ijlpr 2022; doi 10.22376/ijpbs/lpr.2022.12.6.SP25.L50-60

International Journal of Life science and Pharma Research

ISSN 2250-0480

Research Article

Stress Coping Strategies of Medical Students

Coping Strategies Adopted By First Year Medical Students and Their Academic Outcomes

***K.Jaiganesh[1] , R. Sobana[2], and P.Bharathi[3]**

[1].Professor of Physiology, Mahatma Gandhi Medical College, Sri Balaji Vidyapeeth. , Pondicherry, India.

[2]. Professor of Physiology, Mahatma Gandhi Medical College, Sri Balaji Vidyapeeth, , Pondicherry, India .

[3].Retired Professor of Physiology, SR Medical College & Research Institute, Akathumuri, Thiruvananthapuram

Abstract: Medical students tend to experience greater overall psychological distress when compared to the levels of distress observed in the general population. A careful analysis of the coping behaviors and their associations with personality factors etc., in the light of their biological basis, may offer important clues for successful interventions in order to yield fruitful academic outcomes. The fundamental aim was to evaluate the associations between the choice of coping strategies and the Big Five Personality traits among academic high- and low-achievers, and average students who have recently been exposed to the medical curriculum. The other three aims were to evaluate the relationship between the employment of coping strategies and psych morbidity among the above group; to explore the gender-based differences among the above student category; to assess the variations in the associations of adaptive/maladaptive coping with relationship to personality and other factors in the light of higher biological control mechanisms. The voluntary participants of the study include one hundred and forty-two first year medical students (68 males, 74 females) from a private University in Puducherry state, South India. The self-rating anxiety scale and self-rating depression scales were found out. The personality traits were elucidated using the NEO-FFI (NEO Five Factor Inventory), which was administered to all the participants. Those with T-scores above 50 were classified as having elevation in the concerned personality trait. After evaluating the scores of the various personality traits. The average marks secured by the students in four consecutive academic examinations was entered. Correlations between the coping strategies and the above mentioned factors among *low- achievers* revealed a) a small negative association between TOC and Neuroticism ($p<0.05$); b) a small positive correlation between EOC and anxiety scores ($p<0.05$); c) a negative association between TOC and anxiety and depression ($p<0.05$); and d) a negative association between AOC-SD and depression scores ($p<0.05$) were noted. . Studies concerning the link between coping strategies, personality and psychopathology may help in identifying certain risk and resilience factors that could influence the impact of stressful academic training for individual students.

Key words: Students, Medical, Psychology, Stress, Coping, Academics

***Corresponding Author**

***K.Jaiganesh , .Professor of Physiology, Mahatma Gandhi Medical College, Sri Balaji Vidyapeeth. , Pondicherry, India.**

Received On 18 September 2022

Revised On 11 October 2022

Accepted On 14 October 2022

Published On 20 October 2022

Funding This research did not receive any specific grant from any funding agencies in the public, commercial or not for profit sectors.

Citation *K.Jaiganesh , R. Sobana, and P.Bharathi , Coping Strategies Adopted By First Year Medical Students and Their Academic Outcomes.(2022).Int. J. Life Sci. Pharma Res.12(6), L50-60 http://dx.doi.org/10.22376/ijpbs/lpr.2022.12.6.SP25.L50-60

1. INTRODUCTION

Medical students tend to experience greater overall psychological distress when compared to the levels of distress observed in the general population[1]. Psychological distress interferes with their aptitude and commitment towards pursuing a medical career, though the profession is highly rewarding in the long run. The distress may occur due to their inability in coping up with the demands and challenges imposed by the rigorous academic curriculum, resulting in a high frequency of depression, anxiety and stress-related ailments being reported among the medical student population[2]. The ensuing psychopathology needs careful monitoring and successful interventions targeting the exact a etiology. Stress exists when people are confronted with situations that tax or exceed their ability to manage them[3]. Under such taxing situations, people undertake efforts to prevent or diminish the associated threat, harm, and loss, or to reduce the resulting distress. The diverse ways in which people respond to the perception of stressful situations are labeled as coping. In short, coping implies responses to adversity and to the distress that results. Since coping strategies are intricately related to an individual's approach towards stressful life events[4], analysis of specific coping styles can provide clues to the etiology of physical and mental ailments[5]. It is generally considered that task- or problem-oriented coping styles (TOC) are positively related to adaptation and good health, while emotion-oriented coping styles (EOC) are negatively related to adaptation and good health[6]. A third category known as avoidance-oriented coping(AOC) is also considered to be maladaptive in the long run, since it is characterized by an avoidance in confronting the stressful event, which does not alter his or her life style. AOC has two components, a social diversion component (AOC-SD) which correlates negatively with depression, and a distraction component AOC-Di), which is not related to depression[4]. Since coping strategies are hypothesized to play an important role between the antecedents and outcomes of the stress process, the present study was undertaken to evaluate the impact of various factors like personality traits and psych morbid symptoms among academic high- and low-achievers, on the choice of coping (adaptive and maladaptive) among first year medical students, who have recently been exposed to the stressful academic curriculum. A careful study of the biological basis of temperament-based responses to stress might throw a light on the probable mechanisms operating as links between the coping strategies, inherent personality factors, psychomorbidity, and academic achievement among these students.Fig.1 illustrates the temperament-based responses to stress proposed by various authors[7,8,9,10]. The associations between the Big Five Personality traits(Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness),with an emphasis on their biological basis, viz., the Approach & Avoidance Systems, which in turn are superseded by the Effortful Control System, is depicted in the schematic diagram. Neuroticism (emotional instability or a pervasive tendency to experience negative emotions[11]) is regarded as being similar to the Avoidance or Defense System located in the limbic system[12,13] which exhibits avoidance behavior when threatened by looming harm or pain, as it has a negative incentive value for this system. Extraversion (the tendency to engage in the pursuit of possible incentives) is considered to be similar to the Approach or Reward System in the dopaminergic pathways of the limbic system[14,15]. Neuroticism and Extraversion are considered to be reactive or instinctual traits, which are controlled by the superordinate, voluntary, self-regulatory system known as the Effortful Control System located in the prefrontal cortex[16]. Both Agreeableness (concerned with the maintenance of relationships) and Conscientiousness (being methodical, orderly, dependable and reliable) belong to the supervisory Effortful Control System (ECS), which is based on voluntary self-regulation[17]. Derryberry[18] states that the ECS consists of discrete control functions needed for voluntary goal-directed behaviour, the prefrontal cortex being considered to be responsible for such high-level executive processing. By exerting voluntary self-regulation through the ECS, individuals are able to break out of their instinctive, reactive tendencies such as high negative emotionality(linked to Neuroticism), and sensitivity towards reward attainment(connected with Extraversion).Murray & Kochanska[19] state that ineffective regulation of the instinctive or motivational response mechanisms located in the limbic system by the supervisory ECS which can override the instinctual impulses, making one persist in difficult or unpleasant tasks, may make the individuals vulnerable for psychopathology. Therefore, a careful analysis of the coping behaviours and their associations with personality factors etc., in the light of their biological basis, may offer important clues for successful interventions in order to yield fruitful academic outcomes.

