

4. AIM AND OBJECTIVES

4.1 AIM

To evaluate the relationship and effect of Yoga on Working Memory in Adolescents

4.2 OBJECTIVES

1. To establish normative data for working memory task in Indian adolescences.
 - 1.1 To demonstrate normative data for the verbal and non-verbal memory task in Indian adolescents.
2. To explore the relationship between yoga related psychological states and working memory in healthy adolescents.
 - 2.1 To explore the relationship between state mindfulness and spatial memory in healthy adolescents.
 - 2.2 To understand the relationship between state anxiety and spatial memory in healthy adolescents.
3. To evaluate the effect of intense yoga based personality development program on psychological domains and working memory in healthy adolescents.
 - 3.1 To assess the effect of intense yoga based personality development program on dispositional mindfulness in healthy adolescents.
 - 3.2 To evaluate the effect of intense yoga based personality development program on state mindfulness in healthy adolescents.
 - 3.3 To assess the effect of intense yoga based personality development program on state anxiety in healthy adolescents.
 - 3.4 To estimate the effect of yoga based personality development program on spatial memory in healthy adolescents.

4. To examine the immediate effect of cyclic meditation on working memory and psychological states in healthy adolescents.
 - 4.1 To examine the immediate effect of cyclic meditation on verbal and non-verbal memory in healthy adolescents.
 - 4.2 To investigate the immediate effect of cyclic meditation on state anxiety in healthy adolescents.

4.3 RESEARCH QUESTION AND HYPOTHESES

The following research questions and hypotheses were addressed through four different studies:

***Research Question 1:** What is the relationship between psychological states and working memory in adolescents?*

Hypothesis 1: Higher levels of state mindfulness will be positively related to working memory.

Hypothesis 2: Higher levels of state anxiety will be negatively related to working memory.

***Research Question 2:** What is the effect of intense yoga based personality development program on psychological domains and spatial memory in healthy adolescents?*

Hypothesis 3: Intense yoga based personality development program may enhance spatial memory in healthy adolescents.

Hypothesis 4: Intense yoga based personality development program may improve dispositional mindfulness in healthy adolescents.

Hypothesis 5: Intense yoga based personality development program may increase state mindfulness in healthy adolescents.

Hypothesis 6: Intense yoga based personality development program may reduce state anxiety in healthy adolescents.

Research Question 3: *What is the immediate effect of cyclic meditation on state anxiety and working memory in adolescents?*

Hypothesis 7: Immediate effect of *cyclic meditation* may enhance verbal and non-verbal memory in healthy adolescents.

Hypothesis 8: Immediate effect of *cyclic meditation* may reduce state anxiety in healthy adolescents.

4.4 DEFINITIONS OF KEY TERMS

Definitions of terms are provided below to clarify the purpose of this study:

- **Mindfulness** is conceptualized as a state of attentiveness to present events and experiences that are unmediated by discursive or discriminating cognition (Brown & Ryan, 2003; Brown, Ryan & Creswell, 2007). For the purposes of this study, state mindfulness was operationalized through total scores obtained on the *Mindfulness Attention Awareness Scale* developed by Brown & Ryan (2003). Further dispositional mindfulness was operationalized through total scores obtained on the Child and Adolescent Mindfulness Measure (CAMM) developed by Greco, Baer, & Smith (2011).
- **Working Memory (WM)** is conceptualized a limited capacity system serving to keep “active” a limited amount of information for a brief period of time, and then to operate on it (Teixeira, Zachi, Roque, Taub & Ventura, 2011), has also been conceptualized as a component of higher-order cognitive processes (Engle, 2002). For the current study, multidimensional assessments of working memory, all

domains verbal, non-verbal and spatial measures were administered to understand the working memory. Various tools like visual memory task, spatial memory task (Baddeley, 1993) and Corsi Block-Tapping Task (Kessels et al, 2000) were used to operationalize working memory.

- **State Anxiety** (a temporary condition experienced in specific situations) refers to transitory unpleasant feelings of apprehension, tension, nervousness or worry, often accompanied by activation of the autonomic nervous system; it reflects how threatening a person perceives his environment to be. For the purposes of this study, state mindfulness was operationalized through total scores obtained on the State Anxiety Inventory & State Anxiety Inventory short form developed by Spielberger (1977).
- **Yoga** is defined as various component (Nagendra, 2010) such as *āsana* (seat or meditative posture), *prāṇāyāma* (regulation of breath), *pratyāhāra* (withdrawing the mind from the objects of sense experiences), *dhāraṇa* (confinement of the mind to one point or one object or one area) and *dhyāna* (relaxed dwelling of the mind in a single thought with awareness while practicing unbroken concentration). Further practice of yoga involves ethical principles of self restraints (*Yama*) and observances (*Niyama*).
- **Cyclic Meditation** (CM) is a 'moving meditation', which combines the practice of yoga postures interspersed with relaxation techniques. The objective of CM is to calm down the mind through a cyclic of awareness. The core principle of CM is when mind loses its awareness (*laya*) and enters into a sleepy state, stimulate (*Sambodhayet*) and awaken it. Do it again and again till mind reaches a state of

poise and calmness with present moment awareness (Nagendra & Nagarathna, 1997).

- ***Adolescence*** transitional phase of growth and development between childhood and adulthood. The World Health Organization (WHO) defines an adolescent as any person between ages 10 and 19. The biological determinants of adolescence are fairly universal; however, the duration and defining characteristics of this period may vary across time, cultures, and socioeconomic situations.