DEVELOPMENT AND STANDARDIZATION OF ADOLESCENCE STRESS SCALE AND IDENTIFYING PSYCHOSOCIAL FACTORS CONTRIBUTING TO ADOLESCNECE STRESS

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by

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DECLARATION

I, Laxmi Priyanka Nakka, hereby declare that this thesis entitled "Development and Standardization of Adolescence Stress Scale and Identifying Psychosocial Factors Contributing to Adolescence Stress" Submitted by me under the guidance and supervision of Prof. Meena Hariharan is a bonafide research work. I also declare that it has not been submitted previously in part or in full to this University or any other University or Institution for the award of any degree or diploma. I hereby agree that my thesis can be deposited in Shodhganga/INFLIBNET.

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CERTIFICATE

This is to certify that the thesis entitled " Development and Standardization of Adolescence Stress Scale and Identifying Psychosocial Factors Contributing to Adolescence Stress" submitted by Nakka Laxmi Priyanka bearing Registration Number 20CPPH05 in partial fulfillment of the requirements for award of Doctor of Philosophy in Psychology in the Centre for Health Psychology under School of Medical Sciences is a bonafide work carried out by him/her under my supervision and guidance.

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Further, the student has the following publication before submission of the thesis/monograph for adjudication and has produced evidence for the same in the form of the reprint in the relevant area of her research:

1. Hariharan, M., Padhy, M., Monteiro, S. R., **Nakka, L. P.**, & Chivukula, U. (2023). Adolescence Stress Scale: Development and Standardization. *Journal of Indian Association for Child and Adolescent Mental Health*, 09731342231173214.

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the student has made presentations in the following conferences:

1. Annual Convention of the National Academy of Psychology (NAOP) organised by Ahmedabad University (2023)
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ABSTRACT

Stress is defined as a negative emotional condition accompanied by biochemical and physiological changes in the body, preceded by a cognitive appraisal where the individual perceives the demands on self, exceeding the resources followed by a behavioral initiative to change the situation or adapt to it. Adolescence is a critical phase of life with rapid physiological hormonal changes making them vulnerable to environmental stimuli. Confronting a range of stressors at this phase of life can lead to detrimental physical and mental health consequences without proper resources available to them. After a thorough literature review it was definite that there is a huge gap in stress measurement for Indian adolescents. Further review of literature related to psychosocial factors contributing to stress in adolescents revealed that each of them had a unique relation to stress. The previous studies stated that these psychosocial factors are interrelated and are found to have an influence on one another causing the individual differences in one's stress perception and reaction. The major objective of the study was to develop Adolescence Stress Scale with defined factor structure and adequate psychometric properties. This study also aimed to investigate if there are any differences in stress levels of adolescents of different gender, class and age group and to identify the psychosocial factors contributing to stress in adolescence. The stress experiences and coping strategies of adolescents with high and low stress levels were also explored in current study. To accomplish these objectives this study was carried out in four phases and explanatory sequential mixed method approach was adapted. In first phase stressors from 2241 children (5 to 21 years) were identified through survey design and put through content validity. After retaining the appropriate stressors, a 56 items scale evolved for the adolescent age group (11 to 18 years). This scale was taken forward for further standardization process in next phase where it was administered on a sample of 643 (11 to 18 years) and the data was put through exploratory factor analysis. This resulted in a 31 items

scale with ten dimensions. These dimensions are major loss induced stress, enforcement or conflict induced stress, phobic stress, interpersonal conflict induced stress, punishment induced stress, illness and injury induced stress, performance stress, imposition induced stress, insecurity induced stress and lastly, unhealthy environment stress. In third phase the final adolescence stress scale was pilot tested on a sample of 227 adolescents (11 to 18 years) and psychometric properties of the scale were established through test-retest reliability and convergent and discriminant validity. In the last and fourth phase of the study Correlation design was adopted where the ADOSS was administered along with 11 other tools measuring the psychosocial variables on a sample of 1104 adolescents (11 to 18 years). These 11 tools measuring psychosocial factors are Self-Efficacy Questionnaire for Children (SEQ-C), Self-esteem scale, Big Five Questionnaire for Children (BFQ – C), Frustrative non-reward responsiveness subscale (FNRS), Social skills scale, Physical Health scale, Family health questionnaire, Psycho-social support scale, Perceived physical environment scale, Protective factors scale and Promoting factors scales. These tools were administered on adolescents for six consecutive days. At each phase of the study, purposive sampling technique was followed and permissions were taken from the educational institutions, informed consent from the parents of the participants and assent from the children and . After this a qualitative study was carried out on a subsample of eight participants with high and low stress levels to understand their experiences of stress and coping where data was collected through semi-structured interviews with six leading questions. This study successfully evolved a 31 items stress scale with ten dimensions through exploratory factor analysis and the scale was standardized by establishing psychometric properties. The confirmatory factor analysis also resulted in good fit model. The results of t-test and one way ANOVA revealed that there are significant differences identified between the stress levels of adolescents from different gender, academic class and age groups. Hierarchical regression model and serial mediation path

analysis were carried out to identify the predictors of stress and the mediating effects of certain psychosocial variables respectively. Qualitative thematic analysis resulted in some common and exclusive themes for high stress group and low stress group. The Adolescence Stress Scale is can be used in several settings such as clinics, schools, hospitals and in research through which exact source of overload of stress can be identified for planning appropriate intervention that facilitates the much-needed biopsychosocial approach to health care.

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LIST OF ABBREVIATIONS

AESI	Academic Expectation Stress Inventory
ASS	Academic stress scale
AGFI	Adjusted Goodness-of-fit Index
ADOSS	Adolescence Stress Scale
ASQ	Adolescent stress questionnaire
ATS	Amphetamines Type Stimulants
AMOS	Analysis of Moment Structures
BAS	Behavioral Approach System
BIS	Behavioral Inhibition System
BFQ – C	Big Five Questionnaire for Children
CFI	Comparative Fit Index
CFA	Confirmatory factor Analysis
CR	Critical Ratio
DASS	Depression, Anxiety and Stress scale
ESSA	Educational Stress Scale for Adolescents
EFA	Exploratory Factor analysis
FNRS	Frustrative non-reward responsiveness subscale
GHQ	General Health Questionnaire
GFI	Goodness-of-fit Index
HSUP	Hand Uplifts Scale
ICMR	Indian Council of Medical Research
ICDS	Integrated Child Development Scheme
LoC	Locus of Control
MPC	Mooney Problem Checklist
NCDs	National Crime Report Bureau statistics
NIMHNS	National Institute of Mental Health and Neurosciences
OSL	Optimum Stress Level
PSS	Perceived Stress Scale
PSS	Perceived stress scale
RMSEA	Root Mean Square Error of Approximation
SAS	Scale of Academic Stress
3SQ	Secondary school stressor questionnaire
SEQ-C	Self-Efficacy Questionnaire for Children
SPSSI	Singh Personal Stress Source Inventory
SRRS	Social Readjustment Rating Scale
SD	Standard Deviation
SE	Standard Error
SEM	Structural Equation Modelling
UNFPA	United Nations Population Fund India
WHO	World Health Organization

Chapter I

INTRODUCTION

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INTRODUCTION

The phenomenon of stress is a commonplace reference in everyday conversation. It is said that stress is something like a shadow in human life. Sometimes it is ahead of you, sometime beside you while sometimes behind you. But the fact that remains is that it is always around you. Stress is a part and parcel of human life. Majority of people refer to stress as a negative entity that impacts your life adversely. However, a close analysis reveals that stress is an essential essence of life, which in right proportion is a requirement for moving forward in life, but when in excess, has the potential to incapacitate one, and when inadequate creates inertia in life (Hariharan & Rath, 2008).

Stress is defined as an emotional state that is negative in nature, involving alterations in physiological and biochemical aspects of the body, preceded by a cognitive appraisal where the individual perceives the demands on self, exceeding the resources followed by a behavioural initiative to change the situation or adapt to it (Hariharan, 2020). Thus, the impact of stress is seen in physiological, psychological and social domains of life. An infant is observed to have the fear of strangers (Walker & Roberts, 2001). A growing infant who is learning to walk is seen to experience unrest until one stabilizes in walking; a pre-school child is observed to struggle with holding a pencil to make marks on the paper until the skill is attained; a child in early childhood is caught with the pain when being admonished, being bullied or being punished. Children in different stages are found to have irrational fears such as the presence of ghost, probable death of a loved one and so forth. Adolescents are found to be stressed by high demands on academic performance, and behavioural norms. Adults are found to be stressed by career related issues, financial needs, loss of self- esteem and, so

forth. In later part of life people are stressed because of health issues, insecurities, fear of death, loss of loved one, and so forth.

While stress is a common factor that runs across the life span, there are certain critical stages in life when stress is likely to originate from multiple sources and shows a peak. Adolescence is one such phase in life when stress peaks up. In the entire life span, adolescence is considered to be the most critical phase. This is the first major transitional phase in human life when an individual gradually transforms from the childhood to adulthood. This critical phase is in a transit between the childhood and adulthood. One of the distinct features of the phase is the hormonal changes that are not overtly observable. Alongside there is also a visually perceivable changes in the physical characteristics of the child. These two induce huge changes in the emotional domain that emerges mainly because of the hormonal imbalance and lack of coping skills to interpret, adapt or handle these distinct physical manifestations. These changes also bring about different interests in socialization processes, building social networks, forming intimate relationships with the opposite gender that is packed with mutual demands and expectations, peer pressures to conform with certain 'adult' behaviour, which may be in conflict with the family, religious and personal values. Further, unfortunately enough, this is the stage when one has to get inducted into major career options involving academic decision making, high demands on academic performance. Thus, the adolescent encounters multiple sources of stress. Entangled in such situation, the adolescent has not attained the required maturity that comes out of experience to handle such intense stress levels. The social skills are not yet fully developed to identify the right person to approach and seek support. As a consequence, an adolescent tends to either yield to these pressures that impacts the general health and wellbeing or attempt to escape by taking shelter under health risk behaviour such as smoking, substance abuse, alcohol, unsafe sex or antisocial behaviour. In certain cases buckling under the pressure of stress, adolescents are

also observed to manifest dysfunctional behaviour. The extreme step taken by the adolescents under stress is seen to be suicidal behaviour. As per the statistics of the National Bureau of Crime (2021), the adolescence suicide accounts to 7.4% in the year 2020 and 6.5 % in the year 2021. According to World Health Organization ([WHO] 2023) there is one suicide recorded in every 40 seconds globally and one in every four minutes in India. This suggests the progressive increase in the suicides among the adolescence age group. This should ring an alarm amongst the psychologists, medical professionals, educationists, bureaucrats and policy makers. We, as a nation should preserve, protect and nurture our adolescent population because they constitute a large proportion of our population and also the future development of the nation. They need to be treated with care and concern. It is not right to treat them either as miniature adults or as the expanded version of children. They are a clan by themselves with their special problems, needs and complexities. Treating their health problems with biomedical approach, academic failures with remedial teaching or underachievement with interim interventions are now obsolete. The scientific evidence has sufficient indications that disequilibrium in one dimension of life may have its complex interrelationship with another dimension. For example, repeated health problems such as infections, accident-proneness, or complaints of pains and aches may have wider connotations that can be traced to stress. Similarly, behavioural deviations and misbehaviours may have stress as a major source. Thus, it is highly desirable that any disturbance to homeostasis manifested by an adolescent is approached with multilevel diagnosis of which assessment of stress levels should constitute an important component.

Now comes the question of availability of robust measuring techniques to assess stress. The field of Psychology has contributed immensely to the study of stress among all age groups. There are also a variety of instruments that measure stress. However, given the fact that the sources of stress are age specific and have sociocultural milieu, one size does not

fit all. The stress scale designed for the adults will not work on the children or adolescents. Similarly, the stress scale developed for the adolescence age group and standardized on American population has its limitations in assessment of Indian adolescence because of the cross-cultural variations in social norms and values. Hence there is a dire need to develop and standardize an Adolescence Stress Scale (ADOSS) on Indian adolescence population. This needs to include rural and urban sample as well as more than one region. Hence, this study is an attempt to standardize a scale to measure adolescence stress and also identify the psychosocial factors contributing to the adolescence stress.

Adolescence

The definition of adolescence does not have a convergence. The United Nations included the age group between 10 to 19 years into the category of adolescence. In India, the age classification of adolescence varies with various programmes. The youth policy defines adolescence as those within the age bracket of 13 to19 years. the Integrated Child Development Scheme (ICDS) includes 11 to 18 years age group into their adolescence scheme. The Reproductive and Child Health Programme differing from these two schemes conforms to the UN categorisation of 10 to 19 years as adolescence. To avoid confusion, the United Nations Population Fund India (UNFPA, 2003) report recommended that the individuals within the ages 10 to 19 years be referred to as adolescent population. Adolescence constitutes a very precious and substantial percentage of Indian population. In 2001 it was 239 million constituting 22.8% of total population, which decreased to 236 million amounting to 19.6% in 2011. According to the 2021 census the adolescence population reached to 253 million accounting to 21% of total population. This is projected to increase to 257 million in 2031. Thus, the adolescent population at any point in time constitutes a major proportion that sustains the rank of India as a country of youth. This is something to be cherished because the economic growth of the nation rests on the young

population of the country. This advantageous ratio of youth population can be an advantage if the youth power, energy and channelizing of the energy is in positive direction. If not, the large chunk of youth may turn out to be a liability.

As already been mentioned, adolescence is one of the critical stages of development in the life span, particularly from the perspective of the magnitude of stress one has to handle. While the stress is from multiple sources, the life experience of the adolescence phase is not ripe enough to handle the same. Adolescence behaviour is normally described as one that shows inconsistencies that swings between that of a child and an adult, one that manifests frequent emotional outbursts and irritability, one that manifests rebellious attitude, one that inclines towards adventures (Hartley & Somerville, 2015) one that swings between manifestation of high energy and inertia, one that simultaneously manifests both the emotion of love and hatred, one that shifts between demonstration of extreme care and carelessness, one that manifests the paradox of extreme care and callousness in grooming oneself (Harter, 2012). Such paradoxical behaviour originates from total confusion about one's role as a child or an adult, one's abilities to be autonomous or dependent, one's need for independent decision-making and lack of ability to do so, conflicts between biological needs and the constraining forces of personal and family values. It may not be an exaggeration to say that an adolescent is frequently found torn between the extremes in many dimensions of life. This is highly stressful. Further, the socio-cultural environment is typically not very understanding about the erratic behaviour even though the challenges faced in adolescence phase are not a strange phenomenon.

There is no gold standard for the adolescent behaviour, particularly so for the Indian adolescents. At least in western countries, the adolescents after a particular age are expected to be independent and move out of their parents' supervision to fend for themselves. Though there is a strong influence of the West due to globalization, the specific social norms related

to the economic independence in adolescence has not yet replaced the traditional system. Thus, the Indian adolescents are caught between their financial dependence on parents and progressively increasing needs that may have financial implications.

In India, there is mounting evidence of adolescence mental health casualties (Trivedi et al., 2016). Fortunately, the awareness of psychological services has been increasing both in urban and rural educational institutions. With the non-availability of competent family support in resolving many emotional problems, the adolescents are increasingly approaching counsellors in educational institutions with their problems (Parikh et al., 2021). In majority of cases, it is found that the adolescents have no major mental health problem but manifest anxiety and depression that are non-clinical in nature. Such extreme affect swings are found to arise with major life events and aberrations such as break in relationship, financial crunch, interpersonal conflicts, and inability to cope with academic demands, value conflicts, prolonged illness, or irrational thoughts. In such cases, before going on for any clinical assessment for their affect state, it may be relevant and appropriate to get a preliminary assessment of their stress levels in various dimensions. Such diagnostic approach may indicate the specific area where the adolescent is facing unmanageable stress. Intervention plan can be targeted and easy. In a totally different scenario relating to the field of research, there may be many occasions when a researcher wishes to compare different age groups on the stress levels. One instrument may not be suitable for the various age groups. Researchers working on adolescent group may need to correlate various psychosocial variables of the group with stress levels, particularly in the context of career choices and performance stress being very high among the adolescent group. In such cases, age-appropriate stress scales relevant to the socio-cultural mosaic of the nation becomes very essential. In view of these facts, the need for a holistic, standardized stress scale for Indian adolescence assumes

Measurement Instruments for Stress

There are several measurement instruments available that are used to assess stress. Most of these instruments are not designed to measure stress in particular and the ones that were developed and standardized to measure stress were of different cultural origin (Hariharan et al., 2023). Those constructed by Indian researchers are majorly done for the purpose of their research where stress is studied as one of the psychological correlates to a major factor. In such cases, the probability of not having established the psychometric properties are high (Rao, 2012).