1.1 AIMS AND OBJECTIVES

1. To evaluate the associations between the choice of coping strategies and the Big Five Personality traits among academic high- and low-achievers, and average students who have recently been exposed to the medical curriculum.
2. To evaluate the relationship between the employment of coping strategies and psychomorbidity among the above group.
3. To explore the gender-based differences among the above student category.
4. To assess the variations in the associations of adaptive/maladaptive coping with relationship to personality and other factors in the light of higher biological control mechanisms.

2. MATERIALS AND METHODS

2.1 Study participants

The voluntary participants of the study include one hundred and forty-two first year medical students (68 males, 74 females) from a private University in Puducherry state, South India were included for the study. The exclusion criteria were any mental illness or unwilling students.The study was conducted after approval from the institutional research committee of our institution; MGMCRI/IRC/2013/physio/3.The study was conducted in accordance with the declaration of Helsinki.

2.2 Setting

The information sheet and consent form were delivered during a briefing on the project that was held in each of their different courses. Those who returned the signed consent form and consented to participate were scheduled

2.3 Anxiety

The Self-rating Anxiety Scale (SAS) of Zung[20] is a brief, 20 item self-report questionnaire that measures the presence

and magnitude of the anxiety-based symptoms that are listed in the DSM-IV-TR (APA 2000) criteria for anxiety. Each item is scored on a 4-point Likert scale and raw scores were converted into SAS indices, with participants having cut-off index scores above 45 being classified as "clinically anxious".

2.4 Depression

The Self-rating Depression Scale (SDS) devised by Zung[21] was used to identify the students with depressive symptoms. This scale is also a brief, 20-item self-support questionnaire which measures the presence and extent of depressive symptoms. The same 4-point scale as in the SAS was used. Raw scores (Range = 20-80) were converted into SDS indices, and a cut-off index score of 50 was used to identify the participants experiencing significant depressive symptoms After computing their SAS and SDS indices, the personality traits were elucidated using the NEO-FFI (NEO Five Factor Inventory)[22] , which was administered to all the participants. The NEO-FFI consists of 60 items developed to provide a concise measure of the five basic personality factors and uses a five-point Likert response format. The participants responded by marking on each of 60 items whether they *strongly agree, agree, neutral, disagree or strongly disagree* with a given proposition about themselves. The scores of 12 items were summed to provide an overall measure of every factor. Raw scores were converted to T-scores using the formula T = 50 + 10(X - Y) / Z, where, X = Raw score of the student; Y = Average Score of the whole cohort; Z = Standard Deviation. Those with T-scores above 50 were classified as having elevation in the concerned personality trait. After evaluating the scores of the various personality traits, the average marks secured by the students in four consecutive academic examinations was entered. The Coping Inventory for Stressful Situations (CISS) devised by Endler & Parker[23] was administered to evaluate their coping strategies.

2.5 Selection bias

In order to reduce bias due to non-response, we offer all participants of the study a reward in terms of a good pen for remembrance.

3. STATISTICS AND ANALYSIS

SPSS version 21.0 for Windows (Armonk, NY: IBM Corp) was used for statistical analysis. Continuous variables are expressed as mean standard deviation (SD) or median with interquartile range for categorical variables and simple percentage for continuous variables (IQR). The Shapiro-Wilk test was used to determine the normality of continuous variables in data. To make comparisons of continuous variables, an unpaired t-test or Mann-Whitney U test was employed as suitable. To investigate the link between categorical variables, the Chi-square test was used, and odds ratios with 95% confidence intervals (CI) were calculated.Pearson's Correlation was used to calculate the correlation coefficients between the coping strategies, personality traits, psychomorbidity and grades. Gender-based differences in coping strategies was evaluated by students't-test. Calculating alpha value as 0.05, beta value as 0.1. r value as 0.4 , the sample size should be a minimum of 62 students . We sampled 140 to overcome failures and drop outs.

4. RESULTS

All the students completed the study. Their mean age was 21.4 years (SD - 2.3 years; range - 17 to 23 years). Correlations between the coping strategies, personality traits, psychomorbidity and grades among *high-achievers* revealed a) a significant positive correlations between EOC and Neuroticism($p<0.01$); b)a small positive association between AOC-SD and Neuroticism ($p<0.05$); a small positive association between AOC-SD and Agreeableness($p<0.05$), (vide table 1a).

