CHAPTER - 7

7.0. DISCUSSION

7.1. STUDY ONE

7.1.1. SELF-ESTEEM AND ATTACHMENT STYLE

In the positive implicit attitude category, the relation between Self-esteem and close attachment style is significantly positive; whereas in negative implicit attitude category, the relationship is weakly positive. The relationship between self-esteem and dependent attachment style is weak in both positive and negative implicit attitude groups. And, the relation between self-esteem and anxious attachment style is negative. This shows that students with good self-esteem tend to show close and secure attachment styles, and may take up career choice with a lot of confidence. However, the anxious attachment style students may suffer a lack of confidence, even though they have positive implicit attitude towards engineering.

7.1.2. PARENTAL BEHAVIOUR AND ATTACHMENT STYLE

For the positive implicit category, the relationship between the perceived parental behaviour like inducing guilt and the three types of attachment styles shows weaker relationship compared to the negative implicit engineering category. Inducing guilt was relatively prominent strategy in close and anxious attachment styles for negative implicit attitude category. Both in positive and negative implicit attitude categories, the relationship between threatening to punish was negatively correlated with close attachment style; and positively related to anxious attachment style. Encouraging performance was positively related to close attachment style, in negative implicit category; but negatively related to

dependent attachment style in the positive implicit attitude category. The relationship was positive between encouraging performance and anxious attachment style, in positive implicit attitude category. Explaining reasons was observed to have a negative relationship between close, dependent, and anxious attachment styles in the positive implicit attitude category, whereas in the negative implicit attitude category, the relationships were inverse, from weakly negative to positive relationships. Offering choices relationship trend varied across attachment styles. Both positive and negative implicit attitude categories had negative relationships with close attachment style. The trend of relationship between offering choices and dependent attachment style was positive in positive implicit attitude category and negative in negative implicit attitude category. The trend of relationship between offering choices and anxious attachment style was positive in negative implicit attitude category and very weakly positive in positive implicit attitude category. The relationship between being aware and anxious attachment style was positively expressed in negative implicit attitude category compared to positive implicit attitude category. Whereas the relationships were almost insignificant, to interpret with close and dependent patterns of attachment styles.

These above-mentioned parental behaviours, namely - inducing guilt, threatening to punish, and encouraging performance, are considered as factors of controlled parenting strategy. Similarly, being aware, explaining reasons, offering choices are autonomy supporting parenting strategies. Attachment style, which is a more inherent trait of a person, closely derives its shape from the early parental experiences in the childhood. Even though attachment styles tend to change over the human life span, we believe in Indian context, unlike the other western cultures, the dependency of a child for education in early

college period fully depends on the parents. Hence the parental influence can be quite strong in the Indian context, though the peer influence would also emerge at around this age. These trends in the results imply that if a person demonstrates close and dependent attachment styles—which we assume to be the foundation for a secure attachment style—where a person has found comfort in being close to others and found others safe to depend upon when in need, we assume that these will foster a clear conflict-free decision-making process when it comes to choosing a career. Hence, they will have stronger implicit attitude toward joining engineering. Here in the study, interestingly, the results suggest that even proactive parental behaviours like explaining reasons, offering choice, also need not be present if the student is having stronger close attachment style. Or in other words, we can say that close attachment style students would anyway find their way to their choices, including career choice. Students with dependent type of attachment style would be benefited by not too much pushing to perform high, and giving too many choices. Similarly, in anxious type of attachment style, offering choices could create a negative impact on their career choice, and encouraging to perform high may motivate to have a better attitude towards career choice.

7.1.3. PARENTAL BEHAVIOUR AND SELF-ESTEEM

In the positive implicit attitude category, the relationship between self-esteem and parental behaviours like being aware, inducing guilt, and encouraging performance are positive and the relationship is negative with parental behaviours like offering choices and threatening to punish. In the negative implicit attitude category, the relationship between self-esteem and parental behaviours is weak, and offering choices had shown negative relationship. These results suggest that having higher self-esteem is associated with being

more aware and grounded types of parental behaviour. Interestingly, inducing guilt and encouraging performance can also be useful strategies as the negative effect of these two are cushioned out with having better self-esteem, and this type of controlled parental behaviour can also help a student have positive implicit attitude towards engineering. However, threatening to punish and offering choices may be counterproductive regarding self-esteem.