The most frequently used measures to asses stress in adolescents in India are academic stress scale for students or perceived stress scale. Academic stress scale for students was originally developed by Kim (1970). This was adapted to the Indian context by Rajendran and Kaliappan (1990) and was further refined by Rao (2012). Measurement of stress in academic domain no doubt is a very important tool for Indian adolescents who encounter tremendous stress in the field. This will be useful in the context of Educational Psychology, particularly during curriculum revision. However, there are many other dimensions in the lives of the adolescents which induce stress. Capturing academic stress in isolation may not be as much helpful as a diagnostic tool though it may contribute valuably as a research tool. The other scale that is widely used in India is Perceived Stress Scale (PSS) (Devi & Mohan, 2015; Deb, et al., 2015). This scale measures many factors such as perception of control, overload along with the thoughts and feelings related to the stress. From this perspective it qualifies as good scale. However, it does not specifically capture stress experiences typical to the adolescence age group. There are many stress scales used by researchers to measure adolescence stress. Some of them are not standardized on Indian sample, some though developed for Indian population have not reported the psychometric properties, yet others are not standardized on an adequate sample, and some are just

questionnaires and have not taken into considerations even the dimensions of stress. An adolescence Stress Scale can be defined as the one that is structured on the basis of a theoretical framework, taking inputs from the target group through empirical survey and review of literature, so it measures multidimensional aspects of adolescent life, and finalised following all the standard steps to evolve into a measuring tool that inherits the characteristics of easy administration and easy response from the target group. This calls for a scale that has all dimensions packed into items that are moderate in number. It demands that the scale is finalised based on robust reliability and validity checks. It also expects that the scoring of the key and the norms are easily applicable.

Stress is a dynamic phenomenon. The same situation has differential impact on different individuals. Between the stressful stimulus and the stress experience lies the individual's cognition. Cognitive mediation plays a great role in determining how the individual reacts to a potential stressor. Hence we observe that the same situation that is interpreted as stress by one is viewed as an opportunity by the other. Thus, a number of individual factors such as age of the individual, past experience, present physical condition, readiness to face the stress, coping skills possessed by one, personality factors, such as frustration tolerance, locus of control, self-efficacy, environmental factors such as physical and family environment, social norms and expectations, social support network may have their influence in experience of stress. It may be of relevance to identify, define and describe a few psychosocial factors influencing stress.

Psychosocial Factors Contributing to Stress

Internal Resources

Internal resources refer to the personal traits and characteristics an individual possesses. They play a great role in stress levels of individuals. There are a number of

findings that relate to internal factors such as personality characteristics and stress. For example, Type A personality and stress (Billing & Steverson, 2013), neuroticism and stress (Mohiyeddini et al., 2015), introversion and stress (Dietrich & Abbott, 2012). Personality factors also include components such as self-efficacy, self-esteem, social skills, frustration tolerance, physical health and protective factors.

Self-Efficacy. Bandura (1977; 1986; 1977) describes self-efficacy as a belief of an individual in their ability to perform and achieve particular tasks with necessary behaviours. It is also referred to as faith in one's own power in influencing the events that occur around them. This concept is closely related to the Locus of Control (LoC). While the self-efficacy of an individual refers to belief in their capabilities in performing task successfully, Locus of Control refers to an individual's general assessment of whether events in one's own life are under one's own control, the control of significant others, or determined by chance, fate, or destiny. Thus, self-efficacy of an individual may vary with situations while Locus of Control is a general perception about the events in one's life which do not change with specific events.

Theoretically an inverse relationship between self-efficacy and stress may be conjectured. It is logical to assume that people who have belief in their ability to achieve a task are the ones who are likely to feel less threat from the task. However, stress is not always related to tasks and self-efficacy relates to specific tasks. Thus, it may be premature to hypothesise that people with high self-efficacy experience lower stress. In fact, one may even assume the reverse of it, that is, people with high self-efficacy have high level of stress. This can be explained with the following logic. Those with high self-efficacy may set oneself to initiate the task and work under Optimum Stress Level (OSL) while those with low self-efficacy may not initiate action at all and therefore experience no stress. Adolescence is a phase where the children have huge multiple tasks and demands from the society. At the

same time, they are not adequately equipped with the skills to accomplish the tasks challenging them. They may be in the process of mastering the abilities in a few tasks, but not all. Under such situation, it may be of interest to examine how much influence a phenomenon like self-efficacy can have in the stress levels of this age group. When a person feels they will succeed at a task, they are less stressed or troubled by that work. Several research studies have discovered a negative relationship between self-efficacy and perceived stress in adolescents (Burger & Samuel, 2017; Mulyadi et al, 2016). On the other hand students with high self-efficacy assume college as a challenge, need to be rewarded as opportunity or a threat to oneself which further leads to stress (Madson et al., 2022)

Self-Esteem. Rosenberg (1972) defines self-esteem as "the overall positive or negative attitude towards the self". It refers to how an individual perceives themselves. Perception of self highly impacts the outlook of an individual's life. Self-esteem is an essential component of psychological well-being and plays an important part in moulding people's beliefs of themselves. It refers to a person's total assessment of their worth and value as a person, which includes their ideas, feelings, and attitudes towards oneself. Self-esteem is a complex construct impacted by a variety of elements such as personal accomplishments, social relationships, and internal self-perceptions. It lays the groundwork for personal development, motivation, and resilience, influencing how people deal with life's problems and create relationships with others. Understanding the dynamics of self-esteem is critical for understanding human behaviour and supporting healthy mental health throughout life.

Personality. Personality characteristics are the unique dominant traits present in each individual which determine their thought process, perception and behaviours. Fiske (1994) proposed five major domains of personality which were further expanded by Norman (1967), Smith (1967), Goldberg (1981), and McCrae & Costa (1987). The five domains are identified as BIG5 personality traits and are defined with respect to adolescence cognitive, emotional

and behavioural disposition (Barbaranelli et al., 2003) as: Openness, Conscientiousness, Extraversion, Agreeableness and Emotional Instability. Openness to experience is an eagerness to learn novel abilities and solve difficulties using abstract reasoning. This assesses self-reported intelligence, particularly in the school domain. This trait also indicates how creative an individual is and their interests towards other people and cultures. It is worth noting that this Intellect/Openness factor is conceptually similar to the Intellect factor. Conscientiousness — this personality trait is assessed with reference to precise and is committed towards one's tasks. Individuals with this dominant trait have qualities such as attention to the specifics and high desire to complete a task with utmost perfection. This drives adolescents to complete the works they are given. Conscientiousness evaluates one's reliability, orderliness, accuracy, and commitment fulfilment. Extraversion — individuals with this dominant trait are highly active in engaging and enjoying other's company. It is essential to possess this trait to maintain healthy relations with parents, teachers and peers. Extraverted adolescents are seen to be seeking and navigating support from others more efficiently. This personality trait is often accompanied with high self-confidence and assertiveness in individuals. Agreeableness is manifestation of being sensitive and concerned towards the needs of one's self and others. Individuals with dominant agreeableness trait behave and act in a way that is socially approved. Emotional Instability—this dominant personality trait includes negative affect such as anger and discontent and are highly vulnerable to anxiety and depression (Fiske, 1994) which is the opposite of emotional resilience in situations of discomfort and distress. This trait is closely associated with the trait neuroticism. Adolescents with emotional instability and neuroticism traits are prone to experience more stressors than individuals with other dominant traits as this disposition induces negative affect. Thus, it is possible that these adolescence have high levels of stress perception and reactivity.

Social Skills. Social skills is defined as the visible indicators that enable an individual to verbally and non-verbally interact in a social construct (Ogden, 2015). They refer to the competence one possesses that facilitate in positively interaction and communicating with others abiding by social norms, resulting in initiating, establishing and sustaining social relationships. Social skills are defined as certain observable behaviours and actions that demonstrate competent interpersonal interaction, communication, and relationship-building ability in a variety of social situations. The operational definition of social skills in this study is an individual's participation in social behaviour as a leader, team member, coordinator, and intimate friend. (Padhy & Hariharan, 2023). Social skills are essential for developing social network that constitutes the social support for a person. Social support fulfils two functions, namely- in enhancing the general wellbeing state of the person and secondly functioning as a shock-absorbing agent at the time of any stressful episodes or crisis. Social support is found to be very useful for crisis intervention (Cole et al., 2013). Individuals with high social skills are likely to experience low stress because of having a wider social network and support system. Adolescence is a phase when the child is still learning social skills. The contribution of family (Kacar & Ayaz-Alkaya, 2022) and educational institutions (Zehrina, 2018) peer group (Rubin et al., 2015) and community (Chung et al., 2016) is found to be significant in developing social skills.

Studies have proved that social skills have the potential to lower the probability of high stress. Durlak et al.,(2011) found that adolescents with better social skills had lower levels of self-reported stress compared to their peers with poorer social skills. Similarly, a study by Hopkins et al. (2011) revealed that adolescents with better social skills were more likely to seek help in times of stress, resulting in lower levels of stress. Farrington et al., (2012) revealed that adolescents with better social skills were less likely to experience academic failure due to stress. Esch and Stefano (2010) revealed that adolescents with better social

skills were more likely to engage in healthy behaviours such as exercising as a means of dealing with stress. A study by Ahmadi and Moeini (2015) found that adolescents with better social skills were less likely to engage in risky behaviours such as drug use as a means of coping with stress. A study by Judd and May (2019) found that adolescents with better social skills and positive academic environment had higher academic achievement compared to their peers with poorer social skills.

Frustration-Tolerance. Frustration is an unpleasant emotion that arises when an individual acts in anticipation of satisfaction but fails to obtain it (Dollard et al., 1939; Berkowitz, 1989; Anderson & Bushman, 2002). On the other hand, tolerance to frustration refers to an individual's capacity to tolerate setbacks without reacting with extreme negative feelings. People with equanimity are the ones who are said to have greater frustration tolerance. The Hindu scripture of Bhagavad Gita propounds the state of Sthitapragnyathwa, or equanimity which is desirable in enhancing wellbeing. This comes with a lot of practice and spiritual advancement in the individual. However, frustration tolerance is a characteristic which is much lower in degree of this state of equanimity. This depends on the threshold level of the individual to take the failures and outcomes of actions that are below one's own expectations. Frustration tolerance of a person might decrease after experiencing major stressful events (Jeronimus & Laceulle, 2017). Higher the frustration tolerance of an individual, lower is the stress levels. This also has a relationship with impulsivity of the individual. Impulsive actions on the one hand are unlikely to fetch desirable results. Secondly, impulsive reactions to failures and frustrations only contribute to stress.

Impulsivity and frustrations are likely to be high among the adolescents. One reason for this is the hormonal imbalance and the second reason is the lack of skills to handle difficult situations. The third reason is that generally the social and academic demands from the

adolescents normally are unreasonable in view of their abilities. Very often the adolescents are found to manifest higher frustration (Yangicher, 2017) and impulsive behaviour. This is both the antecedent and consequence of stress in them.

There has been some preliminary research that indicates that stress in adolescents may be related to frustration non-reward responsiveness, which refers to a tendency for individuals to experience negative emotions when their expectations are not met. Frustrated individuals are highly likely to experience stress and It was further found that frustration non-reward responsiveness was a predictor of coping behaviours in students, in a longitudinal study by Hasratian et al. (2021).

Physical Health. There has been evidence from ancient time till date that confirmed the relation between physical and mental health of an individual. The body-mind connection has been studied for long and the outcome of those evidence-based studies started the advocacy of shift from biomedical to biopsychosocial approach to holistic health. A number of studies have proved the relationship between stress and physical illness (Schroeder & Costa, 1984; Cassel, 2017; Salleh, 2008; Dong, 2016). The body-mind connection has been studied with reference to cardiovascular diseases (Slater et al., 2006), diabetes (Falco et al., 2015), autoimmune disorders (Ader & Cohen, 1975; 1981) and cancer (Moreno-Smith et al., 2010). Stress has been identified as a common denominator in many of the non-communicable diseases, infections, pains and aches. Physical health and stress levels are highly correlated.

The physical health of adolescents constitutes an important factor. In the relationship between physical health and stress it is difficult to demarcate the cause and effect factor. They appear to be mutually complementary. Deterioration in one is seen with concomitant deterioration in the other. Research has shown that higher levels of perceived stress are

associated with poorer physical health outcomes, such as an increased risk of illness and decreased physical activity (Hamer & Steptoe 2012; Hamer et al. 2010, 2012).). There is evidence that adolescents who experience chronic stress may be at greater risk for developing chronic physical health conditions (Bellis et al. 2015, Danese & Baldwin 2017)). Stress can have both positive and negative impacts on physical health. On the positive side, stress can help to motivate and focus adolescents, resulting in improved physical health outcomes such as increased physical activity or improved nutrition (Georgopoulos et al., 2010). On the other hand, chronic stress can lead to ill health, resulting in an increased risk of developing chronic physical health conditions (Bucci et al., 2016). In order to promote physical health and reduce the risk of developing chronic physical health conditions, it is important for adolescents to be able to manage stress. Adolescents who are able to effectively manage their stress may be able to improve their physical health and wellbeing (Damodaran & Paul, 2015). Strategies such as mindfulness and relaxation techniques, as well as physical activity, have been shown to reduce stress levels in individuals further leading to their wellbeing (Nabradi & Szakaly et al, 2021).

Protective Factors. The concept of protective factors is used in the synergy model of resilience by Hariharan and Rana (2016). Protective factors are individual positive characteristics that help insulating the person from the harmful effects of adversities in life. Prior to Hariharan and Rana (2016), Kobasa (1979) conceptualised the personality factor of hardiness which is constituted of Commitment, control and Challenge. Antonovski (1979), in his salutogenic model, proposed three components, namely, Comprehensibility, Meaningfulness and manageability. These characteristics are said to help the individual cope better with stress. This study defines protective factors as a set of internal characteristics of the individual that help in effective coping with stress that results in productive outcome that is, minimises stress (Hariharan & Rana, 2016). They help in shielding him/her from the

severe impacts of adversities. All the internal characteristics mentioned by the researchers independently equip the person to cope in effective and productive way. They may be called internal resources. The transactional theory of stress suggests that when the secondary appraisal of the stress through cognitive mediation identifies the presence of internal or external resources to handle the situation, the stress is likely to be perceived as a challenge than as threat. Protective factors are one such set of personal characteristics which helps in perceiving stress or adversities as a challenge to be confronted rather than a threat to be afraid of. Such cognition helps in minimising the negative impact of stress. The synergy model of resilience in fact advocates that the protective factor is one of the components that helps the individual bounce back and emerge resilient in the face of adversities which induce stress.

Several studies have shown that developing these protective inner strengths can have a significant impact on reducing stress in adolescents. Having a purpose has been found to reduce stress in adolescents by providing them with a sense of direction and meaning (Blattner et al., 2013) because it helps adolescents to focus their energy in positive, productive ways improving their self-esteem, instead of feeling overwhelmed or anxious. Protective inner characteristics were associated with more positive emotions and better psychological wellbeing in adults (Chen et al., 2020). It was found that girls with greater levels of protective inner strengths had significantly low stress levels. It was also found that protective inner strengths were significantly related to better psychological adjustment and fewer physical symptoms of stress (Pervanidou & Chrousos, 2012).

External Resources

The environment of an individual constitutes the external resources. When a person encounters stressful situation, one tends to take into account the availability of both internal and external resources and their strength in mitigating or minimising stress. Those with

strong factors in the physical or social environment such as an unstinted support from a support agent, physical facilities, or strong family support, Family health, financial resources or help may utilise the same appropriately at the time of stress which aids him/her in circumventing stress with relative ease. Following are some of the few such external resources identified and examined.

Promotive Factors. Promotive factors refer to the external factors in the physical and social environment that help in promoting the performance by providing necessary buffer (Rajendran, et al., 2019). Some researchers identified only environmental resources as promotive factors while other included both internal and external resources under the nomenclature of promotive factors. In this study, promotive factors are defined as a set of environmental resources that aid in positive coping with the stress of the adolescents. Research has found that there is a connection between promoting factors and stress in adolescents. A study conducted by (Gilman & Huebner, 2003; Oberle et al., 2011) found that supportive relationships with family and peers, as well as engaging in school activities, had a positive effect against stress among adolescents.