Table-1a: Correlation matrix for academic high-achievers

	SAS	SDS	N	E	O	A	C	MARKS	TOC	EOC	AOC Di	AOC SD	AOC TOT
SDS	.695** .001	-	-	-									
N	.720** .001	.761** .000	-	-									
E	-.198 .417	-.292 .225	-.241 .320	-									
O	-.570* .011	-.555* .014	-.541* .017	.323 .177									
A	-.260 .245	-.312 .194	-.618** .005	-.126 .606	-.227 .350								
C	-.073 .766	-.002 .992	-.080 .746	-.846** .000	-.094 .702	.098 .691							
MARKS	-.010 .967	.188 .440	.236 .332	.052 .834	-.595** .007	.126 .608	-.075 .762						
TOC	.072 .771	-.286 .235	-.085 .730	-.048 .844	.007 .977	-.033 .894	.200 .412	.028 .911					
EOC	.399 .091	.438 .061	.633** .004	.009 .972	-.422 .072	-.397 .093	-.161	.132 .590	.261 .280				

							.510					
AOC Di	-.089 .717	-.176 .471	-.084 .732	-.099 .687	.266 .272	-.091 .712	.122 .612	.046 .853	.195 .425	-.261 .281		
AOC SD	.264 .275	.257 .288	.530* .019	-.082 .738	-.137 .575	-.507* .027	-.005 .987	.062 .802	.143 .559	.598** .007	.340 .154	
AOC TOT	.201 .409	.214 .378	.223 .358	-.033 .893	.110 .654	-.298 .215	-.039 .874	.077 .753	-.017 .944	.804** .000	.585** .009	

(p<0.01);*(p<0.05)

EOC exhibits a highly significant +ve correlation** with Neuroticism; AOC-SD shows a small +ve correlation* with Neuroticism, a small –ve correlation* with Agreeableness; Openness To Experience shows a strong negative correlation with grades

Correlations between the coping strategies and the above mentioned factors among *low- achievers* revealed a) a small negative association between TOC and Neuroticism($p<0.05$);b) a small positive correlation between EOC and anxiety scores($p<0.05$);c) a negative association between TOC and anxiety and depression($p<0.05$); and d) a negative association between AOC-SD and depression scores($p<0.05$)(vide table 1b).

Table-1b Correlation matrix for academic low-achievers

	SAS	SDS	N	E	O	A	C	MARKS	TOC	EOC	AOC Di	AOC SD	AOC TOT
SDS	.388* .021	-	-	-	-	-	-	-	-	-	-	-	-
N	.447** .007	.406* .016	-	-	-	-	-	-	-	-	-	-	-
E	-.297 .084	-.297 .084	-.431** 010	-	-	-	-	-	-	-	-	--	-
O	-.123 .483	-.173 .319	-.211 .223	-.157 .367	-	-	-	-	-	-	-	-	-
A	-.091 .604	.074 .674	-.477** .004	.046 .795	-.306 .074	-	-	-	-	-	-	-	-
C	-.166 .341	-.245 .155	-.366* .031	-.351* .039	.149 .392	-.204 .240	-	-	-	-	-	-	-
MARKS	.125 .474	-.246 .155	.024 .891	.115 .511	-.122 .484	.160 .359	-.240 .165	-	-	-	-	-	-
TOC	-.416* .013	-.362* .033	-.375* .026	.226 .193	.167 .337	-.053 .763	.257 .136	.052 .765	-	-	-	-	-
EOC	.369* .029	.256 .138	.127 .467	.097 .577	-.048 .786	-.060 .733	-.190 .275	-.122 .484	.038 .827	-	-	-	-
AOC Di	-.307 .073	-.362* .032	.008 .965	.099 .570	.159 .362	-.150 .390	-.058 .742	.025 .887	.421* .012	-.252 .144	-	-	-
AOC SD	-.188 .279	-.012 .948	.074 .671	.201 .247	-.166 .340	-.014 .938	-.193 .267	.143 .414	.119 .494	-.234 .177	.549** .001	-	-
AOC TOT	-.286 .096	-.227 .190	.044 .802	.166 .340	.010 .956	-.099 .573	-.137 .434	.090 .607	.320 .061	-.277 .108	.898** .000	.861** .000	-

(p<0.01); *(p<0.05).

TOC exhibits a small –ve correlation with Neuroticism*; EOC shows a small +ve correlation with anxiety scores*;TOC exhibits a small –ve correlation with both anxiety and depression scores*;AOC-SD and depression are negatively correlated*.

Correlation Coefficients among the *average students* revealed a) a significant positive association between TOC and Conscientiousness ($p<0.01$); b) a significant positive association between EOC and Neuroticism ($p<0.01$); and c) a small positive relation between EOC and anxiety and depression scores ($p<0.05$) (vide table 1c).

Table-1c: Correlation matrix for average students

	SAS	SDS	N	E	O	A	C	MARKS	TOC	EOC	AOC Di	AOC SD	AOC TOT
SDS	.469** .000	-	-	-	-	-	-	-	-	-	-	--	-
N	.218* .042	.294** .006	-	-	-	-	-	-	-	--		-	-
E	-.220* .040	-.056 .607	-.356** .001	-	-	-	-	--	-	-	-	-	-
O	-.231* .031	-.322** .002	-.437** .000	-.022 .841	-	-	-	-	-	-	-	-	-
A	.154 .154	.123 .255	-.196 .069	-.128 .236	-.353** .001	-	-	-	-	-	-	--	-
C	-.022 .837	-.178 .099	-.456** .000	-.356** .001	.094 .385	-.177 .101	-	-	-	-	-	-	-
MARKS	-.095 .383	.087 .421	.077 .477	.084 .438	-.008 .944	.003 .978	-.176 .103	-	-	-	-	--	-
TOC	-.207 .054	-.123 .255	-.274* .010	.008 .938	.272* .011	-.180 .095	.283** .008	-.007 .950	-	-	-	-	-
EOC	.285** .007	.243* .023	.339** .001	-.197 .068	-.222* .039	-.088 .417	-.007 .950	-.128 .237	-.017 .879	-	-	-	-
AOC Di	.007 .949	-.155 .152	-.076 .484	.096 .379	.037 .734	.027 .804	-.043 .693	-.025 .817	.225* .036	-.044 .685	-	-	-
AOC SD	-.042 .696	.093 .393	.024 .828	.122 .262	.023 .832	.084 .437	-.234* .030	-.020 .857	.234* .029	.069 .523	.547** .000	-	-
AOC TOT	-.012 .910	-.073 .499	-.045 .680	.118 .276	.036 .741	.054 .621	-.126 .245	-.026 .810	.257* .016	-.003 .975	.940** .975	.800** .000	-

(p<0.01); *p<0.05).