7.1.4. SELF-ESTEEM AND LEARNING

In the positive implicit attitude category, the relation between self-esteem and perceived competency for learning is significantly positive; whereas in negative implicit attitude category, the relationship is weakly positive. Very similar relationship was also observed between self-esteem and reason for learning (autonomy), whereas, the relationship between self-esteem and reason for learning (controlled) were negative in both the positive and negative implicit attitude categories, with the relation being moderate in negative implicit attitude category. In the positive implicit attitude category, the relation between self-esteem and reason for learning (autonomy) is significantly positive; whereas in negative implicit attitude category, the relationship is weakly positive. In the positive implicit attitude category, the relation between self-esteem and perceived competency for learning is significantly positive; whereas in negative implicit attitude category, the relationship is weakly positive. These findings imply that self-esteem, particularly in those who had a favourable implicit attitude toward engineering, is crucial in helping people recognise their own competence. Also, the competency for learning is encouraged through an autonomous way of reasoning out the choice of learning, but becomes counterproductive in the controlled way of reasoning out the choice of learning, especially in the negative implicit

category group.

Aalderen-Smeets et al. looked into the relationship between implicit beliefs about the malleability of STEM (science, technology, engineering, and mathematics) ability and secondary school students' desire to take a STEM subject bachelor's degree. They discovered that students' intentions to choose a STEM study path may be motivated in part by implicit perceptions about the malleability of STEM skills (Aalderen-Smeets et al., 2011). Comparing our results, with the existing literature, our study also showed similar results, where positive and negative E-IAT scores were correlated with the explicit scores in the expected directions. Chi and colleagues studied the relationships between students' attitudes toward science, their perceptions of how difficult it is to learn science, gender, parents' employment, and scientific abilities. They discovered that kids' overall interest in science, their parents' vacation, and their perception of science's difficulty were all related to their scientific abilities (Chi et al., 2017).

An earlier study looked at the relationship between students' extrinsic and intrinsic motivational orientations and how they regarded their teachers' communicative style, specifically how they supported students' autonomy and provided helpful feedback regarding students' learning progress. The relationship between these factors and a variety of language learning outcomes, such as effort, anxiety, and language competency, is also explored. Stronger sentiments of the intrinsic drive were associated with better results in language learning, including increased motivational intensity, greater self-evaluations of competence, and a decrease in fear. Additionally, there was a correlation between students' judgments of the teacher's communication style and their intrinsic motivation: the lower their intrinsic motivation, the more controlling and uninformative the teacher was seen as

being by the students (Noels et al., 1985).

Another study examined the characteristics of controlled and autonomous motivation using a person-centered approach to establish motivational profiles. The findings demonstrated that the group that displayed the highest learning behaviours and performed best on perceived need-supportive training was one that had a high amount of autonomous motivation and a low level of controlled motivation (Vansteenkiste et al., 2009). In a previous study, self-esteem and self-efficacy were employed as mediating factors to explore the connection and mechanism of action between attachment relationships and academic burnout. According to the data, there is no correlation between self-esteem, attachment anxiety, and attachment avoidance scores (Chen et al., 2021).

Another study examined the possibility that the Type D personality type influences the link between attachment and self-esteem. Self-esteem was found to be strongly correlated with Type D personality and attachment type (Huis in ’t Veld et al., 2011). Yousaf et al. investigated how self-esteem functions as a mediator between different attachment styles and children's addiction to social media. One of the causal relationships between attachment styles and social media addiction was discovered to be self-esteem (Yousaf et al., 2021).

According to a different study, parental support is linked to decreased imposter sentiments in children via self-esteem, but paternal overprotection is linked to higher imposter feelings in children. Because parental care and overprotection affect female students' self-esteem, which in turn affects their impostor sentiments, it follows that these factors may also be related to these students' impostor feelings (Yaffe, 2020). Our study

results also stated that parental scale and self-esteem were positively correlated.