Physical Environment. Physical environment is defined as the geographical area in which we live and surrounded by factors that influence our senses and growth (Ferguson et al., 2013). It includes the physical space, material possessions, population density in the environment, environmental hygiene, ambience and so on. The organization of physical environment contributes significantly to the individual's overall wellbeing. An individual's perception of suitability and facility provided by their environment is of high importance than the structure of the environment in general. What may appear structured to one may be viewed as messy to the other. Thus, individual's need satisfaction and personality characteristics play a great role in assessing the physical environment.

Adolescents who have a highly structured environment may feel less stressed because of the predictability that structure creates in the physical environment. However, some adolescents may perceive highly structured physical environment as demanding because every individual in such structured environment will be expected to comply with high discipline to maintain the order therein.

Researchers suggest that in many cases, adolescents' physical environment can contribute to or alleviate stress (Chawla, 2014; Corraliza, 2011; Flouri, 2014). Certain facilities available in the physical environment may be useful in mellowing down the stress. For example, a nationalised Bank in the neighbourhood may reduce the stress for an adolescent who has to make enquiries about educational loan for further studies. Studies have proved that crowding, noise, heat and lack of hygiene, air pollution in the physical environment may themselves be factors to induce stress in the individual while access to places such as parks and playgrounds can decrease stress (Flouri, 2014). It is argued that the quality of physical surrounding, and the perception of this can affect their stress, for example, adolescents who feel unsafe in their environment due to fear of crime may experience higher levels of stress. Erikson et al., (2018) cautioned that stressful physical environment may impact the mental health and wellbeing in the adolescents.

For the purpose of this study, Perceived physical environment refers to an individual's subjective evaluation of the physical features and characteristics of their surroundings, including the natural and built environment. It is the perception of an individual about the physical aspects of their environment, rather than objective physical attributes. This measure includes items such as: Perception of safety and security in the environment, cleanliness, accessibility and convenience, including transportation and pedestrian facilities, perception of noise level and air quality, and perception of the natural environment, such as the presence of parks and green spaces

Family Health. Family health is the overall health of the members of the family. It encompasses the physical mental, social and spiritual health of the family. It takes into account the physical health status in terms of the incidence, type, severity of illness, psychological state, interpersonal relationships, available support, spiritual and religious practices-all of which culminates in family environment. Crandall et al. (2020) defines family health as "a resource at the level of the family unit that develops from the intersection of the health of each family member, their interactions and capacities, as well as the family's physical, social, emotional, economic, and medical resources" by. Family health is a multidimensional notion that includes all family members' physical, mental, and emotional well-being. It acknowledges that the health of people within a family unit is interrelated and impacted by the dynamics, relationships, and surroundings in which they live. Family health goes beyond the absence of sickness to promote overall well-being via supportive relationships, effective communication, and healthy lifestyle choices. A healthy family creates a safe and loving atmosphere in which members feel cherished, respected, and supported in their quest of maximum health. These qualities of family have a huge impact on stress and coping experiences of children. These family resources assist them to perceive a situation as a challenge or threat. Each family member's overall resilience and well-being can be improved by concentrating on family health, resulting in healthier individuals, stronger relationships, and thriving family units.

Social Support. Social support is defined as a broad term, involving a network of social constructs as perceived by an individual. This social construct involves mutual assistance, guidance and validation about life and decision making. Furthermore, it involves social and emotional support in different settings (Wills & Ainette, 2012). It can be operationally defined in terms of the structural and functional aspects which include the degree to which individuals are located or integrated into a social network, support perceived to be available

and support actually received (Padhy et al., 2022). There have been a number of research evidence that associates perceived social support to stress and wellbeing (Toledano-Toledano et al., 2020; McLean,2022; Brailovskaia et al., 2020; Poots & Cassidy, 2020; Reeve et al., 2013; Cohen et al., 2004; Santini et al.,2015). Social support fulfils two major functions. One is to enhance the general wellbeing. Secondly it helps in reducing the stress levels as well as acts as an effective coping mechanism (Reeve et al., 2013; Yıldırım et al., 2017). Indian culture is strong in the availability of social support because of its roots in affiliation needs and significance given to family bonding. Thus, until recently the strong joint family system used to function as an informal counselling service, prevent and mitigate stress, particularly in children. With the breaking of cultural boundaries that came with globalization, the use of social support has been gradually declining in the face of preserving individual and family privacy, avoidance of intrusion into the issues not related to oneself, and so forth which are all borrowed concepts from the Western values. The strength of Indian culture is its strong social support that is naturally available and is very well integrated into social customs and practices. What the West mentions as a significant factor in mitigating stress used to happen very inconspicuously in Indian social system. It is about time that we revive this strength of the Indian culture to enjoy the great benefits of it in minimising stress levels which is progressively increasing across the globe, where Indian population in all age groups is not an exception.

It may be summarised that in the contemporary times when stress is the buzz word for every age group, there is a need to look deep into this phenomenon. In India, a young country based on the high proportion of youth in the population, the researchers in the field of Psychology should focus on preserving the health of the youth, which has the threat of stress that started invading the culture. Adolescence is a critical age when stress impacts the health, wellbeing, cognition, emotion and behaviour of the children. Thus the multilevel

manifestation of stress may escape the notice of the health care professionals, educationists and law enforcing agencies who handle the health, academics and discipline of the youth. Hence it is important that the stress level of the adolescence is measured with a tool standardized on the relevant population and used as a robust tool for diagnosis and research purposes. Alongside, it is also important to identify various internal and external resources that are positively or negatively associated with adolescence stress. This study is a modest attempt at standardizing the adolescence stress scale and identifying the psychosocial factors associated with adolescence stress.

Chapter II

REVIEW OF LITERATURE

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In this chapter nature and prevalence of stress in adolescence is presented along with the critical appraisal of the existing psychometric tools measuring stress and the detailed understanding of psychosocial factors in relation to stress and each other with support of previous empirical findings. This chapter aims to build a thorough scientific foundation that aids to understand the importance of developing a stress scale for adolescents. This chapter also presents theoretical framework, rationale, research questions and objectives of the study.

Stress: Nature and Prevalence

Stress is a major part of life which demands adjustments from the individual. It is an unavoidable phenomenon of daily life and is experienced at every phase of life. The prevalence of stress is rising rapidly with 40% of adults, worldwide, reported to be under stress in a survey done by Gallup in 2021 across 122 countries. In India the prevalence of stress is 24% according to India Fit Report 22-23 (GOQii, 2023). These prevalence rates shed the light on to the immediate requirement of stress management measures at global and national levels. The stress levels are seen to be raising high after the hit of COVID-19 pandemic across the world in 2020 causing additional physical, emotional and psychological burden on everyone (Manchia et al., 2022). This mental health burden can also have a huge impact on economy of the country and the economic loss estimated from 2012 to 2030 in India due to this is more than one trillion USD. Therefore an immediate action needs to be taken to manage stress and lead towards higher wellbeing. Though stress is an inevitable part, it is preventable in most of the cases and is manageable with proper coping skills and support. At each stage of life, individual learns and equip themselves with several coping strategies to manage stress through observation and practice. But these stress experiences and its impact

can differ from stage to stage as some of the phases of human development are critical and sensitive than others. These phases can be referred to as “Sensitive periods” (Crosswell & Lockwood, 2020). Stress may have its greatest impact on an individual during prenatal phase, prepubescent phase, puberty / adolescence phase, becoming parents early in life, and at old age such as menopause (Van Den Bergh et al., 2005; Zeanah et al., 2011; Fuhrmann et al., 2015; Gordon et al., 2015; Saxbe et al., 2018; Crosswell & Lockwood, 2020). Stressor exposure can have a particularly strong effect on development during these periods, when physiological systems are most likely to be influenced by external environmental factors (Knudsen, 2004). Adolescence phase marks as a most sensitive phase of life with its transition from childhood to adulthood undergoing a huge range of developmental changes and social demands.

Stress in Adolescence

India is a youthful country with the world's largest adolescence population. Every fifth person in the nation is an adolescent (UNICEF, 2023). They are the foundation of the country's future. It is in the country's best interests to ensure that this vast number of teenagers remain protected, well-nourished, well-informed, and well-prepared life competencies in order to help the country's economic and social progress. Adolescence is most vulnerable phase of life, with major physiological, psychological, social, academic and behavioural changes (Romeo et al, 2016; Barbayannis et al, 2017; Lally and Valentine-French, 2019; Matud et al, 2020). In 2017, the Indian Council of Medical Research (ICMR) conducted a survey in collaboration with the National Institute of Mental Health and Neurosciences (NIMHANS) that found that 11.7% of Indian adolescents were stressed to a high level. The UNICEF report published in 2021 indicates that one out of five Indian adolescents suffers from stress which leads to depression. During puberty, due to an increase

in gonadal hormones, adolescents are prone to high stress reactivity and sensitivity towards their environment (Steinberg et al., 2004; Stroud et al., 2009). Therefore they are seen to react differentially, both physiologically and behaviourally, to a stressor compared to adults (Romeo, 2010). This transition phase can be seen as a preparation for the responsibilities associated with adulthood, including family, socio-cultural, and economic concerns where they do not have complete knowledge and awareness about these changes (Sivagurunathan et al., 2015). These responsibilities and expectations lead to elevated levels of stress in them (Barbayannis et al. 2022). Such instances expose them to a varied range of stressors.

Sources of Adolescence Stress

Sources of stress are any events or situations in an individual's life which demands for an adjustment causing an imbalance in the homeostasis of the person. These sources of stress are usually referred to as stressors. Adolescents are prone to experience a range of stressors which emerge from different sources such as family, academics, socio-cultural which can be broadly categorised as external sources of stress and the internal sources of stress consists of physical and psychological factors. Internal factors consists of psychological stressors such as loneliness, lack of coping skills, unrealistic expectations, fear of failure, phobias, and any kind of physical illness (Hariharan et al., 2013). The external factors are parental factors such as parenting styles (authoritarian, over-protective), parental expectations, conflicts with parents, parental discord (Dogra et al., 2009). Environmental and socio-cultural stressors experienced by adolescents are unhygienic living conditions, gender discrimination, conflicts with family and friends (Hariharan et al., 2013). According to the report, academic pressure, peer pressure, and parental expectations are the most significant factors contributing to stress among Indian adolescents (UNICEF, 2019). Most frequent stressor experienced by adolescents is related to academics and it includes expectations of self or others, exam

pressure, syllabus structure, classroom punishment, transition to idle school and high school and comparison to their peers (Stroud et al., 2009; Lin & Yusoff, 2013). These simultaneous personal, social and academic demands experienced by adolescents pushes them towards experiencing excessive stress than other age groups. As they are confronted with huge number of stressors they tend to experience high negative mood and mood variability (Stroud et al., 2009). Furthermore, the majority of adolescents are unaware of the challenges affecting their life and are confined to areas where they have little opportunity to acquire skills to cope with these situations effectively (UNICEF, 2023). Therefore, adolescents must be equipped with sufficient coping skills and stress management techniques to lead a healthy life and grow into a high functional adult. But, unfortunately most of the Indian adolescents lack accessibility to mental health resources and are further discouraged from seeking professional support due to social stigma (UNICEF, 2019). This leads to huge number of adolescents with unmanaged stressful experiences leading to severe physical and mental health complications in their present life and also future.

Consequences of Stress

It has been shown that psychopathology and depression increases during adolescence (Hayward, 2003; Stroud et al., 2009). Leaving stress unattended can lead to poor mental and physical health (Brietzke et al., 2012; Jayanthi, Thirunavukarasu & Rajkumar, 2015; Nair & Elizabeth, 2016). Studies suggest stress is particularly harmful at critical developmental stages (Gommes et al., 2019). The impact of stress can be categorised into physiological, behavioural and psychological.

The physiological consequences of high stress involve damage of prefrontal cortex (Arnsten, 2009; Lupien, McEwen, Gunnar, & Heim, 2009). The neurobiological changes caused by constant stress further leads to difficulty in emotion regulation, attention,

concentration and establishing relations (Thompson, 2014). The biggest health concern in recent times has been stress-related chronic illnesses, which include cardiovascular disorders, diabetes mellitus, auto-immune disorders, pulmonary and gastrointestinal diseases, cancer, neurological ailments and arthritis (Narayan et al., 2010; Fricchione, 2018; Salleh, 2008). It accelerates the aging process in both adolescence stage and adulthood (Humphreys et al., 2016; Tyrka et al., 2010), thus highlighting the particularly pernicious nature of these effects across the lifespan (Slavich et al., 2019). According to a national survey 35% of 10 to 12 year-olds and 25% of 13 to 19 year olds had their blood pressure in the range of stage 1 or 2 of hypertension and 7% of school going children in India are diagnosed as hypertensive (Vasudevan et al., 2022 ; Zaidi & Ferranti, 2022, Meena et al., 2021). The diabetes was also found to be highly prevalent in 15 year olds with the prevalence rates 12.3% and 8.4% in boys and girls (Kumar et al., 2021).

Severe stress also leads to health risk behaviours in adolescents such as smoking, alcohol consumption, aggression, drug abuse and unsafe sexual habits (Damodaran & Paul, 2015; Liu, 2020; Pascoe, Hetrick & Parker, 2020; National health mission, 2023). In a National survey on Extent and pattern of substance abuse in India conducted in 2018 it was found that 1,48,00,000 users in India of the substances such as Alcohol, Cannabis, opioid, sedatives, inhalants, cocaine, amphetamines type stimulants (ATS) and hallucinogens belonged to the age group 10-17. In 2019, 8.5% of Indian adolescents of age 13 to 15 years, consumed tobacco in any form and according to an additional survey, 13.1% of drug and substance abusers in India are under the age of 20. (Udaya, 2023, Child line India, 2023).

Stress, when not dealt effectively, may result in conditions such as depression, , suicidal conduct, dissociative and eating disorders, as well as schizophrenia, anxiety, poor concentration, with psychological distress (Stroud et al., 2009). The prevalence rate of mental

illness was found to be 13.4% in a meta-analysis including 41 studies conducted in 27 countries from every world region among children and adolescents (Polanczyk et al., 2015). A review of 40 Indian studies on childhood and adolescence depression states that the point prevalence of depression ranges from 3% to 68% in school based studies and clinical based studies showing 1.2% to 21% with the incidence rate estimated to be 1.6% (Grover et al., 2019) and 14.5 % of adolescence were found to be suffering from anxiety disorders (Nair et al., 2013). Such serious impact of stress on mental health leads to high suicidal ideations in adolescents with no proper support. According to WHO (2020) suicide due to stress among late adolescents is one of the top five leading causes of death and according to the National Crime Records Bureau data, 8.2% of adolescents died by suicide 2020 and the number is seen to be increasing shockingly from 9,413 in 2018 to 9,613 in 2019 and further 18% rise in the year 2020 with 11,396 deaths due to suicide in children.

Such detrimental consequences on both physical and mental wellbeing of adolescence due to unresolved stress calls attention for measures to be taken at home, school, and government levels for better management of their stress levels. The major step towards this would be primary intervention through prevention and diagnosis which requires a standardized age and culture specific measurement tool for adolescence stress. Identifying stressors of adolescents helps in attaining a deeper knowledge on their psychological and social distress and to further prevent these stressors to occur whenever possible (Crosswell & Lockwood, 2020)**.**

Measurement of Stress

In India the mental health issues of any kind are frowned upon and due to the stigma associated, the mental health resources are very limited particularly for children and adolescents. In a review study on school based interventions in India, the key issues in mental

health sector are found to be not identifying or misdiagnosing a mental illness, shortage of mental health professionals, lack of proper interventions schedules specific to different age groups (Mehra et al., 2022). In another Indian based study, it was found that almost 90% of the individuals suffering from mental illnesses do not receive proper care and treatment (Gururaj et al., 2016). Globally, it was reported that 50% of psychological issues arise at the age of 14 and majority of these cases are left unnoticed and unresolved (WHO, 2023)**.** Considering these issues, it is crucial to act upon the quality of mental health services provided to adolescents and everyone else in the country. The first step towards it would be to develop a standardized tool to identify stress levels is adolescents for early diagnosis and effective treatments so that it will not be progressed into any chronic physical or mental illness. An appropriate and reliable measurement instrument based on the socio-cultural background is extremely important. To better understand who is vulnerable to the detrimental consequences of stress, how stress exposure is linked to health decline, and where intervention efforts should be focused (Crosswell & Lockwood, 2020), we need to identify and measure stress during sensitive periods. It is important to invest in adolescents today to ensure their health in the future so that they can grow up healthy, bringing health into their families (Mukherjee et al., 2020). The approach for measuring stress has been a topic of conflict since many years as the concept of stress is defined as stimuli by some, as a response and as a transaction between an individual and their environment by some others which lead to several methods of stress measurement. The stress can be measured through biomarkers, such physiological and biochemical changes, self-report questionnaires which adapts stimulus or response approach, the other method is through interviews and experiments (Crosswell & Lockwood, 2020). Measuring stress through biomarkers lacks the consideration of cognitive appraisal and individual differences. This makes it less reliable as the rise in cortisol levels does not necessarily indicate the rise in distress and maybe

influenced by several other factors (Hariharan, 2020). The interview approach, though it is provides a experiential and contextual detail, it is time consuming and not feasible for large sample studies (Grant et al., 2004). The self-report approach of stress measurement provides a choice to measure stress as either a stimulus or a response. Whenever stress is seen from the viewpoint of stimuli, standardized scales measure stressful life events that may be major life events, daily hassles or a combination of both (Hariharan, 2020). The importance given to cognitive appraisal of the event/situation involving subjective evaluation stressors makes it a preferable approach than measures of stress based on interpretation or response viewpoint (Byrne et al., 2007).

