		Fish posture (<i>Matsyasana</i>)
Surya Namaskara	Each round of 12 Steps	1 st round with mantra, rest 11 rounds without mantra
Breathing practices	Conscious breathing	Awareness of natural breathing pattern
	Sectional breathing	Separately Abdominal, Thoracic and Clavicular breathing
	full yogic breathing	Combination of Abdominal, Thoracic and Clavicular breathing
Kriya	Kapalbhati	Alternate and both nostril (Active exhalation)
Pranayama	Dynamic pranayama	Bhastrika (Breathing with rapid inhalation & exhalation)
	Balancing pranayama	Anulom-vilom (Slow & rhythmic alternate nostril breathing)
	Cooling pranayama	Shitli (Inhalation through mouth- beak of the tongue)

Tranquilising pranayama	Bhramari (Exhalation, with a honey bee sound)
Mudra	Jnana mudra
Relaxation	IRT (Instant Relaxation Technique), QRT (Quick Relaxation Technique), DRT (Deep Relaxation Technique)

ASSESSMENTS

The assessments for measuring physical fitness were done using Eurofit physical fitness testing battery. This battery of tests, designed by the European Council (Council of Europe. Committee for the Development of Sport.; Committee of Experts on Sports Research., 1988), is a standardized set of tasks evaluating physical speed, strength, flexibility, balance, and agility. Reliability of Eurofit physical fitness parameters for adolescent males ranged from 0.84 to 0.94 (Donncha, Watson, McSweeney, & O'Donovan, 1999). Participants were instructed and familiarized with each of the tests prior to administration. The procedure for selected tests were detailed below.

Anthropometry: Height and weight was measured using standard measuring device. Body mass index (BMI) was calculated by using formula $BMI = \frac{\text{Weight in kg}}{(\text{height in m})^2}$.

Plate-Taping Test (PLT): On the table two discs were placed 60 cm apart with a rectangle in the centre. Keeping the non-preferred hand on the rectangle,

participants moved the preferred hand back and forth between the discs as quickly as possible. The time taken to complete 25 cycles ((50 taps) is recorded using a stopwatch. The process was done twice and best result was recorded.

Sit-and-Reach Test (SAR): Trunk flexibility was measured with participant seated on the floor with legs extended to front with knee locked. The soles of the feet were placed flat against the sit and reach box. Participants were asked to reach forward along the measuring line as far as possible by keeping hands side by side with palms facing downwards. After some practice reaches, the maximum distance was recorded to the nearest centimeter.

Standing Broad Jump (SBJ): The starting line was marked on a sturdy mat. The participants were told to stand behind the starting line, to jump forward by swinging arms and slightly bending their knees and land on both feet. The distance from the starting line to the back of their heels was measured. This process was done three times and the best attempt was recorded.

Sit-Ups Test (SUP): This test was done by lying down in supine position with bent knees at right angle, feet on the floor kept hold down by trainer and hand crossed over chest with palms on opposite shoulders. Lifting upper body to a vertical position and then returned to the supine position was counted as one sit-up. Number of sit-ups in 30 seconds was recorded.

10x5m Shuttle run (10x5mR): Two lines were made 10 meters apart and the participants were told to stand behind the starting line with preferred leg forward. At the whistle participant started running to the other line, crossed it and then ran back to the starting line. Time taken to complete five round-trips at maximum speed between the two lines was recorded in seconds.

Socio-demography measures: A short demographic questionnaire and screening sheets were completed by adolescents and parents. Variables included are gender, age, handedness, sibling hierarchy, family background, mother's age, father's age etc.

Data collection was done on the first day (pre-data) and on the ninth day (post-data) of the 10 day camp. Small station set up was done for each performance test by investigators. Three trained researchers were available on each station for data collection. Out of three, one was supervising the test process, one with measuring instrument and third was recording the result and signing the sheets

for confirmation of test completion. Each participant was provided with individual excel sheet table with all details. When the participant came to station, he/she handed over the sheet to the researcher (who filled the result column). As the subject finished each test, his/her sheet was signed off and moved on to the next station. After finishing all tests, participant handed over the sheet to one senior researcher, who checked the sheet and signed it and put it in the collection box. Calibrated stop watches, standard measuring and test materials were used to conduct the tests and record the data.

DATA ANALYSIS

To maintain confidentiality, data sheets were coded and all personal identifiers along with name were omitted. Data analysis was done with SPSS (Version 19). Paired samples t-test was used to evaluate change over time. The results of the tests were deemed to be significant if probability values were less than 0.05 whereas trends ($p < 0.1$) were also highlighted.

RESULTS

The three cohorts comprised of 145 (41.38% girls) (62.76% Juniors), 166 (27.11% girls) (59.64% Juniors) and 194 (38.14% girls) (57.22% Juniors), with a mean age of 11.84 ± 1.77 , 12.22 ± 1.82 and 12.06 ± 1.82 respectively. All individual cohorts were evaluated for the effects of a 7-day holistic integrated yoga intervention program on weight and BMI

(Anthropometry), speed of limb movement (PLT), explosive leg power (SBJ), trunk strength and endurance (SUP), running speed and agility

(10x5mR) and flexibility (SAR) using European Test of Physical Fitness (EUROFIT) battery by a single arm pre-post study.