7.2. STUDY TWO

7.2.1. ATTACHMENT STYLE, FREEWILL AND DETERMINATION, THE IDEA AND PARENT SCALE

Close attachment style is negatively correlated with personal limitation in yoga practitioners and positively correlated with personal agency, identity exploration and experimentation in non-yoga practitioners. Anxiety is positively correlated with negativity in both the groups and with feeling in between in yoga group and with other focus in non-yoga group. However, all the correlations are weak. This shows that students with close attachment style tend to take responsibility of their lives and students with anxiety tend to have a negative approach towards life. Previous studies have demonstrated that stable attachment serves as a model for developing successful romantic relationships, which in turn promotes higher psychosocial adjustment (Kumar & Mattanah, 2016). The present study results support previous study reflect similar results.

7.2.2. FREEWILL AND DETERMINATION, THE IDEA AND PARENT SCALE

Despite the fact that both groups' participants' personal agency is favourably connected with identity exploration, experimentation, self-focusedness, and autonomous support, the correlation with experimentation is only moderate. Whereas the correlation with identity exploration, self focus and autonomous support are moderate in yoga group and low in non-yoga group. The relationship between personal agency, negativity and other focus is positive in yoga group but with weak correlation. In non-yoga group, the relationship between personal agency and parental control is negative with a low strength of

correlation.

Though personal limitation is positively correlated with parental control in both the groups, the correlation is moderate in yoga group and low in non-yoga group. The relationship between personal limitation and other focus is positive and moderate, while the relationship between personal limitation and feeling in between is positive and weak in yoga group.

Previous studies found that employees who believed in free will received better work performance ratings than those who did not, probably because believing in free will makes it easier to exert control over one's behaviour. (Stillman et al., 2010). According to findings from a different study, diffuse-avoidant style and rethinking of commitment were negatively connected to identity functions, whereas informative and normative styles, commitment, and in-depth exploration were positively correlated with identity functions (Schwartz et al., 2013). Another study's findings revealed that high aware individuals who had a greater decision boundary for particular tasks tended to prefer such tasks over others (Collier & Shi, 2020). Probably, in our study, yoga practitioners owing to their higher mindfulness show better decision-making capabilities and execute inner free will for making decisions.

7.2.3. THE IDEA AND PARENT SCALE

Identity exploration is positively correlated with autonomous support in both the groups. However, the correlation is weak. Experimentation is positively correlated with autonomous support in both the groups. But autonomous support has a moderate correlation in yoga group and low correlation in non-yoga group. Negativity is positively

correlated with parental control in non-yoga group and the correlation is low. Self focus and other focus are positively correlated with autonomous support in yoga group with weak correlation. Other focus is positively correlated with autonomous support in yoga group with weak correlation.

Prior studies have demonstrated that parenting practises and the quality of parent-child relationships continue to have an impact on the mental health of emerging adults, particularly for daughters (Steele & McKinney, 2019). People who have high levels of closeness are happier, less lonely, and have more self-esteem than people who have low levels of intimacy (Weisskirch, 2018). Higher unpleasant childhood experiences were associated with a lower likelihood of feeling less self-focused and a lower likelihood of believing that this stage of life is one of possibility and experimentation. On the other hand, greater ACEs scores were linked to more negativity and instability (Davis et al., 2018). Negative consequences for emerging adults were connected to parental psychological control manifestations in relation to accomplishment and dependency through different pathways. (Liga et al., 2017). These results suggest that in yoga practitioners, a sense of identity exploration, and autonomy supportive parenting styles are more prevalent.

7.3. STUDY THREE

In terms of psychological variables including the adult attachment scale, general health questionnaire, mindfulness attention awareness scale, and social desirability scale, there was no noticeable difference between the groups at the baseline. This showed both the groups had comparable psychological profiles. In the EEG variables, meditation score, low alpha, high alpha, and mid gamma bands were found to be different between the groups.

The post hoc tests showed that the changes were detected between pre versus during and pre versus post comparisons, and the during versus post comparisons were not significant. This shows that compared to the baseline, the changes are substantial at during and post.

Comparing our results with the existing results in the literature, in a study, meditation improved relaxed alertness and internalised attention by increasing amplitude in the alpha and theta waves (Kim, Kim, Jang, & Lee, 2022). There is a high frequency in attention and a low frequency in meditation in delta, theta, alpha, beta, and gamma waves (Kakde & Momin, 2021).