TOC shows a highly significant +ve correlation with Conscientiousness**; EOC exhibits a significant +ve correlation with Neuroticism**; EOC is +vely related to anxiety and depression scores*;

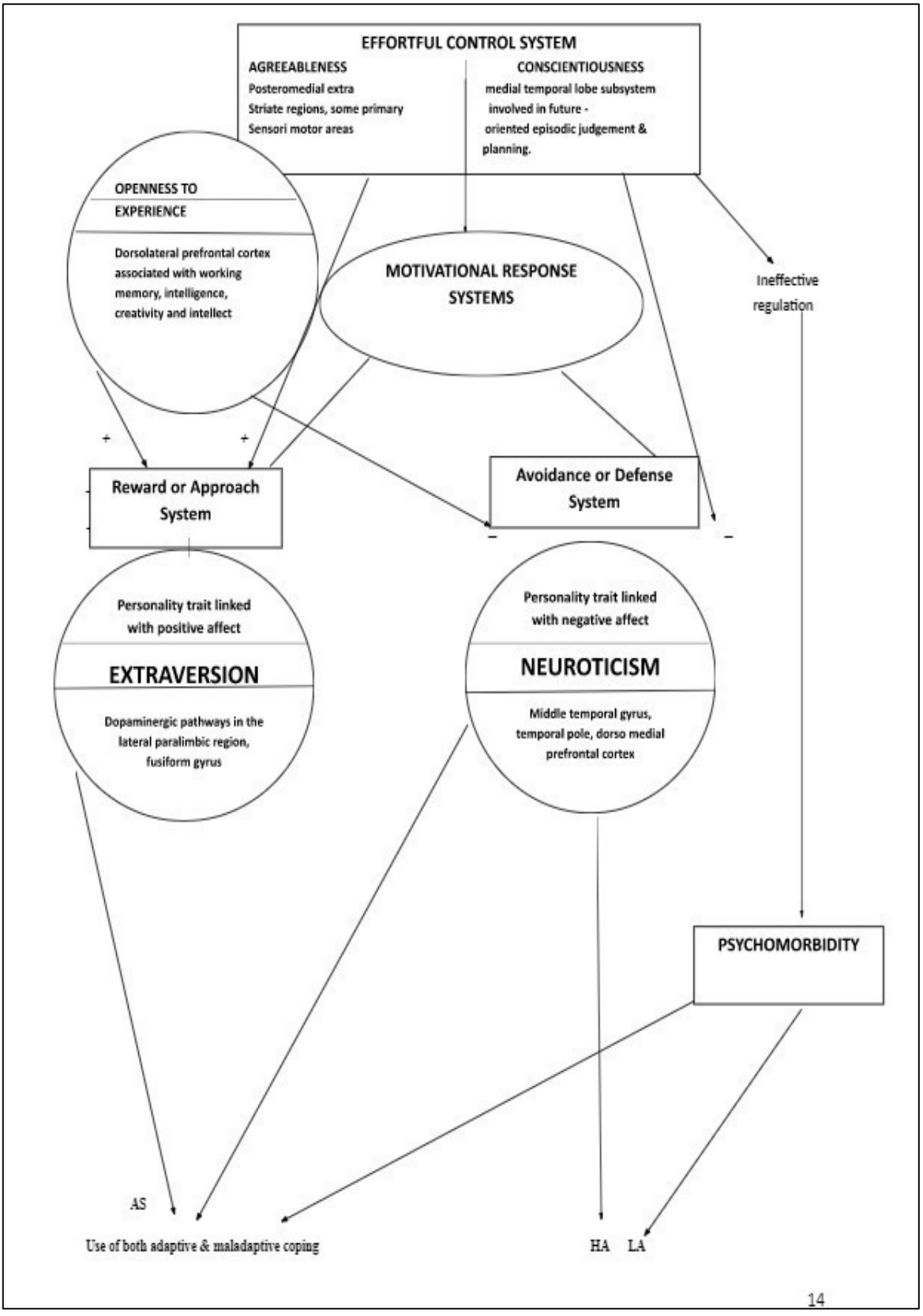
Table 1 showing Academic and psychosocial, determinants of stress among medical undergraduate students with coping startegies

Coping strategies	TOC	Neuroticism
Low achievers	P<0.05 – negative	P<0.05 – negative
Average achievers	P<0.01 – positive	P<0.01 – positive
High achievers	P<0.05 – positive	P<0.05 – positive

Student t-test revealed a significant difference in EOC between male and female students, females exhibiting more of EOC when compared to male students (t =2.1987; p<0.05).