TABLE-III
COMPARISON OF PRE-POST DATA OF THREE COHORTS

Measures	Batch 1 (n=145)			Batch 2 (n=166)			Batch 3 (n=194)		
	Pre Mean (±SD)	Post Mean (±SD)	p value	Pre Mean (±SD)	Post Mean (±SD)	p value	Pre Mean (±SD)	Post Mean (±SD)	p value
Weight (kg)	43.42 ±13.20	42.32 ±13.15	< 0.001*	41.33 ±12.24	40.47 ±12.08	< 0.001*	44.04 ±12.38	42.75 ±12.41	< 0.001*
BMI (kg/m ²)	19.34 ±3.80	18.84 ±3.80	< 0.001*	18.24 ±3.95	17.85 ±3.86	< 0.001*	19.28 ±4.98	18.68 ±4.93	< 0.001*
10x5mR (sec)	15.81 ±1.63	15.79 ±1.73	0.888	15.91 ±1.69	15.82 ±1.66	0.301	16.27 ±1.59	16.11 ±1.77	0.020*
SBJ (cm)	126.44 ±27.87	131.35 ±27.36	0.001*	128.34 ±25.82	136.71 ±25.44	< 0.001*	131.48 ±24.35	133.70 ±26.96	0.061
PLT (sec)	11.85 ±1.44	10.81 ±2.22	< 0.001*	12.01 ±2.07	12.95 ±2.55	< 0.001*	13.09 ±2.00	12.32 ±1.81	< 0.001*
SUP (freq./30s)	13.87 ±6.44	14.90 ±6.23	0.003*	15.93 ±6.35	17.33 ±6.37	< 0.001*	15.13 ±5.76	17.98 ±6.45	< 0.001*

SAR	31.78	33.22	<	31.11	32.45	<	31.12	31.69	0.069
(cm)	±6.31	±7.29	0.001*	±6.21	±6.21	0.001*	±7.21	±7.06	

BMI (Body mass index); 10x5mR (Shuttle run); SBJ (Standing board jump); PLT (Plate tapping); SUP (Sit-ups); SAR (Sit and reach); SD (Standard deviation); *indicates p < 0.05.

As seen in Table 3, comparing pre and post data for each of the cohorts, there was significant (p < 0.001) decrease in scores of weight and BMI in all the three cohorts. Time taken in 10x5mR has not shown significant change in batch 1 and batch 2 but significant change is seen in batch 3 (p = 0.020). Scores of SBJ in batch 1 (p = 0.001) and batch 2 (p < 0.001) increased significantly and positive trend is observed in batch 3 (p = 0.061). Time taken for PLT was significantly decreased in batch 1 (p < 0.001) and batch 3 (p < 0.001), but significant increase is observed in batch 2. SUP scores were significantly increased in batch 1 (p = 0.003), batch 2 (p < 0.001) and batch 3 (p < 0.001). Scores of SAR in batch 1 (p < 0.001) and batch 2 (p < 0.001) increased significantly and positive trend is observed in batch 3 (p = 0.069).

TABLE-IV
COMPARISON OF PRE-POST DATA OF THREE COHORTS OF JUNIORS

Measure	Batch 1 (n=91)			Batch 2 (n=90)			Batch 3 (n=111)		
	Pre Mean (±SD)	Post Mean (±SD)	p value	Pre Mean (±SD)	Post Mean (±SD)	p value	Pre Mean (±SD)	Post Mean (±SD)	p value
Weight (kg)	37.26 ±10.28	36.01 ±10.04	< 0.001*	36.03 ±10.72	35.03 ±10.31	< 0.001*	38.27 ±9.99	36.74 ±9.98	< 0.001*
BMI (kg/m ²)	18.32 ±3.55	17.70 ±3.52	< 0.001*	17.62 ±4.14	17.14 ±3.98	< 0.001*	18.35 ±3.58	17.59 ±3.58	< 0.001*
10x5mR (sec)	16.12 ±1.61	15.99 ±1.68	0.438	16.75 ±1.31	16.38 ±1.42	0.001*	16.57 ±1.52	16.60 ±1.70	0.752

SBJ (cm)	121.5 7 ±26.5 2	126.5 4 ±26.0 5	0.012*	119.6 9 ±23.1 3	127.9 7 ±20.0 8	< 0.001*	129.8 5 ±21.3 4	128.5 0 ±21.8 6	0.272
PLT (sec)	11.86 ±1.15	11.39 ±2.30	0.026*	12.21 ±2.42	14.72 ±2.02	< 0.001*	13.47 ±2.06	13.04 ±1.56	0.018*
SUP (freq./30 s)	13.11 ±6.67	14.30 ±6.18	0.011*	13.76 ±6.55	15.20 ±6.67	0.001*	14.27 ±5.91	15.52 ±6.64	0.001*
SAR (cm)	32.18 ±5.50	34.52 ±6.63	< 0.001*	30.97 ±5.60	32.11 ±5.48	< 0.001*	30.62 ±6.41	31.25 ±6.40	0.121

BMI (Body mass index); 10x5mR (Shuttle run); SBJ (Standing board jump); PLT (Plate tapping); SUP (Sit-ups); SAR (Sit and reach); SD (Standard deviation); *indicates $p < 0.05$.

Analysis of the junior subgroup, as presented in Table 4, showed significant decrease in scores of Weight ($p < 0.001$) and BMI ($p < 0.001$) in all three cohorts. Time taken in 10x5mR has not shown significant change in batch 1 and batch 3 but significant decrease is seen in batch 2. Scores of SBJ in batch 1 ($p = 0.012$) and batch 2 ($p < 0.001$) increased significantly and slight decrease is observed in batch 3 but non-significant ($p = 0.272$). Time

taken for PLT is significantly decreased in batch 1 ($p = 0.026$) and batch 3 ($p = 0.018$) respectively, but significant increase is observed in batch 2. SUP scores were significantly increased ($p = 0.011$), ($p = 0.001$) and ($p = 0.001$) in batch 1, 2 and 3 respectively. Scores of SAR in batch 1 and batch 2 increased significantly ($p < 0.001$) and no significant change was seen in batch 3 ($p = 0.121$).