Internal attention or other cognitive processes are reflected by low-frequency alpha power (Travis, 2019). According to EEG studies, meditation significantly increases alpha and theta activity (Kora et al., 2021). Our study results also fit with previous study results.

The high gamma band in EEG and emotion are highly correlated. Compared to positive stimuli, negative stimuli cause the brain to become more active and responsive. (Yang et al., 2020). During touching, EEG waves, delta, theta, beta, and gamma signals were higher than during meditation (Lawpradit & Yooyativong, 2021). Anxiety and high arousal levels were reduced in people who did not experience an increase in gamma energy following mindfulness training, and these effects were reduced to a lesser amount in subjects whose gamma energy levels increased (Naderan et al., 2021). It might not have affected the emotional stability because the findings of our investigation showed that there was no significant difference between high gamma and mid gamma bands in the post-test.

Previous study found that 8 weeks of brief daily meditation decreased negative mood state and enhanced attention (Basso et al., 2019). Mindfulness Based Intervensions have

limited positive effects on attention in healthy adults (Yakobi et al., 2021). A meta-analysis suggests that attention is likely implicated in meditation, and meditation may improve some, but not all, attentional processes (Sumantry & Stewart, 2021). Mindfulness training as an intervention and a long-term practice is indeed associated with reliable changes in objective attention performance (Verhaeghen, 2021). EEG neurofeedback appears to increase state mindfulness in adults during a brief meditation (Hunkin et al., 2021). Previous study results showed that meditation increases attention, significant changes in the delta band which represent the brain in deep sleep (Harne et al., 2019). Another study found that the delta power was reduced and the transitivity of the delta network was increased immediately after the start of meditation. Then, the beta and gamma power increased, and the clustering coefficient and global efficiency of the gamma network increased at the deep meditation substage (Wang et al., 2019). After meditative intervention, post-traumatic residual disability subjects exhibited increased gamma activity in the left inferior parietal lobule relative to normal controls. In addition, changes of delta activity in the right precuneus correlated with changes in the psychological score on role physical item (Hata et al., 2019).

Another study results showed a significantly smaller average amplitude of eye movements in the delta band (1–4 Hz) during mindfulness meditation than instructed mind-wandering (Matiz et al., 2019). Longitudinal reductions in EEG power in the beta frequency range were identified after 3 months of focused attention meditation (Skwara et al., 2022). The results of a previous study revealed a significantly lower global phase synchrony in beta frequency band of the Meditation group, which has been previously reported as an indication of reduced cognitive processing and achieving the mindful state

in experienced meditators (Yoon et al., 2021).

A brief breath awareness mediation has less consistent effects with beta and high gamma activity (Colgan et al., 2020). A study observed a robust increase in occipital gamma power (30–70 Hz) during the deepest stage of meditation across all sessions (Luft et al., 2019). Mindfulness training to promote creativity leads to the increase of gamma bands in the central and parietal regions (Naderan et al., 2021).

In our study, there were significant within-group differences observed in specific EEG variables, such as overall meditation score, low alpha, high alpha, mid gamma, and high gamma. However, no significant differences were found in other variables like the overall attention score, beta, delta, and theta waves. Further, there were also no significant difference between yoga and sports groups.

The observed trend in the overall attention score could be attributed to the nature of the two groups in terms of presence of cognitive demands. In our study, the EEG were measured in a state, where no specific attention-based cognitive task was given. Hence, attention-related EEG variable measured in this study might not have been sensitive enough to detect differences between the two interventions, during the three states of meditation practice. On the other hand, significant within-group differences in overall meditation score, low alpha, high alpha, mid gamma, and high gamma could be attributed to the relaxation and stress-reduction effects of yoga and sports interventions (Gard et al., 2014; Hillman et al., 2008). Previous research suggests that yoga can enhance relaxation and reduce stress by increasing alpha brainwave activity (Froeliger et al., 2012). Similarly, sports and physical activities have been shown to improve mood and reduce stress, thus influencing alpha and gamma brainwave activity (Hillman et al., 2008).