In this context, a thorough review of published literature revealed a variety of standardized measures used to assess stresses encountered by adolescents in India. Some studies adopted scales from another nation, whilst others utilised instruments that solely measured a single kind of stress experience. The issue in such cases is a lack of multidimensionality and a restricted focus on the causes of stress. Items in tools from other countries may be insignificant to another culture (Aggarwal et al., 2007). Each of these scales along with the tool description is critically remarked on in the next section.

Tools measuring stress

The first attempt to measure stress through a self-report was made by Holmes and Rahe (1967). They developed Social Readjustment Rating Scale (SRRS) with most common life stressors which are termed as major life events. Though this scale had its own relevance, it was criticized for its lack of capturing subjective perception of the stressors and not considering the individual differences. Later, the hassles and uplifts scale (HSUP) was developed by Delongis et al. (1982) to measure people's attitudes towards daily life situations. The HSUP evaluates both the positive and negative daily life events experienced by individuals, rather than major life events. These scales, though had their own limitations,

they were taken as inspiration to develop several other stress measurement tools. Following are the scales frequently used to measure stress levels of Indian adolescents.

General Health Questionnaire-12 (GHQ-12) was developed by Goldberg (1978) originally with 60 items and then evolved into short-form versions. It is a psychometric tool developed to screen the mental illnesses in primary healthcare and outpatient settings. This questionnaire consists of 12 items which evaluate both positive and negative feelings of the participants and is most commonly used stress measurement tool. Each item of the scale is interpreted as a manifestation of stress by some researchers (Lin et al., 2013) whereas some define a factor structure of the tool with few items representing stress (Gao et al., 2004; Sanchez-Lopez & Dresch, 2008). Respondents are given four options to choose from, which indicate the frequency of their experience of each given statement. These options range from "not at all" to "much more than usual". The scoring ranges from zero to 36. The cut off scores of the scale differ from study to study depending on the context it was used in and does not have any standardized universal norm (Kim et al., 2013). Though the scale was standardized, adapted and translated to different cultural contexts, it intends to measure an individual's overall mental wellbeing rather than stress. This makes GHQ-12 not a suitable to measure stress experiences and responses of the participants exclusively. The use of this scale may fail to capture accurate stress perceptions of individuals as it does not consider age differences in perceptions as it is applicable to be used in a population above 12 years.

Mooney problem checklist (MPC) was developed by Mooney and Gordon (1950) to identify the problems faced by high school students. This tool was further revised by Joshi and Banerji (1979) for Indian population (N=2402) and was translated to Hindi language. This scale consists of 40 items measuring 4 dimensions of problems adolescents have with relation to a) their parents, b) their peer relationships, c) their role as students and d) their future. Each one of these four dimensions consists of tem items. The original problem lists

were developed from a huge number of free replies, case records, and literature evaluations on student concerns (Leynes, 2015). It was not developed as a measurement test but only as a checklist to identify the source area of problems, therefor did not yield any scores. But the revised version is a Likert scale with four responses. For each subscale a score of 20 was considered as a cut off to be perceived as a problem. For each problem statement the mean value of two or more was appraised as stressful. This scale, as described was not exclusively developed as a stress scale, though the checklist records the problem areas. It might not be suitable to present high school students as the decades have passed when the scale was first developed and the stress experiences of adolescents have changed significantly with a great shift in social and school dynamics.

Another scale, which is not exclusively a stress scale, but is used as a common measurement tool is the Depression, Anxiety and Stress scale-21 (DASS-21; Lovibond & Lovibond, 1995). This tool assesses stress along with the depression and anxiety. It was developed to define, understand, and measure these three constructs. This is a shorter version of 42 item scale testing the same three domains. The longer version consists of 14 items each domain while the shorter version consists of seven items. It is a four point Likert scale (zero to three) assessing the negative emotional symptoms for each subscale. A greater score indicates higher severity of these negative symptoms. It has been used in the age groups of 14 to 80 years. Though the psychometric properties of this scale are also well established in several studies from different countries, it does not identify the age specific stressors of adolescents which makes it less reliable to be used in adolescent population and the origin of the scale is not Indian. The other setback for the scale it does not focus on the stressors experienced by the respondents and does not consider their cognitive appraisal as the scale only records the frequency of the experience but not the intensity of the stress experienced by the individual.

Perceived stress scale (PSS) is developed by Cohen et al., (1983) which measures stress in terms of response. This scale has 10 items and is useful for the age group 12 and above. It has both negative and positive statements about the feeling of an individual. The respondent's frequency of experiencing these feelings is recorded in this scale. It is a five point Likert scale with scores ranging from zero to 40 and measures stress levels as low, medium and high. The psychometric properties of the scale are well established. Less number of items, high reliability and easy usage makes this scale a mostly used one among all age groups. This scale, though famously used to measure stress in adolescence, it fails to measure the age specific stress experiences of the respondents and it measures stress in terms of stress response which does not provide a scope to identify stressors and prevent them.

Secondary school stressor questionnaire (3SQ), a 44 item questionnaire describing the stressors of high school students was developed by Yosuff (2011). It is a five point scale measuring the severity of stress caused by that stressor through responses ranging from causing no stress at all to causing severe stress with scores zero to four. This scale has six dimensions which measure the stressors related to – academics, intrapersonal stressors, learning and teaching, interpersonal relations, social group and teacher related stressors (Lin & Yosuff, 2013). This scale proves it significance with being age specific and considering different sources of stress in high school goers. Though this scale can be used to measure stress levels of adolescents and is found to be reliable, it has scope to improve. One of the major setbacks of the scale is that the items of the scale were gathered from the literature, rather than collecting from the high school students themselves. The sample size of the study establishing psychometric properties being 100 is another setback for the scale. Such low sample from one area or school may not represent the population targeted. The criterion or construct validity of the scale was not established, only face validity and content validity was checked, which might not be sufficient.

Scale of Academic Stress (SAS) was developed to measure the academic stress of the students with 40 items. Kim (1970) established and standardised the scale. Later, this was adapted to Indian context by Rajendran and Kaliappan (1990) and Rao (2012). Personal inadequacy, interpersonal issues with teachers, teaching techniques, fear of failure and inadequate study facilities are the five components measured by this scale. It is a Likert-type scale with options ranging from 'No Stress' to 'Extreme Stress' on a five point scale and scoring goes from zero to four. Each factor has equal number of items with scores ranging from zero to 32. Higher scores imply higher academic stress. This adopted version of the scale was standardized on 156 male students belonging to high school. The reliability of the scale was established with a satisfactory score whereas the validity was not found to be established. This scales attempt to measure different aspects of academic stressors makes a great contribution to stress measurement as the academic stress is highly significant. But it might not be sufficient to capture all the stress experiences of the adolescents as there are a varied range of stressors arise from different aspects of their life and it was found to be standardized only on boys. This makes it less reliable for all other genders. Taking the year of original scale construction and also the adopted version, it can be assumed that the scale might not be adequate to capture the new age academic stressors experienced by school going children.

Educational Stress Scale for Adolescents (ESSA) is a 16 item measurement tool to assess stress related to academics in adolescents. It was developed by Sun et al. (2011). This scale has five dimensions evolved from a 30 item preliminary version. The dimensions of the scale are Pressure from study, Worry about grades, Self-expectation, and Workload, Despondency which are found to explaining a good amount of variance (64%). The psychometric properties of the scale are well established and the scale was standardized on more than 2,000 Chinese participants from grades seven to twelve belonging to the age group 11 to 20. The scale's

items were generated through a thorough analysis of both English and Chinese literature, as well as expert comments. These items represent the response towards a stressor each were predefined, including attitudes toward study and grades, perceived pressure, perceived burden, expectations from others, and self-expectation. This is a five point likert scale scores ranging from 1 = strongly disagree to 5 = strongly agree with a higher score indicating greater stress. In the final scale, five items were adapted from the Academic Expectation Stress Inventory (Ang & Huan, 2006) with minor wording changes. The strengths of the scale lies in the large sample, wide age group of adolescents and good factor structure of the scale, and its weakness is that the use of the scale is only limited to measure educational stress of the adolescents.

Academic Expectation Stress Inventory (AESI; Ang & Huan, 2006) is a nine item scale. This scale measures stress due to expectations through two dimensions which are Expectations of Self (four items) and of Parents or Teachers (five items). This evolved from initial 15 items. Respondents are asked to rate on a five-point scale, with 1 being “never true” and 5 being “almost always true”. The overall score can vary from 9 to 45. Higher scores on the scale indicate higher levels of stress due to expectations. It has a satisfactory internal consistency (Ang & Huan, 2006). This scale measures the adolescents’ (12-19 years) perception of self-expectations and other-expectations and was developed through three phases- item pooling through relevant literature review, exploratory and confirmatory factor analysis. The systematic method followed to develop and standardize the scale stand as strengths of the scale. Item pooling through literature and focusing on single aspect of stress generation are the major setbacks of the scale which provide a room for improvement and better stress measurement tool.

Academic stress scale (ASS; Sheu et al., 2014) is a ten item measurement tool which is adapted from Perceived Stress Scale (Cohen et al., 1983) by making minor changes to the

statements to make them suitable for academic context. It assesses an individual's appraisal of their academic situations as stressful or not. This scale is a five point scale with response scores ranging from zero to four. The final scores are calculated through sum of all items after four of the positive items are reverse coded. Higher scores on the scale indicate higher academic stress in the respondents. Other than internal consistency of the scale, psychometric properties were not found to be established (Sheu et al., 2014). Adopting the items from the PSS to academic context might not include all the essential aspects of academic stress and it measuring the stress levels in terms of response is limited to just symptomatic distress and does not provide a scope for stressor identification and prevention.

Adolescent stress questionnaire (ASQ; Byrne et al., 2007) seems to address the concerns related to previous stress measurement tools. This scale development followed a series of systematic steps. The ASQ measures the stressor load of adolescents with 58 items with 10 dimensions. These dimensions are stress of home life, school performance, school attendance, romantic relationships, peer pressure, teacher interaction, future uncertainty, school/leisure conflict, financial pressure and emerging adult responsibility and explain a good amount of variance in exploratory factor analysis. The items for the scale were gathered through direct interaction with adolescents and focus group methodology. This scale is an extension of original ASQ (Byrne & Mazanov, 2002) contained 31 items distributed among 7 sub-scales. The respondents are supposed to give the rating based on the severity of the stress experienced by them on a five point Likert scale with 1 being not at all stressful and 5 being very stressful to measure their stress levels. The scale was tested and standardized on a sample of 1039 adolescents belonging to grades 7 to 12 with age range of 13 to 18 years (Byrne et al., 2007) and has well established internal and external reliability. This scales attempt to fill in the gaps from previous measurement tools contributes greatly to the stress measurement of adolescence. The multidimensionality of the scale and considering subjective

perception of the adolescents makes it a highly reliable and makes it a step closer to measuring their stress levels accurately.

ASQ was adopted and revised for Indian context by D'souza et al. (2018). For the revision, the items of ASQ were checked for relevance to Indian context with focus group study including 8 adolescents and 8 experts. Finally, 38 items were retained with 9 domains. This is 4 point scale with scoring ranging from 1 (not stressful/not relevant) to 4 (very stressful). The scale was pilot tested on 20 adolescents and was administered 153 adolescents (12 to 14 years) for establishing psychometric properties. The factor structure of the scale was tested through confirmatory factor analysis. The modified ASQ had acceptable internal consistency and test–retest reliability (D'souza et al., 2018). Though the scale construction was done through systematic procedure, adopting scale from other culture may not be relevant for Indian context as there are huge cultural differences. Many stress experiences specific to Indian adolescents can be missed out when the scales are adopted from other countries and result in non-accurate measurement of their stress levels and experiences. And another pitfall of the scale is it was standardized on a small sample of narrow age group of 12 to 14 years.

Another stress scale for adolescence developed by Jagannathan et al. (2023) is a 20 item scale which measures the frequency of stress experience of the respondents. Some of the scale items were adopted from the ASQ and ASS, and other items were added after considering the experiences of experts those who work with the adolescent population. The items pooled through this were evaluated by three experts and culturally inappropriate items were dropped and few items specific to Indian adolescents were added. This scale was then distributed to ten teachers and ten parents for approval. Sentences were reframed and changed based on their feedback to make them simple and concise. Finally, the scale was

administered to 20 adolescents, and 20 items were kept after receiving 100% concordance. The final scale consists of 20 items with 4 factors - Personal (9 items), Academic (4 items), Family (4 items), and Social (3 items). Respondents are asked to give the frequency of their feelings on a four point scale with options ranging from never to nearly every day. The ratings of the scale ranged from zero to three with total scores ranging up to 60. Higher scores on the scale imply higher stress levels in respondents. This scale is useful to measure stress in adolescents' between the ages 10 and 17 years. The internal and external reliability of the scale were established with satisfactory results and the validity was established with comparing salivary cortisol and results were satisfactory (Jagannathan et al., 2023). These items under this scale might show a bias as the opinions of the adolescents was not considered but the opinions were taken from the teachers and parents. This might result in missing out the real life stressful experience of the adolescents. The other major limitation of the study is that the scale's psychometric properties were established only on 100 participants.

Singh Personal Stress Source Inventory (SPSSI; Singh et al., 2004) is a stress measurement tool developed in India. This has 35 items where respondents are given three options seldom, sometimes and frequently to choose from to rate the frequency of their stressor experience (Shivaji, 2022). The scoring of the scale ranges from 0-30 interpreted as mild stress, 31-79 as moderate level of stress and 80 or higher as high levels of stress. The inventory has Hindi version and the English version with established reliability (Rosemarie, 2019). This tool fails tool measure the individual differences in cognitive appraisal of the stressor by the participants and their perceived severity. This tool, though constructed in India, it is not specific to the adolescent population.

From the review of above mentioned scale it can be observed that there is no standardized stress measurement tool in India to assess their stress levels with less limitations and maximum accuracy. This signifies the importance and immediacy of stress measurement requirement for Indian adolescents. This study attempts to fill the gaps detected in previous stress measurement approaches to build a novel tool with robust scientific method and not limiting to single stressor experience.

Factors contributing to Stress in Adolescents

There have been several theoretical perspectives on stress and coping, with Lazarus' (1999; Lazarus & Folkman, 1984) transactional viewpoint being the most frequently used model (Nicholls & Polman, 2007). Stress and coping are viewed as an on-going dynamic process from the transactional viewpoint, which involves the individual engaging with their surroundings making evaluations of events, and trying to cope with problems (Reeves et al., 2009). The cognitive appraisal of severity of stress is weighted against a number of cognitive, personality and environmental factors (Hariharan 2020). This explains the individual differences in stress and coping experiences and they have a differential impact on one's physical and mental health. These psychosocial factors influencing the appraisal of stress can differ for adults and adolescents. Identifying and studying these personality and environmental factors affecting the stress perception can give an insight into stress perception of adolescence. These factors are broadly categorized into internal and external factors that contribute to stress of adolescence.

Internal factors and External Psychosocial factors

Physical and personality factors constitute the internal factors contributing to stress. Considering the body mind relation, physical factors such as health history of an individual, their health habits and health experiences can deeply influence the stress reactivity of

adolescence and personality factors such as self-efficacy, self-esteem, frustration tolerance, social skills can have an influence over their stress perception. Personality traits such as extraversion, agreeableness, emotional instability, openness and conscientiousness also have a significant part in how individual perceives their surroundings. An individual's cognition mediation is also highly affected by the external factors such as health and structure of their family, perceived and available social support, promoting factors and their physical environment. These factors contribute to one's perceptions and their coping efficacy while simultaneously having an effect on each other. Some of these factors can act as a mediator or moderator for another variable in influencing stress and coping experiences of the adolescence. Therefore, it is of much relevance to understand how each of these factors might influence adolescence stress experiences.