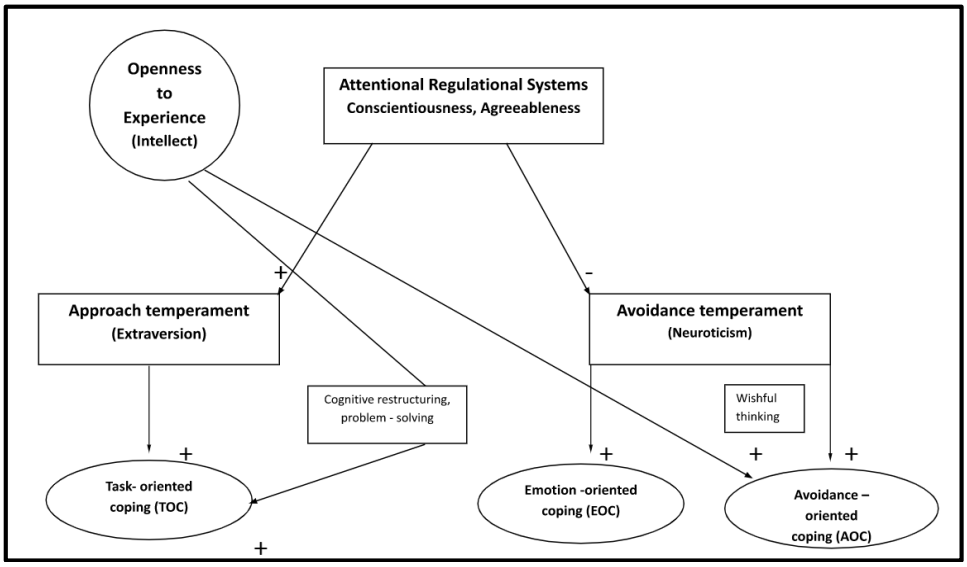
Table 2 with demographics and strategies

Coping strategies	Variables	
Sex	Male	Females more EOC- p<0.05
	Male	Females more AOC p <0.05
Age	Similar age – p value >0.05	Similar age – p value >0.05



A Biological model illustrating the regulation of instinctual traits (Neuroticism & Extraversion) by the voluntary self – regulatory system known as Effortful Control (Agreeableness & Conscientiousness) located in the higher cortical regions. + - facilitation; - inhibition.
The relationship of coping strategies to the Approach & Avoidance systems in depicted. HA-High-achievers; LA-Low-Achievers; AS-Average students.

Fig: I Use of maladaptive coping



+ Facilitation; - Inhibition
** Extraversion facilitates TOC; Neuroticism facilitates EOC & AOC; Openness to Experience facilitates TOC & AOC*

Fig:-2 The association between coping strategies, personality traits connected with the Approach & Avoidance temperaments, and Attentional Regulational Systems, as proposed by Mc Crae & John, Caspi et al., Rothbart & Hwang,. Peabody & Goldberg (vide References)

5. DISCUSSION

Our findings illustrate that the coping strategies employed by students vary according to their degree of academic achievement, as revealed by the positive and negative associations between coping styles, personality traits and psychomorbidity among high and low achievers, and average students (vide fig.1 &2)

5.1 Factors influencing the choice of coping strategies among academic high-achievers

The high-scorers in our sample have strong negative correlations between their grades and the personality trait of Openness to Experience (which makes an individual interested in acquiring knowledge and new skills), implying that though they score well, they do not have any genuine desire to gain knowledge, their goal being only to secure better grades than others or to present an appearance that they are more competent than others (performance-goal orientation). Eppler & Harju[24] state that performance goal orientation is likely to reflect maladaptive coping responses, since it is characterized by a focus on outcome, which leads to increased anxiety and an inability to persist when faced with obstacles. This fact is endorsed by our findings which reveal a strong, positive association between EOC, which is a maladaptive form of coping and Neuroticism, among high-achievers. As their Neuroticism increases, these students resort more to behaviors associated with emotional venting, since Neuroticism makes them more vulnerable to distress, causing intense emotional outbursts, disengagement from threat, and a short- time relief from distress[25]. This relief is accompanied by a reduced motivation to return towards solving the real problem, thus minimizing TOC. Though Carver et al[26] state that increased Neuroticism is associated with less of TOC which requires careful planning, positive thinking and cognitive restructuring, our findings did not reveal any association between Neuroticism and TOC among the high-scorers, suggesting that EOC and AOC may be more adaptive in uncontrollable situations akin to that found in the above group. We also found a positive relation between AOC-SD and Neuroticism, and a negative association between the Social Diversion component of AOC (AOC-SD) and Agreeableness (friendliness) among the above group, reinforcing the presumption that these students may be subjected to high-intensity stress. The increase in AOC-SD associated with a decrease in Agreeableness implies that they may be forcibly indulging in conversation with others only for the sake of relieving themselves from the stress-induced feelings and emotions, and not because of a genuine interest in the welfare of others. Social *diversion* is sought, rather than social *support*. Though AOC may be effective in uncontrollable, aversive situations, it only aims to escape distress, and is ineffective in alleviating it over the long term[27]. There was no association between psychomorbidity and coping styles among this group, suggesting that personality, coping, and goal orientations may be forming a composite matrix under the control of specific brain centers; since the personality factors are fixed traits, the maladaptive coping strategies observed in relation to the personality traits may be occurring as specific traits themselves in the case of high-scorers, endorsing the view of Deary et al[28]. Our finding is in consonance with that of Struthers et al[29].also, who postulate that a domain-specific coping style may play an important role in the way students manage stressful circumstances and performance at college. As observed in our sample, Emma Campbell[30] also states that neurotic students perform much better academically when compared to emotionally stable participants. The fact that the high-achievers cope up with stress in some way or the other culminating in a positive academic outcome, reinforces the

assumption of Lazarus[31] that EOC may be of value in some cases by aiding in the release of negative emotions, allowing the person to consider the problem more calmly. AOC is also not necessarily an ineffective coping strategy for all situations, since it is an important predictor of positive feelings towards school, as there are some uncontrollable aspects of school life that might be effectively coped with through avoidance[27]. According to some authors, people with different personality traits exhibit different coping styles and different degrees of vulnerability towards traumatic events[32] .Further, persons high in Neuroticism seem to experience fewer short-term benefits of adaptive coping like TOC, and more short-term benefits of maladaptive coping than do those low in Neuroticism[33], which explains why Neuroticism is associated with maladaptive coping, despite long-term negative effects of doing so. Neuroticism is also linked to less flexibility in coping across situations[34], perhaps because psychological distress interferes with the selection of optimal strategies. Therefore, the association between negative affect and maladaptive coping seen in high-scorers may be linked to the operation of intrinsic survival mechanisms in these students. To conclude, personality influences the selection of coping strategy, which in turn influences outcomes(mediation),and also determines how well a given strategy works for an individual(moderation)[33], this interplay of personality and coping deciding the adjustment processes among high-achievers.