TABLE-V
COMPARISON OF PRE-POST DATA OF THREE COHORTS OF SENIORS

Measure	Batch 1 (n=54)			Batch 2 (n=76)			Batch 2 (n=83)		
	Pre Mean (±SD)	Post Mean (±SD)	p value	Pre Mean (±SD)	Post Mean (±SD)	p value	Pre Mean (±SD)	Post Mean (±SD)	p value
Weight (kg)	53.81 ±10.9 1	52.96 ±10.7 1	< 0.001*	47.60 ±10.9 5	46.91 ±10.8 2	< 0.001*	51.77 ±11.0 3	50.80 ±10.6 9	< 0.001*
BMI (kg/m ²)	21.10 ±3.58	20.78 ±3.49	< 0.001*	18.96 ±3.60	18.69 ±3.56	< 0.001*	20.52 ±6.20	20.13 ±6.03	< 0.001*
10x5mR (sec*)	15.23 ±1.53	15.42 ±1.78	0.262	14.94 ±1.57	15.17 ±1.69	0.067	15.88 ±1.60	15.47 ±1.66	< 0.001*
SBJ (cm)	135.0 ±28.3 8	139.8 ±27.8 5	0.015*	138.7 ±25.1 2	147.2 ±27.3 0	< 0.001*	133.6 ±27.8 6	140.6 ±31.3 6	0.001*
PLT (sec*)	11.83 ±1.84	9.80 ±1.65	< 0.001*	11.79 ±1.56	10.95 ±1.31	< 0.001*	12.59 ±1.81	11.37 ±1.68	< 0.001*
SUP (freq./30 s)	15.10 ±5.92	15.88 ±6.24	0.143	18.50 ±5.03	19.84 ±4.96	0.001*	16.28 ±5.39	21.28 ±4.41	< 0.001*
SAR (cm)	31.10 ±7.49	31.04 ±7.88	0.883	31.29 ±6.89	32.86 ±7.00	< 0.001*	31.78 ±8.15	32.29 ±7.85	0.319

BMI (Body mass index); 10x5mR (Shuttle run); SBJ (Standing board jump); PLT (Plate tapping); SUP (Sit-ups); SAR (Sit and reach); SD (Standard deviation); *indicates p < 0.05.

Analysis of the senior subgroup, as presented in Table 5, showed significant decrease in scores of weight and BMI in all three cohorts. Time taken in 10x5mR was increased but not significant in batch 1 and batch 2 but significant decrease was seen in batch 3 ($p < 0.001$). Scores of SBJ increased significantly with ($p = 0.015$), ($p < 0.001$) and ($p = 0.001$) in batch 1, 2 and 3 respectively. Time taken for PLT is significantly decreased with $p < 0.001$, $p < 0.001$ and $p < 0.001$ in batch 1, 2 and 3 respectively. SUP scores were significantly increased in batch 2 ($p = 0.001$) and 3 ($p < 0.001$) but not in batch 1 ($p = 0.143$). Scores of SAR increased significantly ($p < 0.001$) in batch 2 but not in batch 1 and 3.

DISCUSSION

The current study has examined the effect of short term residential integrated yoga intervention on physical fitness among adolescents in residential setting in summer holidays. In present study, significant weight loss and decrease in BMI were observed which is in line with previous study done on adults with 6-day residential program (Telles, Visweswaraiyah, Balkrishna, & Kumar, 2009) and in contrast with another study where weight loss was not seen (Telles, Singh, Bhardwaj, Kumar, & Balkrishna, 2013), which may be due to variation in time duration and yoga intervention. As the present study was carried out in a residential setting, the weight loss across all batches could be attributed to the

holistic approach which included yogic practices, disciplined life style and balanced diet. Reduction in time taken in 10x5mR has shown improvement in agility and speed. Direction of positive change is similar in all three batches although significant in batch 3. Distance covered in SBJ has shown improvement in explosive leg strength which was significantly seen across the batches. This might be due to stretch and strengthening of the muscles by asana and Suryanamaskara practices. Reduction in time shows improvement in PLT which measures upper body reaction and coordination. The results of the batch 1 and 3 has shown significant positive change in alignment with the previous study (Telles, Sharma, Yadav, Singh, & Balkrishna, 2014). The increase in reaction and coordination could be attributed to improved concentration and attention due to calming down the mind by practicing bhakti yoga and jnana yoga. Significant increase in SUP across the batches has shown improvement in abdominal strength and muscular endurance which is aligned with earlier study in children (Telles et al., 2013). Significant increase in SAR across the batches has shown improvement in flexibility. Results aligned with the study done among children (Chen et al., 2009) and young adults (Bal B.S., 2009) following yoga. This improved flexibility might be due to different loosening practices and yoga postures included in this study. However, any physical

activity, mainly asana, pranayama etc. involve concentration, mindfulness, psychological steadfastness, a relaxed and calm mind. This could be achieved through Jnana yoga, Bhakti yoga and Karma yoga practices.

All three batches have shown significant changes in weight, BMI, SBJ, SUP and SAR. Junior group has shown significant changes in Weight, BMI, SUP and SAR across all three batches. PLT has shown negative change in juniors of batch 2 which could be contributed to the negative change in PLT results of batch 2. Senior group has shown similar significant changes in Weight, BMI, SBJ and PLT. Trend of change was in same direction and similar in all three batches. Time taken for 10x5mR did not change significantly overall. Long intervention may be required to improve agility and speed.