Self-Efficacy. Self- efficacy is an internal characteristic which has a high influence on one's perception and behaviour (Bandura, 1987). It is believed that self- efficacy aids coping behaviours of the individuals. Research supports with evidence that self- efficacy is one of the internal factors that has a great influence on stress perception of individuals. Increase in emotional efficacy was found to be helping school going students with them perceiving low academic stress (Arslan, 2017). There are also few studies which found no relation between the stress levels of students and their self-efficacy (Shaj, 2021) which implies that there are other factors which might contribute to the relation between one's self-efficacy and their stress perception and further research need to be done to investigate these differences. A study carried out by Parto and Besharat (2011) on a large sample of 914 high school students identified the role of self-efficacy in coping behaviour of the adolescents. Individuals with low self-efficacy were found to be avoiding tasks anticipating barriers and therefore not risking in adapting to new coping strategies. They are also found to be lacking commitment towards their interests and given tasks therefore giving up easily on coping behaviours

(Bandura, 1997). They focus on personal limitations and failures rather than the task requirements. Therefore have high stress perception than others. The cognitive evaluation of self-efficacy depends on the past experiences, upbringing, emotional and physiological states and social compulsion (Bandura, 1986; Sebastian, 2013). This personal characteristic has a great influence over cognitive appraisal therefore affecting the stress perception and coping behaviours of the individual (Karademas & KalantziAzizi, 2004). It influences the onset and persistence of coping behaviours (O-Leary, 1992). Self-efficacy is a method of regulating an individual's emotions, which may provide several benefits in stress experience. To study the influence of this factor in relation to stress and other influencing variables will help in improving coping behaviours of adolescents

Self Esteem. One's own perception of themselves can have a high influence on their perception of stress too. An individual who has positive attitude towards themselves will also have a positive outlook on the situations in their life. In particular, students with high self-esteem can efficiently manage stress and therefore have better academic performance (Galanakis, 2016). Specifically, low self-esteem combined with stress is risk factors for developing depression (Baumeister et al., 2003; Galanakis, 2016). Stress experiences of a person also has an in turn effect on their self esteem (Schraml et al, 2011). Positive attitude and accepting one's own self leads to the positive affect which can influence the appraisal of situation as less stressful or manageable (Avison & McAlpine, 1992; Major, Barr, Zubek, & Babey, 1999; Rector & Roger, 1997). Low levels of self esteem was also found to be having an impact on physical health causing psychosomatic symptoms and predicting ill health (Birndorf et al., 2005; Kivimäki & Kalimo, 1996; Birndorf, Ryan, Auinger, & Aten, 2005; Rhee, Holditch-Davis, & Miles, 2005; Stinson et al., 2008). High self efficacy leads to individual adapting to effective coping strategies such as problem solving rather than opting for avoidance coping and it also aids a person in seeking social support (Fleishman, 1984;

Azharkamandi, 2018). It improves the readiness to adapt to new and effective coping strategies (Baltas & Baltas, 2004).

Low self-esteem has been consistently associated with higher levels of stress among adolescents. A study by Azharkamandi, 2018 found that low self-esteem was a significant predictor of increased stress among both boys and girls. Another study found that self-esteem mediated the relationship between stress and depression among adolescents (Gonzalez-DeHass et al., 2005). Another study found that self-esteem was also positively related to coping self-efficacy, or the belief in one's ability to cope with stress (Gonzalez-DeHass et al., 2005).

Frustrative non reward responsiveness. Stress and frustrative responsive have been long related as they continue to influence each other. Frustration was found to be increasing in stressful adolescents (Gatzke-Kopp et al., 2015). There are a number of studies which suggest that individuals experience distress when they lack fulfilment (Vasile & Albu, 2011). High frustration was also found to be predicting increase in distress and health risk behaviours leading to depression and anxiety in adolescence (Jeronimus, 2015; Jeronimus et al., 2016). FNR is also positively correlated with Neuroticism (Rivero et al., 2020). Exposure to stressful events at this phase of life can also affect their temperament in turn resulting in them being highly frustrated (Laceulle et al., 2012). This makes them more susceptible to stressful situations.

Personality traits - Openness, Conscientiousness, Extraversion, Agreeableness, Emotional Instability. Review of previous literature gave an insight into the unique contribution of these personality traits towards the stress experiences. Extraversion was found to be positively predicting the stress levels and negative affect (Bibbey et al., 2013). Extraversion was found to be inversely linked with cortisol stress response (Penley &

Tomaka, 2002; Wirtz et al., 2007). Individuals with higher extraversion were found to be more energetic and social, with active emotion coping styles (Penley & Tomaka, 2002; Suls, 2001; Afshar et al., 2015), more positive affect, and less anxiety (Mccrae, 1987), which may result in less negative feelings and lower cortisol stress reactivity when confronted with a stressor. In a study, Openness personality trait was negatively related with stress with low cortisol levels thus implying low stress perception (Bibbey et al., 2013). Similar findings regarding the negative association between openness and cardiovascular stress responses have been documented in prior literatures (Bibbey et al., 2013; Williams et al., 2009; Kiekens et al., 2015). Earlier research also found no relation between openness and cortisol response (Oswald et al., 2006). These contradictory findings about the association between openness and physiological response to stress imply that openness may have unequal, conflicting impacts on stress responses.

In a study carried out by Xin *et al.* (2017) in early adults where the stress responses were recorded physiologically, Neuroticism, which is associated with emotional instability, was found to be negatively related to acute stress with low physiological responses. In other studies, it was also stated that they may experience higher levels of stress when it is chronic (Bibbey et al., 2013; Penley & Tomaka, 2002; Schneider, 2004; Schneider et al., 2012; Williams et al., 2009). Higher neuroticism scores indicate more severe subjective stress reactions, i.e., a bigger positive impact reduction towards stress and a worse sense of control on stress activities. Individuals with higher neuroticism are more likely to suffer chronic stress, which leads to down regulation in both the autonomic nervous system (Bibbey et al., 2013; McEwen, 1999; Suls, 2001) and the HPA system (Booij et al., 2013; Dallman, 1993). Extrovert neuroticism personality was found to be adversely predicted stress. In a study on adolescent females with introverted neuroticism predicted educational stress positively whereas those with extrovert neuroticism predicted negative educational stress. Most prior

research have found that among these personality traits, neuroticism predicts the occurrence of stressful life situations as well as academic achievement (Hammen, 2006; Liu & Alloy, 2010; McAbee & Oswald, 2013). Individuals with emotional instability are more likely to experience unpleasant emotions, which may be a predictor of stress (Rentala et al., 2019).

Conscientiousness was found to be protecting against stress by influencing coping strategy in late adolescents and young adults. Conscientious people may have low levels of stress because they are confident in their coping abilities and know how to efficiently employ the coping techniques they choose (Bartley & Roesch, 2011). There are few studies reporting no significant relationship found between agreeableness or conscientiousness and stress responses (Bibbey et al., 2013; Oswald et al., 2006; Wirtz et al., 2007), whereas other studies in adults have reported that there is a relation between these two personality traits and physiological stress responses (Garcia-Banda et al., 2011). These findings show that the association between agreeableness or conscientiousness and acute stress reactions may be less consistent but neuroticism is positively related. In an Indian study, there was no relationship between conscientiousness and extraversion and stress (Manohar et al., 2021). Thus each personality trait has individual and unique effect on an individual's stress perception which is needed to be investigated in more detail.

Social skills. People with low social skills are more likely to be exposed to unfavourable experiences, making them prone to psychological disorders (Segrin, 2001). The social skills deficiency stress generation theory describes this. This notion was investigated in previous research studies. The findings show that there are typically unfavourable relationships between social skills and bad life experiences, but that these connections are higher simultaneously than prospectively. Although social skills were projected to be connected with negative life events that are social in character, they were also similarly predictive of non-

social life events in the majority of cases. Segrin (2001) found that social skills have been connected with academic success, psychological adjustment, coping abilities, and employment (Miles & Stipek, 2006). Individuals deficient in social skills may have greater interpersonal issues than those who are socially skilful (Padhy & Hariharan, 2023). Social skills are seen to be gradually developing during childhood and adolescence (Bandura, 1986; Beauchamp & Anderson, 2010). Establishing and keeping strong connections with peers, as well as learning and adjusting to the rules of school and society, are key developmental tasks in middle childhood (6 to 12 years) which will foster them with required social affiliative skills (Eccles, 1999; Sorlie et al., 2021). Thus social skills play an important role in how an individual perceives their daily life situations and uses available resources to handle them further influencing their stress and coping experiences

Physical health. Stress of an individual is strongly associated with their physical health resulting in acute and chronic illnesses. In similar way illness and health risk behavious of an individual inturn affects their stress experiences **(**Salleh, 2008**).** Certain harmful behaviours, such as smoking, drinking, and getting little exercise, do not appear to be directly related to stress levels (Pappas & Britz, 2010). Academic stress in school going children results in less physical activity and increase risk towards health problems (Stults-Kolehmainen & Sinha, 2014; Salleh, 2008). Stress leads to several chronic illnesses and high health risk behaviours (Pervanidou & Chrousos, 2012). Health risk behaviours such as substance abuse can provide and individual with a temporary sense of satisfaction due to immediate gratification or fitting into peer groups which might reduce stress in some cases. But it can have long term effects on the physical and mental health leading to high stress perception and stress reactivity. Several studies were carried out on how stress has an impact on illness and health risk behaviours but there are limited studies which see the effect of acute illness and health risk

behaviors on stress experiences of adolescents and should be further investigated upon to build effective stress management interventions.

Protective and Promotive factors. The internal characteristics of the individual are the protective factors as they protect the individual against the impact of stress causing adversities. Some Internal features of the individual (Protective elements) as well as external environmental elements (Promotive Factors) can function as buffers against adversity in one's life (Hariharan & Rana, 2016). External variables in the physical and social surroundings are referred to as "promotive factors" because they aid in the promotion of performance by acting as a buffer (Rajendran et al., 2019). These protective and promotive factors are previously studied majorly with relation to resilience. The resilience of an individual is influenced by how protective factors function as a buffer against adversities that affect performance further having an effect on their perception of coping resources. The existence of these protective variables was thought to have a shielding effect on individuals, protecting them from the detrimental effects of adversity and stressful life events (Rajendran, 2019). Researchers such as Sameroff et al., (2003) stated that, although protective variables assist to insulate one from the negative impact, good experiences such as success and achievements that have intrinsic worth play a role in fostering resilience. Thus, while the protective variables serve as a buffer from perceiving stress, the promotional elements serve as the driving force to cope with it.

Each positive experience may encourage and boost the urge to strive or succeed even more. Rutter (1987) defined the significance of protective factors by stating that they work as moderators of the individual's reaction to the unfavourable environment. Rutter highlighted three such processes: developing a positive self-image, lowering the impact of risk factors, and breaking the negative cycle, which may relate to the vicious spiral of adversity and bad

outcomes such as failure, underperformance, and underachievement leading to low self-esteem and efficacy. Luthar et al. (2000) described resilience as 'a dynamic process involving positive adaptation within the setting of considerable adversity', emphasising the need of understanding the process. In this description, two things stand out: "significant adversity" and "positive adaptation." In other words, the individual should be confronting stressful events while also exhibiting high protective factors (in terms of positive personal attributes), high promotive factors (in terms of high positive environmental variables), and great successes. It was shown that resilient people maximised help from both internal (like coping skills) and external (social support) resources to deal with adversity. This clearly emphasises the stress perception and reaction is an interplay with protective (internal) and promotive (external) elements (Rajendran, 2019). Thus it is relevant to study the role of these factors on stressful experiences of adolescence which will lead to resilience building and effective coping.

Family health. On the contrary, it is determined by the intricate interaction of family members' internal and external personal resources (Hetherington, 2003; Wallerstein et al., 2013). These resources determine how parents and children manage not just the obstacles but also the possibilities that underpin interpersonal interactions throughout the continuities and discontinuities of human development (Leme et al., 2015). Numerous studies have demonstrated that the general health and well-being of the family might impact adolescence stress levels. Mistry et al. (2002) discovered that family health, including elements such as family cohesiveness and communication, was adversely related with stress levels in them. Furthermore, a positive family climate, defined by support, warmth, and efficient communication, was related with reduced levels of stress among school goers (Grant et al., 2016). Adolescent coping techniques might be influenced by the health of their families. According to one study, having a supportive home environment, which includes emotional

support and problem-solving abilities, is connected with the adoption of adaptive coping strategies such as seeking social support and active problem-solving (Largo-Wight et al., 2005).

A negative home environment, on the other hand, was associated with the employment of maladaptive coping methods such as avoidance and emotional detachment (Largo-Wight et al., 2005). Adolescents who are stressed might benefit from family health as a promotive factor in using coping resource. Davies et al. (2004) discovered that positive family functioning, including warmth, coherence, and flexibility, buffered the harmful influence of stress on adolescent mental health outcomes. Adolescents who had healthy family relations were more resilient and could cope better with challenges. Family health is important in stress and coping. A healthy and supportive family environment can help to reduce stress and use adaptive coping techniques, whereas a negative family environment can raise stress and lead to the use of maladaptive coping strategies (Wallerstein et al., 2013). Promoting family health and cultivating a supportive home atmosphere may have significant ramifications for children and adolescent's well-being and capacity to cope well with stressors in their life.

Psychosocial support. Having social support has a favourable influence on the ability to manage with stress (Nilsen et al., 2013; Yildirim et al., 2017). A study done on medical college students stated that social support improves one's coping (Luo & Wang, 2009). In an ideal world, one might demonstrate that received assistance that matched stressor needs mitigated stressful events, but mismatched received support did not (Lakey & Cohen, 2000). This is consistent with previous research, which revealed that a lack of parental support in adolescence is frequently related with increased distress, greater levels of problem behaviour, and worse life satisfaction (Dumont & Provost, 1999). The source of psychosocial support also influences one's judgement of situations and previous studies on school and college

students revealed that, who consider friends as their primary source of support are especially vulnerable to poor adjustment (Baqutayan, 2011; Feiring et al., 1998).

Social support has been found to have a negative relation with stress levels of children in most of the research studies (Hall et al., 2010; Glozah & Pevalin, 2014; Saltzman et al., 2018) examined the relationship between psychosocial support and stress in adolescents. It was found that adolescents perceiving high psychosocial support had low stress perception. The study also found that psychosocial support was more effective at reducing stress in adolescents who received support from multiple sources. Other research has also demonstrated the effectiveness of psychosocial support in helping adolescents cope with stress. For instance, a study conducted by (McCoy et al., 2014; Maymon et al., 2019; Scanlon et al., 2020; Cage et al., 2021) found that adolescents who received psychosocial support from family and school had low stress than those who received no support.

Perceived Physical Environment. The subjective appraisal and impression of an individual's physical surroundings in which they live or spend time is referred to as the perceived physical environment. Several research have been conducted to investigate the association between adolescents' perceived physical surroundings and stress and coping. Adolescent stress levels might be influenced by their physical surroundings (Chawla, 2014; Corraliza, 2011; Flouri, 2014). According to Evans et al. (2017), adolescents who viewed their physical surroundings as more disordered and hazardous reported greater levels of stress. Similarly, Hartig et al. (2007) discovered that unfavourable impressions of the physical environment, such as noise and pollution, were connected with higher stress among adolescents. Adolescents' coping techniques might also be influenced by their perception of their physical surroundings. Adolescents who viewed their physical surroundings as more helpful and restorative were more likely to utilise problem-focused coping methods such as

seeking social support and engaging in problem-solving, according to one study (Hartig et al., 2007). Negative evaluations of the physical surroundings, on the other hand, were related with higher use of emotion-focused coping methods such as avoidance or withdrawal. Coping methods can help to control the relation between stress and the perceived physical environment.

Clean air, a stable climate, appropriate water, sanitation and hygiene, chemical safety, radiation protection, healthy and safe workplaces, sound agricultural practises, health-supportive cities and built environments, and a maintained natural environment are all requirements for optimal health (WHO, 2023). According to aadolescents study, when school goers employed more effective coping mechanisms such seeking social support and problem-solving, the negative influence of their perceived physical environment on their stress levels was reduced (Wu et al., 2017). Less successful coping methods, such as avoidance or self-blame, on the other hand, amplify the association between perceived physical surroundings and stressful experiences. These findings underline the importance of the perceived physical surroundings in connection to stress and coping. A pleasant and supportive physical environment can help to reduce stress and promote the use of adaptive coping techniques, whereas a negative or hazardous physical environment can raise stress and lead to less effective coping (Flouri, 2014). Understanding the influence of the physical environment on the well-being of adolescents can help to inform treatments and policies targeted at establishing healthier and more supportive settings for this demographic.