5.2 Factors influencing the choice of coping strategies among academic low-achievers

At the other end of the spectrum, when we consider the low-achievers, they exhibit strong associations between psychomorbidity and both adaptive and maladaptive coping. The use of TOC declines with an increase in anxiety and/or depression, while EOC increases with elevation in anxiety levels. They also exhibit less of the Social Diversion component of AOC(AOC-SD) when depression increases, implying that during depressive episodes, they might prefer to remain in isolation, rather than socializing with others. Endler & Parker[23] have observed a similar association between AOC-SD and depression in their study. Therefore, psychomorbidity, rather than personality factors, seems to play a predominant role among low-achievers. Psychopathology is prevalent among 71.42% of the population of low-achievers, while among high-achievers, 63% have symptoms of psychomorbidity. Factors operating independently of the personality traits and their relationship to certain domains seem to play a predominant role in the selection of coping strategies among this group. They seem to exhibit more of situation-specific *coping responses*, rather than inherent *coping styles* or individual differences which form a composite matrix with other related factors, as observed among high-scorers. Therefore, the primary difference between the high- and low-scorers may be attributed to the fact that the former may be endowed with inherent personality factors, domain-specific coping styles and accomplishment drives which may themselves be forming a distinct, composite matrix controlled by higher brain centers associated with voluntary self-regulation; the latter exhibit situational specific coping responses, when their vulnerability to psychopathology increases. Psychopathology has a moderately negative influence on adaptive coping and a moderately positive impact on maladaptive coping behaviors among this group. None of the factors seem to exhibit positive associations between the adaptive coping style of TOC among high and low-achievers at both the extreme ends of the spectrum, which differs from the case of average students, who exhibit strong associations with both adaptive and maladaptive coping, utilizing a wide dimension of possible strategies. The fact that relationships between personality and coping is scarce among low-scorers suggests that they may be experiencing only a low degree of stress when compared to high-scorers, as strong relations between personality and coping are revealed only in samples exposed to high- intensity stressors[35,36]. All the participants in our study were subjected to a uniform academic environment, and all of them were from similar socio-economic statuses, and therefore the differences in responses to stress can be attributed to differences in the appraisal of the stressful circumstances confronted by them, or due to differences in goal-orientations concerning their academic curriculum.

5.3 Factors influencing the choice of coping strategies adopted by average students

Personality traits related to both positive and negative affect play important roles in the handling of both adaptive and maladaptive coping among these students, while psychomorbidity exhibits a small, positive associations with EOC alone. Conscientiousness exhibits a significant positive association with TOC, while Neuroticism shows a strong, positive association with EOC. EOC is positively associated with both anxiety and depression. The interplay of personality and coping among these students suggests that this group may be more emotionally stable when compared to high and low-achievers. Multidimensional models of coping[37] may be exhibited by these students, since they seem to display a wide range of both adaptive and maladaptive coping in relationship to negative as well as positive personality factors, in contrast to high-scorers who exhibit a narrow dimension of specific responses. The utilization of a wide range of possible coping responses reflects their balanced outlook in handling stressful situations, and possibly a good metacognition, which predicts sustained academic success. But this assumption needs the assessment of coping over time along with studies on goal orientations to better understand its relationship to learning-oriented goals and its outcome.

5.4 Gender-related variations in coping strategies

Female students exhibit significantly more EOC($p<0.05$) when compared to males, and this may be attributed to their increased emotional responsiveness and sensitivity in contrast to men, who tend to be more analytic and task-oriented[38]. Endler & Parker[39] also found that women used more EOC and AOC than men. The greater employment of EOC by women may also be due to their increased susceptibility towards symptoms of anxiety, which afflicts women twice as often as men, men being resistant to anxiety as a result of the protection afforded by testosterone[40]. Several studies have revealed positive associations between EOC and anxiety[41]. Folkman & Lazarus[42] have found that the coping process typically includes both problem-focussed and emotion-focused functions, suggesting that people use different strategies at different stages of the coping process. According to Carver et al.,[26] the adoption of either TOC or EOC depends on the goal behind their use. For example, if one seeks support and reassurance, it is emotion-focused, but if the aim is to obtain advice or instrumental help, it is a form of problem-focused coping. Therefore, one cannot be rigid regarding the boundaries between adaptive and maladaptive coping strategies. Though it is clear that the high-achievers in our

sample are subjected to stress amounting to a high intensity, they may be resorting to maladaptive strategies only to *resolve* the real problem accompanying the stressful situation, which is evidenced by their successful academic outcomes. Though certain authors state that coping is much more important for emotional outcomes than for academic achievement[43], our findings reveal distinct variations among the associations between coping strategies adopted by high-and low-achievers and average students. Coping is a behavioral manifestation of high levels of emotion-management, and it is this behavior that determines academic achievement[44]. Interventions should target this behavior in order to be successful, since it is much easier to concentrate on changing a behavior rather than a construct. Such interventions include cognitive and behavioral techniques for dealing with and handling stressful situations, such as positive reappraisal, problem solving, and stress avoidance[45], which involve training the voluntary Effortful Control System in regulating the instinctual and motivational resposes of the limbic system, so that psychopathology can be minimized. Oldehinkel et al., state that Effortful Control not only protects against anxiety in individuals high on Neuroticism, but protects against depression as well, irrespective of whether they are high or low on Neuroticism[46]. Therefore successful treatment of psychopathology requires the ability to self – regulate. Since the learning of adaptive coping strategies requires the activation and sustenance of difficult and tedious behaviours[47], one can strengthen the effortful control capacities through training menthods which involve gaining control over reactive, automated patterns of negative thought[48,49], as the ECS mechanisms are more amenable to change than the reactive temperamental traits of Neuroticism and Extraversion. Cognitive restructuring and problem solving, which are connected with intellect (associated with the trait of Openness To Experience), are strengthened through such interventions. According to Taylor & Stanton, coping may be modifiable, and doing so may lead to enhanced academic achievement[50]