In present study, significant results across three independent cohorts corroborate the benefits of short term integrated yoga towards improvement in weight loss, flexibility, endurance and strength in adolescents in residential setting. The positive outcomes of the present study also corroborates the finding of earlier studies on yoga and physical fitness among children (Bal B.S., 2009; Benavides & Caballero, 2009; Bhavanani, Udupa, Madanmohan, & Ravindra, 2011; Bhutkar et al., 2011; Chen et al., 2009; D'souza & Avadhany, 2014; Donahoe-Fillmore, Brahler, Fisher, & Beasley, 2010). The findings suggested

that the integrated yoga module specially designed for yoga camp recognized as a tool to establish physical fitness in adolescents. Children found the program captivating and inspiring. Parents also acknowledged that the program was beneficial. The subjective feedback received from children at the end of the program showed that they benefited from a number of positive takeaways in terms of discipline, engaging in good physical activity etc.

This integrated approach to yoga acts on multiple layers of existence (pancha koshas) which comprises of asana, pranayama, meditation, relaxation and knowledge imparted via interactive discussions, lectures, activities, games and friendly competitions. The multi-component nature of yoga and intervening effect of each technique on various koshas, makes it complicated to precisely assign the particular effect to any parameter. Asana practice leads to expansion of mind and ceasing of dualities, according to sage Patanjali (Swami Satyananda Saraswati, 1976). Practice of pranayama, relaxation and meditation works on cellular activities and gives better clarity of thoughts. Jnana yoga sharpens the mind while Bhakti yoga calms down the mind. A healthy mind has impact and influence on physical fitness especially in speed, agility, endurance, perseverance etc. A prospective study recommended considering cognitive factors while developing exercise intervention

programs targeting physical fitness among adolescents (Lang et al., 2018). The school-based application of multicomponent intervention strategies was the most consistent promising intervention strategy for improving physical fitness among children and adolescence (Dobbins, Husson, DeCorby, & LaRocca, 2013).

Not having a control group has had limitations on the study. Having a control group was a practical challenge as this was a residential program and the sample was heterogeneous in nature. This limitation was addressed by having three independent cohorts where large and matched sample size were subjected to have same intervention to observe the repeatability and consistency of the effect, which helped to prove the effect of intervention. As there was no follow up, sustainability of the improvements was not known, which could have been considered for future studies. As uniformity has been maintained in the execution of the intervention, and in conducting the program across three independent cohorts, this acts as a replication of the study. Results from all

the three cohorts indicate consistent and similar trends, which confirm the positive effect of the integrated yoga module in adolescents.

CONCLUSION

Successful repeatability with independent cohorts provide evidence for promoting residential short term yoga camps as a powerful tool to establish physical fitness among adolescents. The results of the study show that yoga is an effective tool to enhance physiological functioning in adolescents. Another aspect of the study exhibits that yoga is one of the sportive components which helps to improve fitness in a holistic way.

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Effect of Residential Yoga Camp on Psychosocial Fitness of Adolescents

Abstract

Background: Adolescence is a key phase of socialization, where improved psychosocial fitness helps to promote socioeconomic productivity in societies. Psychosocial fitness also has an impact on the academic performance, overall health, and quality of life, throughout life. The present study evaluates the effect of yoga intervention on psychosocial fitness among adolescents. **Materials and Methods:** A single group, pre and post yoga interventional study was carried out in three independent cohorts (batches 1, 2, and 3), having sample size of 148, 167, and 195 respectively. A 7-day integrated yoga intervention was given in a residential setting. Psychosocial assessments included social competence, empathy, altruism, parent relationship, and peer friendship. Data were collected from the participants and their parents using respective versions of the scales. While pre- and post-data were collected from all the adolescent participants, pre- and post-data from parents were collected for 340 and 43 parents only. The objective of the analyses was to evaluate the effect of the yoga program and check the consistency of these effects. **Results:** Significant changes ($P < 0.05$) were seen in social competence, empathy, and altruism in batches 2 and 3, whereas changes in batch 1 showed nonsignificant improvements. Analyses of the parental data indicated a significant improvement in parent relationship ($P = 0.035$) and also nonsignificant improvement in all other outcomes. **Conclusion:** Results suggested that yoga intervention might help in improving psychosocial fitness in adolescents. It also helped to demonstrate that administering yoga was acceptable and feasible in a residential setting.

Keywords: Adolescents, empathy, parent relationship, psychosocial fitness, social competence, yoga

Introduction

Adolescence is a time of tremendous growth, potential and socioemotional development^[1] along with considerable risk, during which social contexts exert powerful influences.^[2] Psychosocial fitness is defined as developing a sense of personal identity which will continue to influence behavior and development for the rest of a person's life.^[3] Psychosocial fitness among adolescents plays an important role, considering the need for social integration and the search for self-assertion and independence.^[4] It is marked by a set of learned behaviors displayed by them in the interpersonal context and their performance level for the demands of a social situation. Adolescence is a crucial period of socialization that demands greater attention to the mental well-being, failing which may lead to mental health consequences that may remain throughout life and reduce the capacity of societies' socioeconomic productivity.^[5] Appropriate psychosocial

development of adolescent is an indicator of sound academic performance; physical health; and adequate social, emotional, and psychological health. Psychosocial fitness ultimately contributes in reducing the risk of psychosocial and behavioral problems, violence, crime, teenage pregnancy, and misuse of drugs and alcohol.^[6] Psychosocial fitness includes how one feels and perceives about their societal relationships that has key factors such as empathy, social competence, altruism, and so forth.