Further research would be needed to distinguish the effects of yoga and sports on a broader range of cognitive functions and EEG variables.

7.4. STUDY FOUR

When comparing the results of sports group with yoga group, the results showed that Perceived Competency for learning has decreased more in yoga group than in sports group. A prior study found that regular yoga practise instils the most fundamental and significant life skills (Ankamreddy et al., 2020). The current study, however, revealed a decline in perceived competence. This might be the case since the students found the engineering program's curriculum to be challenging.

Guṇa has slightly decreased in yoga group than in sports group. Previous study results showed the influence of Yoga on *Guṇas* and self esteem in comparison to physical exercise (Raghuram et al., 2009a)**.** According to the findings of a prior study, 10 days of integral yoga practise has a considerable impact on children's *Sattva, Rajas,* and *Tamas* when compared to a control group of children between the ages of 8 and 12 (Patil & Rajas, 2014). According to a prior study, people who practise yoga have significantly more *sattva guṇa* than people who practise physical exercise (Kaur et al., 2022). However, the current study found that *guṇa* had a little downward trend. The students may be more enthusiastic and driven to be dynamic as they enter emerging adulthood, which may be the cause of this. Furthermore, the interventions delivered were simpler, more introspective forms of exercise. Students may not be able to understand introspection properly at this early emerging adulthood age. It may take more time to bring changes in the character. Students

underwent follow up sessions twice in a week for six months only. If same kind of introspective exercises are followed for longer duration, the expected changed may happen in the *gunas* of students. This could be the cause of the observed trend in *guṇa*. The effect sizes were however weaker.

In terms of dimensions of emerging adulthood, self-focused has decreased in the yoga group. In contrast, there were no modifications to the sports group for Self-focused. The self-focused characteristic of emerging adulthood is typical and even beneficial, as evidenced by the way it interacts positively with growth (De la Fuente et al., 2020). Self-focused has marginally decreased among yoga practitioners in the current study. This could be the outcome of spiritual intervention and introspection that aim to counteract egocentrism.

The sports group has seen an increasing impact in nagativity and instability than the yoga group. The best indicator of psychological well-being was the perception of emerging adulthood as a period of negativity and instability (Lane, 2020). High negativity/instability scorers had low life satisfaction and showed little sense of control over their lives (Reifman et al., 2007b). The current study found that the sports group experienced a moderate rise in negativity and instability while the yoga group saw essentially no changes. This suggests yoga practitioners were able to maintain the stability perhaps due to their confidence and decision-making skills admist temptations.

A previous research findings indicated that mindfulness and personality share developmental trajectories over a 4-month period, suggesting avenues for possible personality development via Mindfulness interventions (Karl et al., 2021). Another study provides evidence for negative and positive associations between specific mindfulness

facets and components of perfectionism. The results have implications for a theoretical and empirical understanding of the relationship between perfectionism and mindfulness and can inform the design of interventions to teach students how to cope with distressing forms of perfectionism during emerging adulthood (Manova & Khoury, 2022). Mindfulness mediated the relationship between various aspects of development (negativity/instability, self-focus, and feeling in-between) and self-doubt with age and gender moderating aspects of these relationships (Peer & McAuslan, 2016). The current study results showed no significant difference in identity exploration, experimentation and possibilities, negativity and instability, other focus and feeling in between after intervention. Emerging adulthood is an age group of between 18 and 25 (Reifman et al., 2007a). Emerging adults may find their identity at the end of their emerging adulthood stage. Only after they developed their identity, they will gain their stability in life and overcome the feeling-in-between. Expecting the significant changes in the first semester itself may be too early. However, the knowledge they gained during yoga intervention may help them to take responsibilities to their lives.

Previous study findings showed that laughter Yoga had a positive effect on students' general health and improved the signs of physical and sleep disorders, lowered anxiety and depression, and promoted their social function. Therefore, laughter Yoga can be used as one of the effective strategies on students' general health (Yazdani et al., 2014). Practice of vipassana meditation was effective in reducing somatic symptoms, anxiety, insomnia, social dysfunction and depression. It improved the overall general health of the subjects (Sharma, 2018). Among Chinese Buddhist monastics who practise daily mindfulness meditation, spending more time each day and having longer years of practice were

associated with better mental health (Tsui et al., 2020). The current study results showed no difference in general health after intervention. This study is a comparative study between yoga group and sports group. Sports group is an active control group. When comparing the results of both yoga group and sports group, there was no significant difference in the results. It shows that both yoga and sports play an equal role in general health.