5.5 Limitations

Changes in sleeping habits, vacations/breaks, dietary changes, and different habits of feeds, increased and heavy workload, and new roles and job responsibilities were the top five sources of stress. The teacher student relationship and exam dates are also important in stress. This has not been completely studied in our research work

6. CONCLUSION

Correlations between the coping strategies, personality traits, psychomorbidity and grades among *high-achievers* revealed a) a significant positive correlation between EOC and Neuroticism. Correlations between the coping strategies and the above-mentioned factors among *low- achievers* revealed a) a small negative association between TOC and Neuroticism. Studies concerning the link between coping strategies, personality and psychopathology may help in identifying certain risk and resilience factors that could influence the impact of stressful academic training for individual students.

7. AUTHOR CONTRIBUTION STATEMENT

KJ – manuscript preparation
RS – design and concept
PB – data collection

8. CONFLICT OF INTEREST

Conflict of interest declared none

.

9. REFERENCES

1. Lloyd C, Gartrell NK (1984).Psychiatric symptoms in medical students. *Compr Psychiatry*(25): 552-65
2. Guthrie EA, Black D, Shaw CM, Hamilton J, Creed FH, Tomenson B,(1995). Embarking upon a medical career: psychological morbidity in first year medical students. *Med Educ*(29): 337-41
3. 3 . Sobana R, Parthasarathy S, Duraisamy , Jaiganesh K, Vadivel S.The Effect of Yoga Therapy on Selected Psychological Variables Among Male Patients with Insomnia.J Clin of Diagn Res.2013; 7(1):55-57.
4. Endler, N.S., & Parker, J.D.A. (1994). Assessment of multidimensional coping: Task, emotion, and avoidance strategies. *Psychological Assessment*, (6): 50-60.
5. Clark, A.A., Hovanitz, C.A.(1989). Dimensions of coping that contribute to psychopathology. *Journal of Clinical Psychology*, (45), 28-36.
6. 6.Compas, B.E., Malcarne, V.L.,& Fodacaro, K.M.(1988). Coping with stressful events in older chidren and young adolescents. *Journal of Consulting and clinical psychology*,(56), 405-411.
7. 7. Robert R. Mc Crae, & Oliver P. John(1992). " An Introduction to the Five-Factor Model and Its Applications. *"Journal of Personality* 60(2): 175-215.
8. 8. Caspi, A., Moffit, T.E., Cannon, M. et al., (2005). Moderation of the effect of adolescent-onset cannabis use on adult psychosis by a functional polymorphism in the COMT gene; longitudinal evidence of a gene-environment interaction. *Biological Psychiatry,* 57, 1117-1127.
9. 9. Ayşe Esra Aslan, Berke Kirikkanat, Achievement and Motivation: A Different Perspective on Familiar Concepts,Procedia - Social and Behavioral Sciences, 2013: Volume 106, 308-316,
10. 10.Peabody, D.,& Goldberg, L.R.(1989). Some determinants of factor structures from personality-trait descriptors. *Journal of Personality and Social Psychology,* 57, 552-567.
11. 11. Khatibi M and Khormaee F. Biological Basis of Personality: A Brief Review. J. Life Sci. Biomed. 2016.:6(2): 33-36.12. Evans DE, Rothbart MK (2007).Development of a model for adult temperament. *Journal of Research in Personality*, 41: 868-888.
12. 13.Carver, C.S. (2004). Negative affects deriving from the behavioral approach system. *Emotion* (4), 3-22.
13. 14. Barrett LF, Mesquita B, Ochsner KN, Gross JJ. The experience of emotion. Annu Rev Psychol. 2007;58:373-403. doi: 10.1146/annurev.psych.58.110405.085709.
14. 15.Carver, C.S, Sutton,S.K , & Scheier, M.F.(2000). Action, emotion, and personality: Emerging conceptual

integration. *Personality and Social Psychology Bulletin*, 26, 741-751.