Empathy, a key component of all social functioning, is an effective cognitive ability to adopt the perspective of others in order to understand their feelings, thoughts, or actions.^[7] Altruism is a motivational state, thought, and action with the ultimate goal of increasing other's welfare without considering one's own well-being.^[8] Weak social competencies are thought to limit an adolescent's ability to establish and maintain friendships. Low levels of perceived social competence and negative parental interactions are associated

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with depressive symptoms.^[9] During the adolescent period, their relationships with family and peers undergo dramatic changes and shifts. Strong positive relationships with both family and friends are vital for healthy social and emotional development.^[10] The quality of the parent–child relationship affects the adolescent’s self-concept, which in turn affects the adolescent’s integration into the world of peers.^[11]

Literature on interventional studies, promoting psychosocial fitness are not many and are not focused to target adolescents, their caregivers, and community stakeholders.^[6,12] A systematic review suggested that a multimodal and multidisciplinary group-based approach was found to be an effective interventional strategy.^[13] One of the studies suggested psychosocial assets and well-being, which could be improved among adolescent girls through a brief school day program.^[14]

Since psychosocial fitness is largely to do with how we deal with the mind, yoga may play a role in its enhancements. Yoga is a science of mind control, delineated in historical Indian texts, and comprises of holistic multicomponent practices and considered as an effective intervention to promote the overall fitness. A number of studies have been done on adolescent mental health involving yoga as an intervention that has shown benefits^[15-17] No studies thus far have assessed the psychosocial benefits of yoga on adolescents. Further, adolescence being at the crucial developmental stage, highly vulnerable to biological, psychological, social, and environmental factors and are in a period where they are more receptive to the corrective measures. This warrants considering their physical and psychological aspects while developing intervention programs/strategies to improve social health among adolescents. Considering the psychosocial benefits seen by the practice of yoga in other populations, there is enough to warrant an exploration in the adolescent population.

The aim of the present study was to explore the efficacy of short-term integrated residential yoga intervention on parameters of psychosocial fitness in adolescents. The objective was to evaluate the effects of yoga through a single group pre- and post-design for each cohort. This included eliciting data from adolescents and their parents and engaging in subgroup analyses of different age groups.

This study included secondary data of a registered study (CTRI/2018/02/011709) that evaluated physical, psychological, and social fitness among adolescents.

Materials and Methods

Participants

The participants of the study included healthy adolescent children between the ages of 9 and 16 years, studying in English-medium schools. Participants with single parents, acute or chronic health problems, on medication, having attended any residential yoga program in the

last 3 months were excluded from the study. They were selected from children who were registered to attend three 7-day residential summer yoga programs that naturally formed the three cohorts for the study. Children were screened for suitability and once their parents provided consent along with the children’s assent, were subjected for the preassessment. Considering the rapid psychosocial changes during the adolescence, the participants were further subdivided into juniors (9–12 years) and seniors (13–16 years).

Children from each batch were further randomly divided into smaller groups of 12–15 participants, with two teachers, which made it easy to implement the intervention. Teachers included undergraduates in yoga and were trained on the implementation of the intervention to ensure uniformity.

Since the selection of participants was from a summer yoga camp during the summer break, there was good heterogeneity of the sample with respect to family backgrounds, socioeconomic strata, cultures, traditions, faiths, and academic backgrounds.

Ethical approval was obtained from the Institutional Ethical Committee of S-VYASA with the reference number RES/IEC-SVYASA/64/2015.

Assessment

The psychosocial fitness was assessed by the outcome measures of social competence, empathy, altruism, parent relationship, and peer friendship. Data were collected from the adolescents before and after the intervention. Data of empathy, altruism, and parental and peer relationship, from the parents, were collected before and after 3 months of the intervention using the parent versions of the respective scales. This would help comparing the opinions of the parents with that of their children.

The psychometric scales used are developed and validated by Child Trends^[18,19] and they are (a) Social Competence Questionnaire – 9-item scale with Cronbach’s alpha of 0.79; (b) Teen Empathy – 4-item scale with Cronbach’s alpha 0.84; (c) Teen Altruism – 4-item scale with Cronbach’s alpha 0.80; (d) Positive parent relationship – 6-item scale with Cronbach’s alpha 0.92; and (e) Peer friendship – 5-item scale with Cronbach’s alpha 0.91.

Design

The present study is a single group pre- and post-yoga interventional study carried out during a residential yoga camp for the adolescents. Data were collected from both children, as well as parents, using respective questionnaires. Three independent 10-day residential camps for personality development were organized during the summer by VYASA organization. While the duration of camp was 10 days, the yoga intervention schedule was followed from day 2 to day

8 across the three camps. Eligible adolescents underwent the same yoga intervention program with the instructors, living conditions, daily routine, and dietary plan.

Intervention

The modified version of Integrated Yoga Module, based on Pancha Kosha model (five layers of existence) as explained in Taittiriya Upanishad comprised of yogic techniques that benefit each of the Koshas (gross body – annamaya kosha; energy body – pranamaya kosha; emotional body – manomaya kosha; intellectual body – vijñanamaya kosha; and bliss body – anandamaya kosha). The module was based on various yogic texts, books on yoga for children, and was modified in consultation with the subject experts with more than 25 years of experience in conducting these camps.

The yoga module included Asana, Pranayama, Relaxation, Meditation, and also Jnana yoga (Yama Niyama concepts) and Bhakti yoga (prayers and bhajans). The bhakti-yoga sessions included mantra chanting and singing, whereas Jnana yoga sessions included lectures, creativity such as role playing, storytelling, parables, journaling diary entry, and so forth to drive the Yama Niyama concepts and yogic concepts of food. Few competitive activities were organized between groups to encourage participation and team building. The sessions were administered in a manner that kept the program engaging and interesting to the selected age group. Details of the intervention are summarized in Table 1.