Demographic variables and Stress

In addition to the psychosocial factors, stress perception of adolescents is also influenced by their demographics. The stress perception and reactivity may differ between genders, age groups and academic classes. Previous research provides an extensive evidence

of these differences. Among the adolescents, first year university students were found to be having high risk towards stressors experiences as they are prone to experiencing varied number of stressors which may be due to the new environment (McLean et al., 2022). Adolescence is a age group with rapid changes where individuals belonging to each year can show a great difference in perceiving their environment. Adolescence is broadly divided into early adolescents, middle adolescents and late adolescents (Ostberg et al., 2014), whereas some studies have categorized them into early and late adolescents (Munoz, 2021). With these differences middle adolescents within the age group 13 to 15 years are found to show high reactivity towards stress than early adolescents within the age group of 9 to 11 years (Gunnar et al., 2009). The stressors experienced and the coping strategies adopted vary from early adolescents to middle adolescents. In a qualitative study on athlete adolescents carried out by Reeves et al. (2009) it was found that middle adolescents were exposed to higher number of stressors than the younger adolescents and they were also found to be using problem focused coping whereas early adolescents were found to be using avoidance coping strategies. Gender also plays a significant role in the stressors experienced by them. These gender differences will also further continue to the mental health consequences such as depression and other psychopathology (Hayward, 2003; Stroud et al., 2009). Findings of the most studies regarding gender differences in stress experiences reveal that girls are prone to high stress perception than boys due to high differences in hormonal and physiological changes they experience. Contrast to these findings, some studies suggest that there are no differences in the stress levels experienced by girls and boys as they both go through the rapid changes in this phases of their life (Shaj, 2021). Investigating these demographic differences in stress and coping will add significantly to this field and helps in developing specific interventions of the adolescents wherever needed.

Theoretical framework

Standardization of the Adolescence Stress Scale (ADOSS) is processed along the transactional theory of stress. While the stimulus theories such as Major Life events Theory by Holmes and Rahe (1967) or the response theories such as General Adaptation Syndrome by Selye or Fight or Flight Response by Cannon (1932) viewed stress only from a single perspective. It was not until 1984 when Lazarus and Folkman (1984) proposed the transactional theory that both stimulus and response together were taken into consideration. In Lazarus's view, stress is not solely the product of the individual or the environment, but rather of the transaction between them (Hariharan, 2020). Lazarus and Folkman (1984) in their transactional theory propounded that perception of a stimulus is classified as stress or non-stress based on the individual's evaluation of the strength of the threat or harm in the stimulus vis-à-vis the resource availability assessed by the individual. Thus, alongside the situation and the response of the individual encountering the stress, the cognitive appraisal of the person is given due significance in qualifying an experience as stressful. This accounts for individual differences in evaluating and responding to the same situation. Between the stimulus and the response is the individual's cognitive mediation. This cognitive mediation can be influenced by several demographic and psychosocial factors such as age and gender personality factors, such as frustration tolerance, self-efficacy, self-esteem, environmental factors such as physical and family environment, social norms and expectations, social support network etc.

The current study is contingent on the transactional theory of stress where cognitive appraisal of an individual is given emphasis. Right from the phase of item pooling, the real - life experiences of the sample in the concerned age group has been in the focus. The design of the study is so structured to sustain the focus of individual experiences of stress. Individual's cognitive appraisal of stress is what is emphasised throughout the construction of

the scale. Extending the transactional model further, an attempt was made to identify the demographic and psychosocial factors that contribute to the stress levels of the adolescents.

Rationale

The stage of adolescence is considered a critical phase of development as the individual has to cope with a wide range of demands originating from drastic changes in the physical, biochemical, social, academic and emotional dimensions having a significance bearing on one's future. Many a time, the adolescent, unable to handle the flood of demands succumbs to it either taking an escape route such as deviant behaviour extending to the extreme of suicidal behaviour, or manifests the inability in terms of health related symptoms, sub-optimal cognitive functioning, academic under-performance and under-achievement or failure. Unfortunately, such manifestations end up in labelling the child contributing further to the perpetuation of the same. In this process the child is either symptomatically treated for the health -related symptoms or branded as low achiever. Neither of this helps the adolescent out of the real problem. Given the magnitude of the stress an adolescent passes through with limited skills of coping, it is desirable to have a holistic approach to any adverse manifestations of the children in this age group. There is first a need to rule out stress as the aetiology for any such manifestations before planning any health or academic interventions. This requires a robust measurement instrument that serves as a good diagnostic tool which has cultural suitability. Factors causing stress have a significant cultural loading and also vary with different age groups. Hence, a robust measurement instrument of stress should be evolved from the experiences of the adolescents of a cultural background for whom the said instrument is being constructed. In view of this, developing and standardizing an Adolescence Stress Scale for the Indian population was thought appropriate. The adolescents constitutes 21 % of total population of the country (UNICEF, 2023). In 2021, 6.5% of accidental deaths and suicide constituted of adolescent population (National Crime Report

Bureau statistics, 2021). The NCDs among the adolescents is on the raise. Juvenile delinquency is found to be on the raise. Given such situation, it is time that Indian health system and education system have an indigenous stress scale that functions as a good diagnostic tool in screening and identifying the source of stress for the adolescents. Further, in the context of National education Policy 2020, this scale can function as a good tool to help identify the sources of stress for the adolescents in the new curriculum structure. In the absence of an indigenous age specific stress scale, the present study is taking up not only as a value addition to the knowledge system but also as a value addition to the diagnostic and research tool in the field of Developmental, Educational and Health Psychology.

Research questions

1. Is it feasible to develop and standardize an scale to measure stress among the adolescent age group?
2. What is the underlying factor structure of adolescence stress scale?
3. Are there gender differences among the adolescents in their stress levels?
4. Does adolescence stress follow a developmental trend in the type and intensity of stress?
5. What are the factors contributing to stress in adolescence
6. What are the stress experiences and coping strategies of adolescents with high and low levels of stress

Objectives

1. To develop Adolescence Stress Scale with defined factor structure and adequate psychometric properties
2. To investigate if there is a significant difference in the stress levels of adolescents of different gender, class and age group

3. To identify factors contributing to stress in adolescents
4. To explore the stress experiences and coping strategies of adolescents with high and low stress levels

Chapter III

METHOD

Chapter III

METHOD

The development, standardization, and administration of the Adolescence Stress Scale are presented, in detail, in this chapter. The chapter also gives the specifics of the sample, tools and procedure adopted in different phases. At the outset the plan and design of the study is presented in the tabular form to provide a comprehensive picture of the rigorous process in standardizing the scale.

Plan and Design

The main objectives of the study were to standardize the Adolescence stress scale, and to identify the factors contributing to adolescence stress. The study adopted a sequential explanatory mixed method design to fulfil the objectives. The study was executed phase wise in four phases – i) Development of the Adolescent stress scale, ii) Standardization of the Adolescence Stress Scale iii) Pilot testing and establishment of psychometric properties and iv) Identification of factors contributing to stress in adolescence.

The study design is comprehensively presented in Table 3.1

Table 3.1 Study design

Phase	Description of the Phase	Tasks	Sample size	Age groups	Method Adopted	Type of administration
1a. Initial Survey	Development of Adolescence Stress Scale	Identification of stressors	2241	5 years to 21 years	Survey	Individual
1b. Lawshe's Essentiality Verification	Establishing Content Validity at preliminary phase	Identification of 'essential items'	8 Experts	30-60 years	Identification of experts from the field of Psychology	Individual
2. Standardization of the Adolescence stress scale	Evolving Dimensions of the Scale	Factor analysis	643	11 to 18 years	Factor Analysis	Group administration
3. Pilot testing	Administration of standardized Adolescence Stress Scale	Establishing Reliability & Validity of the Scale	227	11 to 18 years	-	Group administration
4a. Main Study	Identification of the factors contributing to stress in children	Administration of final scale and other 11 tools measuring various psychosocial parameters	1104	11 to 18 years	Correlational	Group administration
4b. Semi-structured Interviews with high and low scorers on Adolescence Stress Scale	Qualitative study	Interviews with identified participants	8	11 to 18 years	Interpretative Phenomenological	One- to- one interviews

Note: Purposive sampling was followed at every phase of the study

As depicted in table 3.1, the total sample consisted of 4215 students between 5 years to 21 years. The current study was conducted in four different phases. The method varied at different phases of the study. In the first phase of the study, the initial identification of the

stressors in the lives of children in the wide age group starting from 5 years to 21 was taken up through a survey method. Item pruning was taken up involving the experts from the field. In phase two, the standardization of the scale was taken up following the standard steps. Phase three describes the pilot testing and establishment of psychometric properties of the scale. Phase four describes the main study where the standardized scale was administered on a large sample of adolescents (11 to 18 years) along with other psychological tools measuring various psychosocial parameters, which was later used to identify the various psychosocial factors contributing to stress among the adolescents. This was also corroborated with a qualitative study on a sub-sample. The four phases of the study will be explained in detail under the Procedure in this chapter and the outcome of the same in the chapter of Results. Before that the sample and the tools are explained.

Participants

The study recruited sample in four different stages following the purposive sampling technique. The first unit of sample was school. The second unit of sample was class the participants studied in and the third unit of the sample was the individual participants. The schools were selected following purposive sampling. The study planned to take into the sample those schools catering to the upper class, middle- class and lower middle -class population. Based on this criteria, the corporate, private and Government educational institutions in Ranga Reddy and Sanga Reddy districts of Telangana and West Bengal were approached with the proposal of the study. Those institutions that first communicated their willingness to participate in the study were included in the sample. The educational institutions were recruited in four phases of the study. In the first phase 15, in the second three, four in the third phase and nine educational institutions in the fourth and last phase of the study were included in the sample, totalling to 31 educational institutions. A total of 4215 children were included in the sample in different phases. Phase 1, where the initial survey

was conducted to gather information on the common stressful experiences of children had a total of 2241 children in the age group of 5 to 21 years. In the second phase, involving standardization of the scale a total of 643 children studying in classes 6^{th} to 12^{th} were included. In the third phase where the pilot testing was carried out for the purpose of examining the suitability of the scale and establishing validity and reliability of the stress scale a total of 227 participants studying in class 6 through 12 were recruited. Later, in phase four, the last phase, a total of 1104 adolescents were recruited as participants for the study. Apart from the standardized Adolescence Stress Scale a series of 11 psychological tests were administered on the group recruited in the last phase. The demographic characteristics of sample at different phases are described below.

Phase I

In this phase, the aim was to identify the stressors experienced by children. Hence, a sample of 2,241 children was approached to participate in the study. Participants belonged to classes one to undergraduate third year. The percentage of participants belonging to each class is- class one(5%), class two(5%), class three(5.6%), class four(4.5%), class five(10.3%), class six(7.8%), class seven(8.7%), class eight(6.5%), class nine(10.3%), class ten(8.3%), class eleven (4.1%), class twelve (3.6%), and first year(7.6%), second year(7%), third year(5.6%) of Undergraduate program. The participants involved in this phase of the study belonged to the ages between 5 years to 21 years. The mean age of the participants was 13.4. They were equally distributed through both genders - 50% girls and 50% boys. They were recruited from 15 different educational institutions (10 schools, 3 junior colleges and 2 degree colleges) in Hyderabad, Telangana, among which 3 schools belonged to government sector, 5 to private sector, 2 to corporate sector, and 2 were private junior colleges, 1 was a government junior college, 1 was a private degree college and 1 was a Central University.

Phase 2

Later, for testing of the initial scale with 56 items, sample of 643 school-going adolescents was drawn from 3 schools in West Bengal and Telangana states of India. Participants belonged to class 6 (n_1= 153), Class 7 (n_2=109); Class 8 (n_3 = 115), Class 9(n_3 =145); Class 10(n_4=121). The participants involved in this phase of the study were between 11 years to 18 years of age. The mean age of the participants was 13.6. Total of 52.1% of the sample comprised of boys and 47.9% comprised girls. Among the three schools two were private schools from urban region and one was a government school from rural region.

Phase 3

To pilot test the final 31 item scale and to establish psychometric properties of the scale a sample of 227 school-going children belonging to class 6(14.1%), class 7(7.9%), class 8(16.3%), class 9(16.7%), class 10(14.5%), class 11(23.8%) and 1st year under graduation (6.6%) was drawn from three educational institutions. The participants were between 11 to 18 years age group. The mean of the age of the participants was 14.34. The sample consisted of 40% boys and 60% girls. Among the four educational institutions one was a government school and junior college from rural region, and a private school and a private degree college from semi-urban region. A sub-sample of 100 was drawn from this sample for test-retest reliability of adolescent stress scale.

Phase 4

In this phase, the aim was to identify the psychosocial factors contributing to stress in adolescents, a sample of 1156 school going adolescents aged between 11 and 18 years from nine educational institutions in rural and urban regions of Telangana, India were included. Due to subject attrition and missing data, 52 sample data were removed. This resulted in a

sample size of 1104, whose data were used to conduct analysis. Participants of the study belonged to the academic classes from 6th through degree 1st year where 11.6% of the sample was from class 6, 12.6% from 7th class, 12.9% belonging to 8th class, 12.4% from 9th class, 12.1% from class 10, 14.6% from 11th grade, 12.5% belonging to 12th grade and 11.3% from degree 1st year. In this study sample 48.9% were girls and 51.1% were boys. Grouping them into early and late adolescence, 46.6% of the sample belonged to early adolescence (11 to 14 years) and the rest 53.4% of them belonged to late adolescence (15 to 18 years). Geographical region they belong to is classified into urban (46.4%), semi urban (30.2%) and rural (23.5%). The family structure of the participants was that 76.2% of the participants had 4 members in a family, 23.8% had more than 4 members in a family and 4.7% of the participants had no siblings and 64.7% had one sibling and 30.6% of them had more than one sibling. The study sample was further categorized based on the socioeconomic status of the participants- poor (0.7%), lower middle class (5.8%), middle class (68.5%), upper middle class (22.9%) and upper class (2.1%). The mean age was 14.59.

For interpretative phenomenological analysis a sub-sample of 10 participants from the sample in this phase (5 with high stress levels and 5 with low stress levels) were approached for a qualitative study. The eight of them agreed to participate in the interview (four participants with high stress scores ranging between 4.5 and 5 and four with low stress scores ranging between 1 and 1.06). Among the participants in the high stress group, two belonged to 6th grade, one was from 10th grade, and one was from 11th grade. The participants were of 11 to 16 years old. Three of them were from semi-urban areas, one from an urban area. Three of them were upper middle class and one was from middle class as per their self-report. Among the lower stress group, three of the participants were boys and one was a girl. Their age ranged between 11 and 18 years. Three of them were from urban region, three were from

rural. Three were of middle class, and one was from upper middle class as per their self-report.

Tools

The study used the standardized Adolescence Stress scale as its primary tool. Apart from that it used a total of 11 psychological tools to measure various psychosocial parameters which may be contributing to the stress. The Adolescent Stress Scale and the other tools are mentioned below.

Assessments for the study, to identify the contributing factors of adolescence stress, were carried out using Adolescent stress scale, Self Efficacy Questionnaire for Children (SEQ-C), Self-esteem scale, Social skills scale, Physical Health scale, Family health questionnaire, Psycho-social support scale, Big Five Questionnaire for Children (BFQ – C), Frustrative non-reward responsiveness subscale (FNRS), Perceived physical environment scale, Protective factors scale and Promoting factors scales (Appendices A3 to A13). In addition to these scales, a semi-structured interview was used to collect the qualitative data (Appendix A14). The structure of the tool and its applicability are discussed in this section. All the tools used in this study were applicable for child and adolescent population.

Personal Details Form

In order to avoid repetition of collecting personal information under every tool a personal data sheet was separately administered to all participants. This collected the details of name, age, gender, class, school, self-reported economic class, geographical region and number of family members and siblings.

Adolescence Stress Scale

Adolescence stress scale was developed as a part of this study. This scale is used to assess the stress experiences and stress levels of adolescents. It has 31 items representing stressful experiences. The scale has three columns — first column constitutes the stressors (e.g., Alcoholic parent, beating by teacher), second column is for the participants to rate the intensity of the stressors from 1 to 5 based on a visual analogue (1 implying least stress and 5 implying the high stress) and the third column is to record the experience of the participant using a dichotomous response (yes/ no). A Visual Analogue scale with 5 emoticons indicating the intensity of the stress from 1(low stress) to 5(high stress) was added to the scale to aid participants in rating.