15. 16.Derryberry, D. & Rothbart, M.K.(1997). Reactive and effortful processes in the organization of temperament. *Development and psychopathology*, 9 ,633-652.
16. 17. Rothbart MK, Ahadi SA, Hershey KL, Fisher P. Investigations of temperament at three to seven years: the children's behavior questionnaire. Child Dev. (2001) 72:1394–408. doi: 10.1111/1467-8624.00355
17. 18. Rothbart, M.K., Derryberry, D., & Hershey, K. Stability of temperament in childhood. Laboratory infant assessment to parent report at seven years. In V.J. Molfese & D.L. Molfese (Eds), *Temperament and personality development across the life span..* (2000) -85-119.
18. 19. Murray, K.T., & Kochanska, C. (2002). Effortful Control: Factor structure and relation to externalizing and internalizing behaviours. *Journal of Abnormal Chid Psychology*. 30(5), 503-514.
19. 20. Zung,W.(1971) ' A rating instrument for anxiety disorders' ; *Psychosomatics,* Vol.12, pp- 371-379.
20. 21. Zung, W (1965), 'A self-rating depression scale' ,*Archives of General Psychiatry, 12*, 63-70.
21. 22. Costa, P. & Mc Crae,R.(1992). *Revised NEO Personality Inventory(NEO-PI-R) and NEO-Five-Factor Inventory (NEO-FFI) : Professional Manual*. Odessa : Psychological Assessment Resources Inc.
22. 23. McWilliams LA, Cox BJ, Enns MW. Use of the Coping Inventory for Stressful Situations in a clinically depressed sample: factor structure, personality correlates, and prediction of distress. J Clin Psychol. 2003 Apr;59(4):423-37. doi: 10.1002/jclp.10080.
23. 24 .Eppler ,M.A.,& Harju, B.A.(1997).Achievement motivation goals in relation to academic performance in traditional and nontraditional college students. *Research in Higher Education,* 38(5),557-573.
24. 25. Lengua L.J.,& Stormshak, E.A.(2000). Gender, gender roles, and personality: Gender differences in the prediction of coping and psychological symptoms. *Sex Roles,* 43, 787-820.
25. 26. Charles S. Carver & Jennifer Connor-Smith (2010). Personality and coping. *Annual Review of Psychology*, 61, 679-704.
26. 27.Mac Cann,C, Fogarty, G.J, Zeidner,M, & Roberts, R.D.(2011). Coping mediates the relationship between emotional intelligence (EI) and academic achievement. *Contemporary Educational Psychology*, 36, 60-70.
27. 28.Deary, I.J., Blenkin, H.,Agius, R.,Endler,N.S.,Zealley.H., & Wood,R.(1996), Models of job-related stress and personal achievement among consultant doctors.*British Journal of Psychology,* 87,3-29.
28. 29.Ward C.Struthers, Raymond P.Perry and Verena H.Menec,(2000), *Research in Higher Education*, Vol.41, No.5, pp-581-592
29. 30.Emma Campbell (2008). The influence of personality, optimism and coping strategies on academic performance, perceived stress and psychological well-being: A longitudinal study of first year university students. *Edinburgh Research Archive*. http://hdl.handle.net/1842/2909.
30. 31. Qutaiba Agbaria & Amnah Abu Mokh | James DiPerna (Reviewing editor) (2022) Self-efficacy and optimism as predictors of coping with stress as assessed during the coronavirus outbreak, Cogent Education, 9:1, DOI: 10.1080/2331186X.2022.2080032
31. 32.Gholamreza Nikrahan, Saher Jahanbakhsh Ganjeh, Elaheh Zarean and Elham Nagh Shineh, (2010). Examining the relationship between big five personality factors, coping styles and depression n pregnant women. *http://www.Elixir journal.org*
32. 33.Bolger N, Zuckerman A.(1995). A framework for studying personality in the stress process. *J. Personal.Soc.Psychol*. 69:890-902.
33. 34.Lee- Baggley D, Preece M, De Longis A.(2005). Coping with interpersonal stress: role of big five traits. *J.Personal.*73:1141-80
34. 35. Cannor-Smith JK, Flachsbart C (2007). Relations between personality and coping: a meta-analysis. *J.Personal.Soc.Psychol*. 13:1080-107.
35. 36.Moos RH, Holahan CJ (2003). Dispositional and contextual perspectives on coping: toward an integrative framework. *J.Clin.Psychol*. 59: 1387-403.
36. 37.Skinner EA, Edge K, Altman J, Sherwood H.(2003). Searching for the structure of coping: a review and critique of category systems for classifying ways of coping. *Psychol. Bull*.129: 216-69.
37. 38.Billings, AG., & Moos, R.H. (1981). The role of coping responses and social resources in attenuating the impact of stressful life events. *Journal of Behaviour Medicine* 4, 139-157.
38. 39. Endler, N.S, & parker, J.D.A.(1990b). Multi-dimensional assessment of coping: A critical evaluation. *Journal of Personality and Social Psychology,*58,844-854.
39. 40.Ron Hartung (2010). Why does anxiety target women more? The News site of Florida University. *http:// news.fsu.edu./News-Archive.*
40. 41.Christine, M.A. Courbasson, Norman S Endler and Nancy L Kocovski (2002). *Current Psychology*; vol.21, (1) 35-49.
41. 42.Folkman S, Lazarus RS (1985). If it changes it must be a process .Study of emotion and coping during three stages of a college examination. *J. Pers. Soc.Psychol*. 48: 150-170.
42. 43.Mustafa Kemal Alimoglu, Erol Gurpinar, Sumer Mamakli, and Mehmet Aktekin (2011).Ways of coping as predictors of satisfaction with curriculum and academic success in medical school. *Adv. Physiol. Educ*, 35: 33-38.
43. 44.Compas BE, Connor – Smith JK, Saltzman H, Thomsen AH, Wadsworth ME (2001). Coping with stress during childhood and adolescene: problems, progress, and potential in theory and research. Psychol. Bull. 127:87-127.
44. 45.Ayers, T.S., Sandler, I.N. West, S.G., and Roosa, M.W. (1996). A dispositional and situational assessment of childhood coping: Testing alternative models of coping. *Journal of Personality*, 64, 923-958.
45. 46.Albertine J. Oldehinkel, Catharina A., Hartman, Esther Nederhof, Harriette Riese and Johan Ormel (2011). Effortful control as predictor of adolescents: psychological and physiological responses to a social stress test; The Tracking Adolescents Individuals Lives Survey, *Development and psychopathology*, 23, pp 679-688.
46. 47.Derryberry D, Reed MA, Pilkenton-Taylor C. (2003).Temperament and coping : advantages of an individual differences perspective. *Dev.Psychopathol*.15:1049-66.
47. 48.Rebecca Todd (2006). Self-regulation in the developing brain. J.Reed & J.W. Rogers (Eds.) *Child*

Neuropsychology: Concepts, theory and practice. London: Blackwell.

48. 49. Rueda, M.R., Posner, M.I., Rothbart, M.K., & Davis-Stober, C.P. (2004). Development of the time course for processing conflict: an event-related potentials study with 4 year old and adults. *BMC Neuroscience*, 5, 39.
49. 50.Taylor, S.E. & Stanton, A.L. (2007). Coping resources, coping processes, and mental health. *Annual Review of Clinical Psychology, 3*, 377-401.