Data extraction

Data collection was done for the children on the 1st day (predata) and 9th day (postdata) of the camp, in small group settings by trained researchers. The investigators and two teachers were available to clear doubts and provide unbiased guidance during the data collection. Data collection from the parents was done on the 1st day (predata), when they came to drop their wards to the camp, and after 3 months (postdata) as a follow-up data, by sending the questionnaire through E-mail.

All the recruited students completed the questionnaires before and after the intervention. A total of 340 parental responses were collected before the intervention and only 43 parental responses were obtained after 3 months as a follow-up data (postdata). Post 3 months data obtained from parents served to evaluate if the yoga intervention had long-term and sustained effects on the social behavior. Only 43 pre- and post-parental data were available that made it difficult to draw strong conclusions on the parental opinions. The reasons for attrition in parental predata were (a) parents were not available at the commencement of the camp, (b) refusal to participate, and (c) lack of English language fluency. Several parents did not respond to the follow-up assessments despite repeated E-mail and reminders due to their preoccupations or disinterest. Hence, the analyses that involved data from adolescents and their parents were from 43 participants.

Data analyses

To maintain confidentiality, the data sheets were coded and personal identifiers were omitted during the data entry. Analysis was done using SPSS Inc. SPSS for Windows, Version 16.0. Chicago, Change over time was evaluated using the paired samples *t*-test. The results of the tests were deemed to be significant if probability values were <0.05, whereas trends ($P < 0.1$) were also highlighted.

Results

The effect of a short-term residential yoga intervention was evaluated for its benefits on social competence, empathy, altruism, parent relationship, and peer friendship by a single-arm, pre- and post-study in three individual cohorts of adolescent children. The three cohorts comprised 148 (57.8% male) (62.8% juniors), 167 (73.1% male) (53.9% juniors) and 195 (62.1% male) (57.4% juniors), with a mean age of 11.84 ± 1.77 , 12.22 ± 1.82 and 12.06 ± 1.82 , respectively. Demographic and anthropometric data are presented in Table 2.

As seen in Table 3, comparing pre- and post-data for each of the cohorts showed that there were no significant

Table 1: Summary of integrated yoga intervention program

Name of the intervention session	Duration
Prayer session	15 min
Asana sessions: Standing postures, sitting postures, prone postures, inverted postures, supine postures	2 h
Meditation session: Om meditation, cyclic meditation	45 min
Pranayama session: Conscious breathing, sectional breathing, full yogic breathing, dynamic (Bhastrika, Kapalbhathi), balancing (Anuloma-viloma), cooling (Shitli), tranquilizing (Bhramari)	1 h
Relaxation session: IRT, QRT, DRT	1 h
Lecture session: Yama Niyama concepts, physical adolescent health, emotional appraisal and control, prosocial behavior	1 h
Chanting and singing session: 18 verses from Bhagavad Gita, devotional songs, patriotic songs	1 h
Creativity sessions: Karma yoga (altruistic group activities), role modeling, parables, storytelling, diary writing, competitions	2 h
Game session: Yogic games, group awareness	1 h
Happy assembly: Cultural program	1 h

IRT=Instant relaxation technique, QRT=Quick relaxation technique, DRT=Deep relaxation technique

changes, observed in the first batch, whereas the subsequent batches showed statistically meaningful changes in teen empathy. Social competence and altruism was significant in the third batch. An interesting observation was that while all changes, although nonsignificant, were in the positive direction, peer friendship had changed negatively.

Analysis of the junior subgroup, as shown in Table 4, indicates that empathy significantly improved in all the three batches. Social competence improved significantly in the first batch and altruism improved significantly in

the third batch. It was interesting to note that unlike the overall result, peer friendship had increased, although nonsignificantly in two of the three batches. All the other variables also showed a nonsignificant positive change.

Analysis of the senior subgroup, as shown in Table 5, indicates that there were no significant positive changes in any of the outcomes in batch 1, but social competence and empathy changed positively in the subsequent batches. Altruism also showed a significant positive change in the third batch. Peer friendship showed a significant reduction in the first batch, which was not seen in the subsequent batches.

Additional analyses compared ($n = 340$) predata of the outcomes between the adolescents and their parents (200 juniors), as seen in Table 6. There were significantly lower altruism and peer friendship and significantly higher parent relationship reported by parents when compared with their children.

Changes in empathy, altruism, parent relationship, and peer friendship were compared between the responses

Table 2: Demographic and anthropometric measures

Variables	Mean±SD		
	Batch 1	Batch 2	Batch 3
Age	11.84±1.77	12.22±1.82	12.06±1.82
Father age	43.54±4.63	43.61±5.61	43.56±4.40
Mother age	38.64±4.15	38.12±3.87	38.16±4.00
Height	148.26±12.81	149.51±12.75	150.5±13.29
Weight	43.42±13.20	41.31±12.28	44.03±12.35
BMI	18.80±3.82	17.75±3.99	18.8±4.98