The adolescence stress scale has 10 dimensions. They are major loss induced stress (e.g., Death of a family member), enforcement or conflict induced stress(e.g., Not getting what you had asked for), phobic stress (e.g., Fear of animals), interpersonal conflict induced stress(e.g., Quarrel between parents) punishment induced stress (e.g., Being punished), illness and injury induced stress (ill health to self), performance stress (e.g., Not meeting academic expectations), imposition induced stress(e.g., Forced), insecurity induced stress(e.g., Separation from loved ones) and lastly, unhealthy environment stress (e.g., Alcoholic parent). The internal consistency of the whole scale was satisfactory with $\alpha = 0.90$ and for dimensions it ranged from .50 to .80. The external reliability of the scale was established through a three week test–retest with $r = .57$ ($p<0.01$). The validity of the scale was also established through convergent and discriminant validity with $r = .29$ and $r = -.20$ respectively with $p<0.01$. The process of development and standardization of the scale are reported in results chapter in detail.

Scoring. The number of items under each dimension range from 1 to 6. Unhealthy environment (item 1), Punishment (items 2 and 18), Major loss (items 8,9,10,11,12,23), phobia (items 13,14,15,30), Imposition (items 16 and 17), Enforcement/Conflict (items 19,22,26,31), , Interpersonal conflict (items 3,4,5,6,7), Illness and injury (items 20 & 21), Performance (items 24 and 25), and Insecurity (items 27, 28, 29). Total scores are computed through the sum of ratings given to all the items. Total scores range from 31 to 155. The scores for each dimension are calculated by adding up the individual item ratings under that dimension. Scores for dimensions range from 1 to 30. The means were calculated for the total scores and the dimension to identify low and high scores. The mean of 2.5 was taken as the cut-off point. Scores with mean greater than 2.5 indicate high stress levels and mean less than 2.5 indicate low stress levels.

Self-Efficacy Questionnaire for Children (SEQ-C)

This scale was developed by Muris (2001) to measure the self-efficacy of children by asking how well they do things in different contexts related to their daily life experiences. This is a 24 item scale and has 3 subscales — social self-efficacy (e.g., How well can you work in harmony with your classmates?), emotional self-efficacy (e.g., How well can you give yourself a pep-talk when you feel low?), and academic self-efficacy (e.g., How well can you pay attention during every class?). Internal consistency estimates of the scale ranged from 0.85 to 0.88. For this study sample, internal consistency was found to be .80 for academic efficacy, .61 for emotional efficacy, .57 for social efficacy and 0.79 for the total scale.

Scoring. This is a five point Likert scale with ratings from 1(not at all) to 5(very well). The total scores range from 24 to 120 for whole scale and are calculated by adding all the item scores. Each dimension has eight items with scores ranging from 8 to 40 - social

efficacy (items 2, 6, 8, 11, 14, 17, 20, and 23), and intellectual/academic efficacy (items 1, 4, 7, 10, 13, 16, 19, and 22) and emotional efficacy (items 3, 5, 9, 12, 15, 18, 21, and 24). The higher the scores, the greater the participants' self-efficacy.

Self-Esteem Scale

This scale was developed by Rosenberg (1965). It is a 10 item, unidimensional scale that measures self-worth of individuals by measuring both positive feelings (e.g., On the whole, I am satisfied with myself) and negative feelings (e.g., At times I think I am no good at all) about the self. The Internal consistency of the self esteem scale is 0.77 and it is α =.56 for this study.

Scoring. This is a 4-point Likert scale where Strongly Disagree= 1 Disagree=2, Agree= 3, and Strongly Agree"=4. Items 2, 5, 6, 8, 9 are negative items where are reverse scored. The total score is obtained by the sum score of all ten items. The scores range between 10-40. Higher scores indicate higher self-esteem.

Big Five Questionnaire for Children (BFQ – C)

This personality questionnaire was developed by Barbaranelli et al., (2003) which measures five personality traits. It is designed specifically for children and adolescents. The personality traits are — Energy/Extraversion (e.g., I like to meet with other people), Agreeableness (e.g., I share my things with other people), Conscientiousness (e.g., I do my job without carelessness and inattention), Emotional Instability (e.g., I get nervous for silly things), and Intellect/Openness (e.g., I know many things). The questionnaire is made of 65 brief statements, each factor consisting of 13 statements. The items under each personality trait are : Intellect/Openness (items 5, 10, 12, 18, 24, 30, 33, 36, 43, 46, 52, 59, 62), Conscientiousness (items 3,7, 20, 22, 25, 28, 34, 37, 44, 48, 53, 56, 65), Extraversion (items 1, 9, 14, 19, 23, 26, 35, 40, 42, 50, 55, 57, 63), Agreeableness (items 2, 11, 13, 16, 21, 27, 32, 38, 45, 47, 51, 60, 64), Emotional Instability (items 4, 6, 8, 15, 17, 29, 31, 39, 41, 49, 54, 58,

61),. Internal consistency for each dimension are as follows - Openness was found to be 0.73, Conscientiousness was 0.81, Extraversion was 0.77, Agreeableness was 0.77, and for Emotional Instability was 0.65.

Scoring. The Big Five dimensions are used to assess personality. This is a five point scale. The rating ranges from 1 (Almost Never) to 5 (Almost Always). The score for each dimension is calculated through the sum of item scores. Each dimension has a score range of 13 to 65. A higher score indicates more dominance of that personality trait.

Frustration Non-Reward Responsiveness Subscale (FNRS)

This subscale was developed as an extension to Behavioural Approach System (BAS), the Behavioural Inhibition System (BIS) by Wright, Lam, & Brown (2009). It consists of five items measuring lowered approach motivation following non-reward. For this study sample, internal consistency was found to be 0.59.

Scoring. This is a four point Likert scale with score range of 1 (very true for me), 2(somewhat true for me), 3(somewhat false for me) and 4 (very false for me). High scores indicate higher frustration response after non-reward.

Social Skills Scale

This scale was developed by Padhy & Hariharan (2023) to assess the skills of individuals in different social contexts of daily life. This scale has 23 items with five dimensions - Leadership skills (e.g., I can lead/ manage a team), Team integration skills (e.g., I am uncomfortable to work in team), Affiliative skills (e.g., I actively/patiently listen to what people have to say), Interpersonal skills (e.g., I can make friends easily) and Social engagement skills (e.g., I take part in group activities). The reliability coefficients for dimensions were between.36 to .68 and for the entire scale of 23 items it was .84. The internal consistency for this study sample is $\alpha = 0.82$., and for dimensions it ranges from .56 to .68.

Scoring. This is a four point scale from 1(Never) to 4 (Always). Items 5 and 15 which are negative items are reverse scored where Always =1 and Never = 4. The number of item under each dimension is - Leadership skills (items 3, 6, 17, 18, 21, 22), Team integration skills (items 5, 15), Affiliative skills (items 1, 2, 4, 12, 20), Interpersonal skills (items 7, 8, 16, 19, 23), Social engagement skills (items 9, 10, 11, 13, 14). The final scores range from 23 to 92. These scores are acquired through sum total of all items. Higher scores indicate strong social skills.

Family Health Questionnaire

This scale was developed by Crandall et al. (2020) to assess health processes and health resources of an individual and their family. This scale has a long-form version with 32 items and a short-form version with 10 items deduced from the long-form. For current study the long-form version with subscales was used. This version of the scale has four dimensions - Family Healthy Lifestyle (e.g., We make a point to follow medical recommendations.), Family social and emotional health processes (e.g., There is a feeling of togetherness), , Family Health Resources (e.g. My mental health or the mental health of my family members got in the way of my family's normal daily activities) and Family External social support (e.g., If we needed financial help, we have people outside of our family we could turn to for a loan). Internal consistency of the scale ranges from 0.82 to 0.92. For this study sample, the Cronbach's α for whole scale is .86, and the same for subscales is ranging from 0.75 to 0.83

Scoring. This is a five- point Likert scale (1=Strongly Disagree, 2= Somewhat Disagree, 3= Neither agree nor disagree, 4=Somewhat Agree and 5 = Strongly Agree). The items under each dimension are - Family social and emotional health processes (items 1 to 11, 18, 19), Family Healthy Lifestyle (items 12, 13, 14, 15, 16, 17), Family Health Resources (items 20, 21, 22, 23, 29, 30, 31, 32) and Family External social support (25, 26, 27, 28) with

number of items under each dimension ranging from 6 to 13. Negative Items 1, 5, 20-24, 29-32 are reverse coded. Sum of all the item ratings give the total score. Total score for each subscale is obtained by the sum of all the items of that particular dimension. Total scores range from 32 to 160. Higher score indicates better family health.

Psycho-Social Support Scale

This scale was developed by Padhy, Hariharan, Monteiro, Kavya, & Angiel (2022) with 22 items measuring the psychosocial support perceived by individuals. It has six dimensions - Social support network (e.g., I believe I will remain close to my friends for a long time), Family based psychological support (e.g., My parents/family members support my decisions), Communicative support (e.g., My loved ones celebrate my achievements), Supportful disposition (e.g., I help others without expecting anything in return), Psychological support deprivation (e.g., I don't have friends to spend time with), Psychological support availability (e.g., There is someone to accompany me when I need them). Internal consistency for total scale is .79 and for dimensions it is ranging from .49 to .67. For this study sample, Cronbach's α ranges from .58 to .71 for the dimensions and is .85 for the total scale.

Scoring. This is a 5 point Likert scale. Responses on the scale range from 1 (Strongly disagree) to 5 (Strongly agree). Number of items for each dimension range from three to five - Family based psychosocial support (items 5, 6, 7, and 9), Communicative support (items 13, 15, and 17), Social support network (items 1, 2, and 4), Supportful disposition (items 3, 18, 19, 20, and 22), Psychological support deprivation (items 8, 11, 16, and 21), Psychological support availability (items 10, 12, and 14). The scores of items 8, 11, 16, and 21, which are negative, are reverse scored. Total score is obtained through the sum of all items. Scores range from 22 to 110. Higher scores on the scale indicate higher social support.

Physical Health Scale

This scale was constructed specifically for this study to assess the physical health status of the participants. The scale comprises of three different sections to assess health history, health risk habits and ill health experiences of the individuals. In Part I of the scale health history of the participants is recorded through 10 items. Each of these items describe a health condition related to each system of the body (e.g., Any chronic problem related to digestive system). Participants are required to answer with a yes or no response against each health condition basing on the fact that they have been diagnosed with any of illnesses or not. In part II of the scale, health risk habits are assessed with 15 statements (e.g., sleeping for more than 9 hours in a day) and part III of the scale assesses the ill health experiences of the participants with 21 statements (e.g., I experience uneasiness in stomach). The two month test-retest reliability of the scale is $r = .57(p<0.01)$ for part I, $.63(p<0.01)$ for part II and $.29(p<0.05)$ for part III. The internal consistency (Cronbach's alpha) for Part I, Part II and Part III are .68, .70 and .83 respectively.

Scoring. Part I of the scale is a dichotomous scale with Yes or No response where Yes = 1 and No=0. Part II and part III are a four- point scale. The ratings range from 1 =Never, 2 = Rarely, 3 = Sometimes and 4 =Almost Always. The total scores are obtained with sum of all the items for each part of the scale. The scores range from 0 to 10 for Part I. For part II scores range from 15 to 70 and higher scores imply high health risk behaviours. In Part III of the scale, positive items 1 (I feel energetic) and 2 (When I wake up in the morning, I look forward to the things I need to do) are reverse scored. The scores for this part of the scale range from 21 to 84. Higher scores indicate ill health in individuals.

Perceived Physical Environment Scale

This scale is constructed specifically for this study to assess the participant's perception of their surrounding physical environment. It consists of 32 items in total. This scale has statements related to the residence, neighbourhood and other essential facilities such as accessibility to transportation and daily household requirements (e.g., My residence is dark, The drainage system in our locality is inadequate). The test- retest reliability of the scale with a gap of two months is $r = .44 (p<0.01)$. The internal consistency is $\alpha = .79$.

Scoring. This is a 4 -point scale where 1 = Totally disagree and 4 = Totally agree. Items 1, 2, 3, 4, 12-21, and 31 which are reverse coded as they are positive statements. Scores range from 32 to 128 and they are obtained by the sum of all item scores. Higher scores indicate adverse physical environment.

Protective Factors Scale

This scale is taken from the Resilience Test Battery developed by Hariharan et al. (2019). This scale consists of a list of 24 statements which represent the characteristics innate to an individual that helps him/her to one to confront adversity (e.g., Ability to perceive the situation with clarity). The respondents are required to rate each protective factor on a ten-point scale indicating the strength of the characteristic listed ranging from low(1) to high (10). Internal consistency of the scale is .75. The internal consistency for the current sample is $\alpha = .92$.

Scoring. Participants were asked to evaluate the items on a 10-point scale. The ratings range from 1 = low strength and 10 = high strength. The score of the scale goes from 24 to 240 and are calculated by adding the ratings given to all the items. The higher the scores, the stronger an individual's protective factors in life.

Promotive Factors Scale

This scale is taken from the Resilience Test Battery (Rajendran et al., 2019). It consists of 14 items; each representing the environmental resources that help an individual in dealing with adverse situations (e.g., Health care facilities within reach). The scale was adapted to make it more suitable for the adolescent population by changing one of the items 'A supportive husband/wife' to 'A protective parent'. Internal consistency of the scale is .93. The Cronbach's alpha is .86 for this study sample.

Scoring. This is 10 point scale where participants were asked to give a rating from 1 to 10 (1 being low advantage and 10 being high advantage) for each statement. The total scores are calculated by the adding up all item ratings and they go from 14 to 140. Higher scores on the scale imply higher perceived advantage of promotive factors.

Semi-Structured Interview

To collect qualitative data a semi-structured interview schedule was formulated in order to understand stress experiences of the participants. This contained seven questions, related to the major stressors, their bodily reactions to stress and the coping strategies they adapt to manage stress. These questions are - i) What are your major sources of stress?, ii)Do you experience any other stressors that are not mentioned in here (adolescent stress scale) ?, iii) What do you do when you feel stressed?, iv) How do you feel when you are stressed?, v) How do you cope when you are stressed?, vi) Does experiencing stress impact your physical health and how?, vii) Are you aware of counselling services and mental health resources? . These leading questions were utilised flexibly to meet participants' comfort levels without altering the essence of the question.

Procedure

Ethical approval: Before data collection, the requisite clearance was received from the University of Hyderabad's Institutional Ethics Committee through letter no UH/IEC/2021/174 dated 21.12.2021 (Copy enclosed in appendix B1). The measurement instruments used in the study were obtained through the public domain, thus, permission from the individual authors was not required. Several educational institutions were approached to seek permission for collecting data from their students. Management of educational institutions were explained about the study design elaborately and those who consented to participate were included in the sample.

The entire procedure is explained in four parts each describing a phase of the study.

Phase 1: Preliminary Survey to Identify Stressors in Children and Adolescents

The phase I of the study was a survey design aimed at development of the adolescent stress scale. This was carried out following two steps, viz Identification of stressors and establishing the Content Validity

Identification of Stressors. To identify the stressors experienced by children, the literature related to various types of stress scales was reviewed, and then an open- ended questionnaire was developed to capture the stressors encountered by them. The open- ended questionnaire recorded the three most stressful events/experiences and the intensity of the stress experienced. Children aged between 5 to 21 years were approached with this questionnaire after seeking permission from the institution. Investigators built rapport with the children before administering the questionnaire. Children were asked to write down three major stressors in their life and they were also asked to rate the intensity associated with stressor from 1(low stress) to 5 (high stress). Data was collected through a focus group discussion

from children belonging to junior classes i.e., classes 1 to 5 and for the participants from class 6 to degree 3rd year the open ended questionnaire was administered. The verbatim was also recorded, through which a unified list of stressors for each class was developed along with its average intensity rating and the frequency of experience.

Establishing Content Validity. The verbatim recorded was translated to its nearest general meaning and the lists of stressors belonging to each class were collated and coded under broader categories. These categories took into account all the similar stressors along with their frequency and mean rating for intensity. Next the data were categorised into four groups based on the age and class of the participants i.e. Group 1 (5 to 10 years age, Class 1,2,3,4,5; n=683), Group 2 (11 to 14 years, Class 6,7,8; n=514), Group 3 (15 to 18 years, Class 9,10,11,12; n=589), Group 4 (19 to 21 years, Degree 1st, 2nd,3rd ; n=455). Many stressors were common among the groups. All the stressors mentioned by the participants were labelled and listed following the method of content analysis. The stressors thus identified totalled to 112.