7.5. STUDY FIVE

After the intervention of yoga and sports for one semester, we compared the results of yoga group with sports group. The results showed that Identity Exploration has moderately increased in sports group and decreased in yoga group. Identity development is crucial in emerging adulthood since it directly affects one's psychological and moral identity (Wood et al., 2018). In terms of identity exploration, the current study found a slight rise in sports practitioners and a decline in yoga practitioners. It demonstrates how meditation and introspective activities have an impact on psychological health and the formation of moral values.

Experimentation and possibilities have shown no change in sports group and moderate changes in yoga group. The best indicator of life satisfaction was the perception of emerging adulthood as a time of possibilities and experimentation (Lane, 2020). Yoga practise as a collection of physical, spiritual, psychological, and social intervention techniques can enhance quality of life, which is a function of wellbeing related to physical, emotional, mental health, and social functioning (Hadi & Hadi, 2007). According to the present study, experimentation and possibilities showed positive trend in yoga group. It indicates that yoga practices lead to enhanced life satisfaction.

In the yoga group, the self-focused trait of emerging adulthood has decreased, whereas there have been no changes in the sports group. The self-focused characteristic of emerging adulthood is typical and even beneficial, as evidenced by the way it interacts positively with growth (De la Fuente et al., 2020). Self-focused has marginally decreased among yoga practitioners in the current study. Like the previous study, this could again be the outcome of spiritual intervention and introspection that aim to counteract egocentrism.

A previous study results showed that the highest levels of dispositional mindfulness are associated with greater psychological wellbeing. Dispositional mindfulness acts against anxiety and avoidance characteristics (Rosales-Villacrés et al., 2021). Levels of dispositional mindfulness in adolescents were linked to attachment insecurity dimensions through attention control and emotion regulation (Goodall et al., 2020). The results of another study showed a positive correlation between attachment styles (both parental and romantic) and dispositional mindfulness (Fall & Shankland, 2021). However, the present study showed no significant difference in attachement styles after intervention. Attachement styles like personality traits tend to be more durable, and hence it may require a longer time to change, even though an appropriate interevention is administered.

The effect of cyclic meditation showed significant improvement in *sattva, rajas* and *tamas* in experimental group after training program whereas in control group, significant increase in *tamas* score and decrease in *rajas* and sattav scores were found (Sharma & Singh, 2019). Yoga can result in improvement of general health and personality development among university students (Maheswari et al., 2019). A randomized interventional study has shown that the improvement in the Yoga group is more when compared to the physical exercises' group for all the *Guṇas*, with accompanying promotion

of positive health and self esteem (Raghuram et al., 2009b). The current study results showed no significant difference in *triguṇa* after intervention, between the groups. This result again highlights that both yoga and sports were equally influencial in influencing the *triguṇa* scores. Perhaps a more durable intervention would be required to notice a perceptible change in the *triguṇa* under such academic settings.

Mindfulness-based meditation therapy is effective for improving the psychological well-being and sense of coherence of nurses, which helps them to cope with stress (Ando et al., 2011). Transcendental Meditation may improve mental health of young adult population especially in the areas of somatisation and anxiety, and this effect seems to be independent of age, sex and marital status (Yunesian et al., 2008). Mindfulness meditation lowers the cortisol levels in the blood suggesting that it can lower stress and may decrease the risk of diseases that arise from stress such as psychiatric disorder, peptic ulcer and migraine (Turakitwanakan et al., 2013). The present study results showed no significant results in general health after intervention. This trend again suggests the influential role of both the yoga and sports interventions. Both the sports and yoga were shown to have positive influene on health (Ross & Thomas, 2010).

These results have given a fair idea about how various psychological factors are influenced in the emerging adults in our study, and their linkages to the academic activites. These results suggest that a long term regular behavioral interventions like yoga are required to make a meaningful change in the emerging adults, who undergo various transformative changes during this phase of life.