SD=Standard deviation, BMI=Body mass index

Table 3: Comparison of pre- and post-data of the three cohorts

Measures	Batch 1 (n=148)			Batch 2 (n=167)			Batch 3 (n=195)		
	Mean±SD		P	Mean±SD		P	Mean±SD		P
	Pre	Post		Pre	Post		Pre	Post	
Empathy	14.70±3.344	15.05±3.841	0.207	14.32±3.014	15.28±3.116	<0.001	13.97±3.341	14.90±3.284	<0.001
Social competence	33.21±6.702	33.70±7.866	0.363	33.19±5.381	34.06±6.816	0.055	32.43±6.513	33.48±6.463	0.021
Altruism	13.15±3.786	13.43±4.113	0.355	13.27±3.574	13.78±3.419	0.052	12.87±3.498	13.66±3.524	0.002
Parent relationship	23.61±4.827	23.84±5.273	0.606	23.58±4.928	23.89±4.885	0.423	23.66±4.168	24.19±4.746	0.099
Peer friendship	20.62±4.278	20.45±4.678	0.663	20.70±4.002	20.43±4.109	0.385	20.03±4.323	20.01±3.900	0.929

SD=Standard deviation

Table 4: Comparison of pre- and post-data of the three cohorts of juniors

Measures	Batch 1 (n=93)			Batch 2 (n=90)			Batch 3 (n=112)		
	Mean±SD		P	Mean±SD		P	Mean±SD		P
	Pre	Post		Pre	Post		Pre	Post	
Empathy	14.41±3.275	15.12±3.557	0.033	13.90±2.860	14.78±3.042	0.029	13.87±3.424	14.65±3.427	0.022
Social competence	32.40±6.823	33.83±6.882	0.029	32.51±5.707	33.04±7.228	0.465	31.89±6.616	32.63±6.710	0.236
Altruism	13.56±3.740	13.82±3.776	0.488	12.82±3.740	13.33±3.576	0.199	12.89±3.483	13.63±3.521	0.041
Parent relationship	23.49±5.058	24.10±4.632	0.227	23.48±5.383	24.01±4.775	0.361	23.71±4.433	24.21±4.973	0.295
Peer friendship	19.98±4.604	20.62±3.785	0.143	20.16±3.940	19.98±4.081	0.682	19.66±4.788	19.71±4.060	0.918

SD=Standard deviation

Table 5: Comparison of pre- and post-data of the three cohorts of seniors

Measures	Batch 1 (n=55)			Batch 2 (n=77)			Batch 3 (n=83)		
	Mean±SD		P	Mean±SD		P	Mean±SD		P
	Pre	Post		Pre	Post		Pre	Post	
Empathy	15.18±3.432	14.93±4.311	0.607	14.81±3.133	15.86±3.119	0.001	14.12±3.240	15.23±3.070	0.002
Social competence	34.58±6.318	33.49±9.363	0.248	33.99±4.890	35.25±6.135	0.010	33.16±6.339	34.63±5.965	0.028
Altruism	12.45±3.795	12.76±4.586	0.544	13.79±3.318	14.31±3.168	0.131	12.84±3.539	13.71±3.549	0.011
Parent relationship	23.82±4.448	23.42±6.232	0.640	23.70±4.368	23.75±5.040	0.917	23.59±3.806	24.16±4.452	0.144
Peer friendship	21.71±3.436	20.16±5.918	0.031	21.34±4.005	20.96±4.105	0.400	20.53±3.569	20.41±3.659	0.729

SD=Standard deviation

received by the 43 adolescents and their parents, as shown in Table 7. It was interesting to note that the adolescents reported a significant change ($P = 0.003$) in altruism and the parents reported a significant change ($P = 0.035$) in parent relationship as a result of the yoga intervention.

Discussion

The objectives of this study were to evaluate the effects that a 7-day residential yoga intervention would bring on measures of psychosocial fitness in three independent cohorts through a single group pre- and post-study. The secondary objective was to compare if these effects were also observed by the parents.

Statistically significant increase in measures of empathy, social competence, and altruism were inconsistent between the three cohorts and between the age groups, except for an increase in empathy, which was seen across all the three cohorts among juniors.

Psychosocial fitness stems from empathy or being able to put oneself in another’s situation in order to understand their feelings. This in turn impacts one’s behavior and makes them better connect with their peers, parents, and surroundings at large. Altruism is also a resultant prosocial behavioral pattern of increased empathy,^[20,21] and these patterns of psychosocial behavior define an individual’s social competence. Building self-awareness is the key to developing skill of emotional appraisal and control, whereby positive social competencies might be achieved. Yoga, being the science of holistic well-being, comprises of practices that encourage internalization and development of self-awareness, and thereby, increase the capacity of self-control.^[22] Yoga practices through a sequence of

awareness building and relaxing practices evoke a deeper calming effect, which helps students get into a frame of mind, conducive to learning and is distinct from the effects of physical exercise alone.^[16] The results of our study may suggest that 7 days of yoga practices may have only been adequate to show a change in empathy scores and a longer intervention might have been required to show consistent impact on the downstream behavioral patterns. Other studies have also indicated that Karma Yoga,^[23] yoga practices, mindfulness,^[24] and prayer^[25] have an influence over the aspects of empathy, altruistic behavior, and social competence in adolescents.

Variables of empathy, altruism, and peer and parental relationship are easily under or overestimated while using a self-reported instrument. Thus, parallel data of these variables were also sought from the parents. It is, however, known that the parents are not able to report accurately, certain aspects of their adolescent children’s behavior.^[26] Comparison of the corresponding adolescent and parent data provided rich information on the discrepancies of opinions held by each of them. Comparing baseline values between parents and their children, it was interesting to note that apart from having an agreement in scores of empathy, all other outcomes were significantly different. It was more interesting that parents opined that their children had very positive parental relationship and a very-low peer friendship, but their children thought otherwise. Noting these discrepancies, we further assessed the changes in these parameters resulting from the yoga intervention in both these populations.

In the present study, adolescents reported only a trend of improvement ($P = 0.095$) in parental relationship as a result of the yoga intervention, but the parents reported a significant ($P = 0.035$) improvement, 3 months after the intervention. However, unlike what was expected, the parameters of peer friendship reduced significantly ($P = 0.031$) in seniors of the first batch.

A positive parent–child relationship is an essential component of adolescent development. During this transitional age, the concept and opinions of oneself grow stronger, taking precedence over that of their parents^[27] and conflicts with parental ideologies emerge. Retaining a

Table 6: Agreement between the parents and adolescents (n=340)

	Mean±SD		P
	Parent data	Adolescent data	
Empathy	13.90±3.052	14.26±3.278	0.131
Altruism	12.31±3.339	12.84±3.614	0.023
Parent relationship	27.10±5.084	23.41±4.762	<0.001
Peer friendship	10.29±3.113	20.45±4.177	<0.001

SD=Standard deviation

Table 7: Comparison of the change scores between parents and adolescents (n=43)

Outcome measures	Data description						
	Parent data set			P	Adolescent data set		
	Mean±SD		P		Mean±SD		P
	Predata	Postdata		Predata	Postdata		
Empathy	12.47±2.914	12.93±2.772	0.446	14.12±3.52	14.84±3.703	0.171	
Altruism	10.35±3.101	11±3.867	0.372	12.3±3.827	13.65±3.484	0.003	
Parent relationship	24.95±5.3	27.05±3.879	0.035	23.19±4.36	23.88±4.3	0.095	
Peer friendship	9.51±2.53	9.56±3.026	0.929	20.37±4.37	20.58±3.923	0.708	

SD=Standard deviation

healthy relationship with parents and peers plays a crucial role in an individual's psychological and physical health.^[28] Components of the intervention also comprised activities that were geared to provide calmness and balance to the mind (Pranayama, meditation) and promoted the quality of relationships and moral behavior (Yama Niyama) in adolescents.^[29] This effect, as observed by the parents, 3 months after the intervention could suggest a sustained change in parental relationship as a result of yoga. The adolescent data, collected before and after a 7-day intervention, might not have been adequate to appraise the change. Furthermore, not having the exposure with the parents during this time might have made it nonconducive for its appraisal. The trend seen in the present study is in line with a previous randomized controlled trial^[30] evaluating changes in socioemotional competencies, such as empathy and prosociality, as a result of a yoga program delivered twice a week for 12 weeks to 125 low socioeconomic adolescents.

The point of reference for peer friendship during the predata was an established set of peers from their native setting, whereas the postdata elicited had a point of reference of peers from within the camp. This subtle disparity was appreciated more in seniors, which had resulted in a significant drop in scores of peer friendship, whereas in juniors there was a higher degree of adaptability indicated by a nonsignificant increase in peer friendship in the first and third batches.

This was the first time that an interventional study of this scale, in adolescents had been attempted. The intervention being tested was also developed in a comprehensive manner, referring authentic Indian texts of yoga, modern-day literature of its interpretations, and modifying it through several iterations with subject experts in yoga, psychology, and adolescent health. An intervention that is focused on the holistic psychosocial development of adolescents, administered in the group setting has shown to be more effective in improving social skills, if there has been at least one medical health professional or an adolescent psychologist involved in its development.^[13] This ensured that while the premise of yoga is grounded to its authentic roots, the practices themselves were able to elicit the interest of the selected age group. Qualitative feedback elicited from the adolescents and parents on all aspects of the camp was very good. Considering that other literature provided stronger evidence to the benefits of yoga among adolescents, an attempt was also made to evaluate a residential camp setting as a way to impart these practices to this age group. To provide a multidimensional intervention like yoga in such large numbers, the study employed close to 40 trainers who were rigorously trained and monitored for uniform quality of instruction. In addition, capture of parental data along with corresponding data from their children was a novel endeavor, although the results had not proven to be what was anticipated.

The inconsistency in the results demonstrate that yoga being a multimodal set of activities, is heavily dependent on how well each person is able to internalize these practices and drive the change of mindset.

The absence of a control group heavily undermined the conclusions drawn in this study. Considering this, the design was reworked at detecting the repeatability of the results. Contrary to our speculation, the internal validity of the results, by virtue of the inconsistency of results, was also poor. Adolescent data should have also been collected along with that of their parents, post 3 months to evaluate the sustained changes in the relationships. The controlled environment of the camp setting might have only provided the required information needed for the psychosocial improvement and evaluating the same after the participants had been given an opportunity to express it in their existing relationships would have provided a fairer comparison. Secondary qualitative data, in anticipation of a nonconclusive result, could have been premeditated, which would have given a rich feedback on the changes needed in the module and its implementation. Future studies, while having a more robust design, should not just be able to detect the effects but also identify possible predictors and mechanisms associated with improvement in psychosocial fitness. Long-term interventions, homogenous samples, and improved and focused interventions also remain as improvements in the future researches in this field.

Conclusion

Adolescence is a phase of emotional and psychosocial transition and yoga, a technique of mind control, which could potentially help in improving holistic personality. The efficacy of a 7-day yoga intervention in improving psychosocial fitness was evaluated and showed that the feeling of empathy increased significantly. There was a sporadic increase in altruism, social competence, and parent relationships in some cohorts while peer relationship deteriorated. Parents providing data on their children's perceived level of altruism, empathy, and relationship with parents and peers, before and after 3 months of intervention highlighted the discrepancy in their understanding of their children and also their ability to perceive the changes while the children could not. Design and implementation flaws, as a result of resources, limit from stating the findings of these studies as conclusive evidence but helps to plan more robust and intricate studies to assess the specific benefits of yoga and its mechanisms.

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Conflicts of interest

There are no conflicts of interest.

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