Against each group, the stressors were noted alphabetically. A group of experts marked each of the 112 stressor as ‘essential’ or ‘not essential’. The judgements of the eight experts were collated. The content validity ratio (CVR) was estimated using Lawshe’s formula CVR = $(N_e - N/2) / (N/2)$, where N_e is the number of experts indicating a stressor as "essential" and N is the total number of experts involved (Lawshe, 1975). Using this as criterion, the items with CVR less than the value of .75 were dropped. This resulted in the elimination of 20 items. Items with less than 1% response frequency were discarded in the following stage. This criterion further resulted in the elimination of 18 items. Consequentially, a single list of 74 stressors (common and exclusive) was retained and their frequency was calculated for each group separately. Stressors with frequency of less than 1% were discarded from the list. Finally, two lists emerged, one list with 39 items for Group 1, and a common list of 56 items

for Groups 2, 3, and 4. Group 1 consisted of children from classes 1 to 5. Groups 2, 3 and 4 consisted of students from class 6 to third year of under-graduation. For the purpose of this study, we selected only the items identified as stressors for the group from class 6 to third year undergraduate students who are placed under the category of adolescence and early adults. Phase 1 of the study ended with identification of stressors for the participants studying in class 6 and above, belonging to the age group of 11 years to 21 years.

Phase 2: Standardization of the Scale

The primary objective of the current study was to develop a stress scale for adolescence and to standardize it. Hence, further data collection was limited to the adolescence age group (11 to 18 years). The scale consisting of 56 items were administered on 643 students studying in classes 6 through 12. Further analysis was carried out using scale with 56 items to standardize the stress scale for adolescents. For the purpose of standardization, the items will have to be put through two statistical analyses, viz- Item analysis to check the internal consistency and Factor Analysis for evolving the dimensions of the scale. Apart from that two other criteria were decided for finalizing the scale. Those items having a mean value of less than 2.5 (which indicates low stress level) and items which were reported as experienced by not more than half of participants. Four items were dropped based on these three criteria. After dropping these items the data was used to compute exploratory factor analysis. Through this analysis the dimensions of the stress scale were identified. This resulted in a 31 item scale with 10 dimensions. Further explanation of factor analysis and standardization of the scale is thoroughly discussed in the results chapter.

Phase 3: Pilot study and Establishment of Psychometric Properties of the Scale

Pilot study was conducted to test the feasibility of the tools and to establish the psychometric properties of the adolescent stress scale. To conduct the pilot study necessary

permissions were taken. A sample of 227 participants from classes 6 through first year of under-graduation was included. The data was collected through class wise group administration. The study was planned for 4 consecutive days for each class. On day one investigator interacted with the participants who were given a consent form to get it signed by their parents. After receiving the written consent from the parents, on day two, participants were asked to give their assent for their participation in the study. Participants who showed interest by signing assent were given the data sheet with questionnaires. First they were asked to fill the demographic details and then the assessments were administered. Adolescent stress scale was given on this day along with the general health questionnaire and children happiness scale for validity testing. Other questionnaires i.e., Self Efficacy Questionnaire for Children (SEQ-C), Self-esteem scale, Frustrative non-reward responsiveness subscale (FNRS), Social skills scale, Physical Health scale, Family health questionnaire, Psycho-social support scale, Perceived physical environment scale, Big Five Questionnaire for Children (BFQ – C), Protective factors and Promoting factors subscales were given on next 2 days. The number days taken for scale administration were extended for one or two more days depending on the comfort of the participants. After three weeks, to establish test-retest reliability, Adolescence Stress Scale was administered on a subsample of 100 participants spread across all classes. The time taken for administration of all scales, during this phase of pilot testing, was found to be six days. Accordingly the plan for the main study was modified to six consecutive days of data collection for every class. Based on the pilot study experience where huge subject attrition was noticed, a larger target was planned for the main study.

Phase 4: Identification of Psychosocial factors Contributing to Adolescent Stress

The main study was executed incorporating the modifications based on the pilot study experience. After seeking the permission from the head of educational institutions on day 1 (Copy enclosed in appendix B2), principal investigator interacted with the school

children to build a rapport. They were explained about stress and purpose of the current study. Then they were given informed consent forms (Copy enclosed in appendix B3) containing information related to the purpose of the study, role of participants, benefits and risks involved and confidentiality. All the information available in the consent form was explained to the children and they were asked to get it signed by their parents/guardians. After obtaining parent's consent, children were asked to sign the assent form (Copy enclosed in appendix B4) for participating in the study. The data collection was carried out in each school with a dedicated time of one week which included collecting data from different classes. To avoid the fatigue in participants, tools were administered as per their comfort and only two to three scales were administered on each day. It took between 40-60 minutes to complete responding to the scales.

On day two, consent and assent forms were collected back and the data sheet containing participant details form and 12 assessment tools was given to the participants. Adolescent stress scale, self-efficacy and self-esteem scales were administered on this day. On day three of the study, personality scale and frustrative non-reward scale were administered, while on day four of the study social skills scale, protective factors scale and promotive factors scale was administered, on day five, physical health scale and family health scale, finally on day six psycho-social support scale and physical environment scale were administered and the debriefing was given to the participants. The administration of the scales was done through class wise group administration. On each day the time taken was 40 minutes to 60 minutes per class.

Challenges faced during the data collection were getting permissions for the schools as the time taken for data collection was long, not all the schools approached were willing to accommodate for all the days and subject attrition was high as some of them were not present on 6 consecutive days of data collection procedure.

After a gap of collecting data, the sub-sample of ten participants were approached to participate in a personal semi-structured interview with the investigator. These participants were selected through the stress level scores obtained through the quatitative study. Among these ten participants five of them scored very high in stress levels and other five scored very low in stress levels when compared to all other participants. Out of the 10 participants who were approached for the interviews eight agreed (4 from each group). These participants were interviewed individually about their stress experiences and coping mechanisms. Information was collected through face- to face in-depth interview. It took 15-25 minutes for each interview. The interviews were recorded in audio format, transcribed, and subsequently translated with the consent of the participants. After the interview ended, every participant was provided with a debriefing.

Chapter IV

RESULTS

Chapter IV

RESULTS

This chapter presents the findings of the study in accordance with the objectives. The first objective of the study was to construct and standardize the adolescence stress scale (ADOSS). This involved the steps of scale development, initial validation, evolving various dimensions through factor structuring and establishing the psychometric properties of the scale. The second objective was to investigate if the stress levels of adolescents differed significantly based on the gender, class and age group they belong to. The third objective of the study was to identify factors contributing to stress in adolescents. The fourth and final objective was to understand the stress and coping experiences of adolescents with high and low stress levels. In order to accomplish these objectives, a series of descriptive and inferential statistics were carried out using SPSS v. 21, v. 26 and AMOS v.21 software. Following is an in-depth discussion of the results.

Objective 1 - Development and standardization of the Adolescence Stress Scale (ADOSS)

The development of the ADOSS passed through several phases before evolving the standardized scale. This is presented in table 4.1.

Table 4.1

Phases of Scale Development & Final Scale

Description of the Phase	Number of Items
Item Pooling	112
Initial Validation	56
Dropping of Low frequency & Low stress items	52
Exploratory Factor Analysis	31
Confirmatory Factor Analysis & The Final Scale	31

Note: The list of 56 stressors, and 31 item final scale are enclosed in appendix A1, A2 respectively

Table 4.1 provides a comprehensive picture of the trajectory of the development of the scale from the stage of item pooling to standardization of the scale.

As a first step items were pooled based on the responses of 2241 participants from class 1 to Undergraduate first year who were asked to name three of their most stressful experiences and rate each of them from one to five, five being high stress, based on the intensity of the stress caused by it. The themes of these items were labelled, coded and content analysed. This evolved a total of 112 stressors varying in frequency. This list was presented to eight experts from the field of Psychology to rate them on the 'essentiality'. Following Lawshe's criteria, a total of 56 items with concurrence of the experts were retained.

As explained in the method chapter, a scale was developed with 56 items through which the data was collected from 643 adolescents (11 to 18 years). This data was used towards the first objective. Prior to the factor analysis, the items were put through item

analysis using SPSS v.21. During this process, four items were dropped based on the three criteria. The first criterion was that items with low item correlation (r = 0.3). A second criterion was items which are reported as experienced by less than half of the sample. Third criterion was items that had low mean of intensity rating (< 2.5). The items which met all these criteria were exempted. These items are waking up early, going to school, bullying by brother or sister, and partiality towards brother or sister. Furthermore, these items were also analysed qualitatively and were found to have a similar meaning with other items. Therefore, it was deemed appropriate to remove them. After eliminating four items from the scale, remaining 52 items were put into factor analysis.

Exploratory Factor Analysis (EFA)

EFA is a statistical approach for identifying the factor structure of a variable. This technique is useful to identify the dimensions of a construct where the number of factors or their nature is not assumed (Costello & Osborne, 2005). Before carrying out the factor analysis it is required to evaluate the data for their potential for this analysis. For this purpose two tests were computed. These tests are Bartlett's test of sphericity (Bartlett, 1954) and the Kaiser Meyer Olkin (KMO) measure of sample adequacy. The assumptions for conducting factor analysis were met, with Bartlett's test being highly significant with $p < .001$ and KMO measure of sampling adequacy being .95. After this, factor analysis was carried out. Maximum likelihood extraction method was computed to determine parameters that best fit the data. This was followed by the promax rotation. The first extraction gave the communalities of each item as presented in the table 4.2. Communalities of an item specify the proportion of common variance in it, relative to the other factors. It can be observed that two items were found to be having communalities less than 0.2 which is considered as low (Child, 1990) and were dropped from the scale. These items are - item 4 (Being alone), and Item 39 (Lack of leisure time).

Table 4.2

Communalities for the initial 52 items of the ADOSS

S.No.	Item numbers	Stressors	Communalities	
			Initial	Extraction
1	1	Alcoholic parent (drinking problem)	.389	.489
2	2	Beating by someone at home	.268	.286
3	3	Beating by teacher	.288	.307
4	4	Being alone	.224	**.163**
5	5	Being ignored by friends	.381	.345
6	7	Being punished	.293	.290
7	8	Bullying by friends	.322	.324
8	10	Career insecurity	.256	.265
9	11	Changing residence	.306	.245
10	12	Changing school/college	.457	.440
11	13	Quarrel between parents	.481	.486
12	14	Quarrel with friends	.462	.485
13	15	Quarrel with parents	.434	.500
14	16	Quarrel with brother/sister	.424	.464
15	17	Quarrels in family	.440	.434
16	18	Death of family member	.607	.652
17	19	Death of friend	.649	.734
18	20	Death of grandparent	.518	.546
19	21	Death of parent	.686	.754
20	22	Failure in exams	.488	.503
21	23	Fear of animals	.353	.338
22	24	Fear of dark places	.458	.602
23	25	Fear of hospitals	.369	.401
24	26	Fear of specific subject	.402	.479
25	27	Financial problem in the family	.405	.387

26	28	Forced to do disliked task	.433	.428
27	29	Forced to participate in an activity	.345	.380
28	30	Getting scolded	.356	.316
29	31	Going late to school/college	.246	.243
30	33	Having to do household work	.273	.288
31	34	High academic pressure	.344	.395
32	35	Humiliation in front of others	.486	.473
33	36	Ill health of loved one	.432	.390
34	37	Ill health of self	.445	.518
35	38	Injury to self	.448	.509
36	39	Lack of leisure time (hobby, playtime, etc)	.236	**.184**
37	40	Lack of sleep	.433	.423
38	41	Losing one's belongings	.467	.479
39	42	Meeting with an accident	.463	.481
40	43	Nightmares	.430	.437
41	44	Not meeting academic expectations (self/others)	.501	.541
42	45	Not meeting expectations in other activities (self/others)	.499	.563
43	46	Parents imposing discipline	.305	.286
44	47	Problems with girlfriend/boyfriend	.308	.346
45	48	Public speaking	.275	.237
46	49	Separation from loved ones (grandparents/ cousins/ friends)	.497	.515
47	50	Separation from parent	.628	.753
48	51	Someone touching me wrongly	.474	.486
49	52	Travelling daily in bad traffic/crowded bus	.407	.411
50	53	Violence at home	.445	.437
51	55	Fear of ghosts, etc	.402	.497
52	56	Not getting what you had asked for	.390	.382

Note: Extraction method: maximum likelihood

Subsequently, exploratory factor analysis was performed again with the remaining 50 items. This was done to extract newer factors of the Adolescence Stress Scale (ADOSS). The similar approach was repeated as earlier by computing the sphericity test and KMO sample adequacy measure. These tests yielded in significant and satisfactory results suggesting in carrying out the factor analysis with sphericity test showing $p<.001$ and KMO=.95 (Kaiser, 1974). Therefore, promax rotation following the maximum likelihood extraction method was carried out. The scree plot derived from the exploratory factor analysis is depicted in Figure 4.1. Table 4.3 displays inter-item correlation matrix of 56 items along with their means and standard deviations. The intensity of the each stressor was rated on a five point Likert scale. The rating ranged from one to five where one was considered as low stress and five was considered as high stress. The mean scores for this set of items in this study sample ranged from 3.94 with standard deviation (SD) = 1.56 (*Stressor:* death of grandparent) to 2.50 with Standard Deviation (SD) = 1.68 (*Stressor:* Alcoholic parent).

Figure 4.1

Scree plot from EFA of the ADOSS

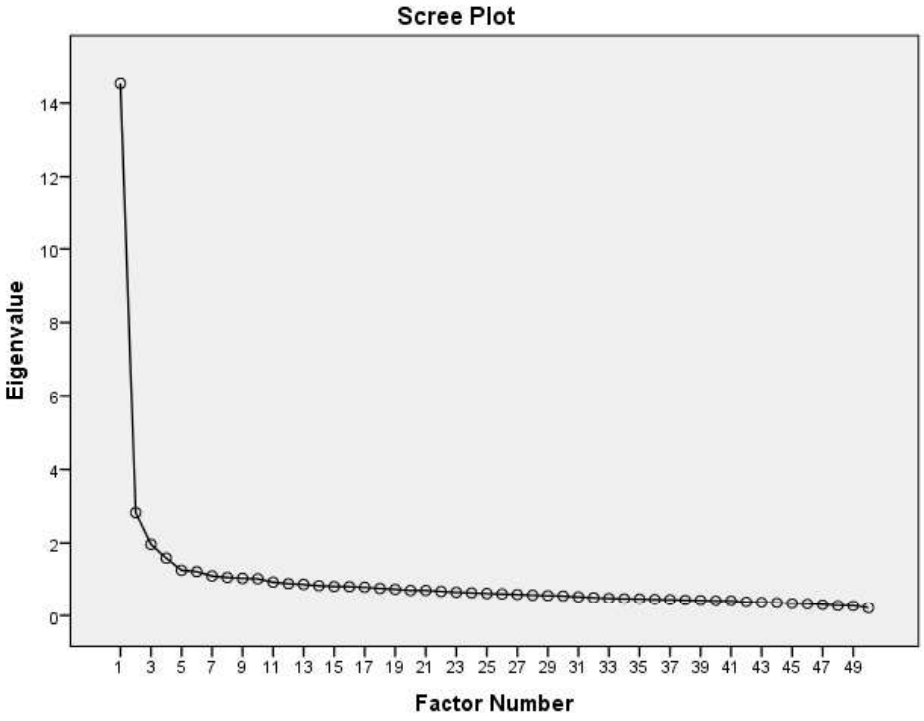


Table 4.3

Correlation matrix, means, and standard deviations of the initial 56 items of ADOSS

Item	1	2	3	5	7	8	10	11	12	13	14	15	16	17	18	19	20	21
1	1.00																	
2	.27	1.00																
3	.19	.29	1.00															
5	.30	.23	.24	1.00														
7	.20	.26	.34	.23	1.00													
8	.34	.26	.21	.35	.28	1.00												
10	.27	.19	.20	.25	.20	.22	1.00											
11	.25	.12	.17	.19	.23	.24	.16	1.00										
12	.37	.18	.25	.28	.26	.28	.24	.45	1.00									
13	.33	.27	.29	.32	.25	.27	.26	.24	.43	1.00								
14	.20	.23	.30	.37	.30	.30	.20	.20	.37	.44	1.00							
15	.32	.25	.22	.30	.24	.29	.26	.20	.31	.47	.43	1.00						
16	.23	.26	.24	.31	.23	.25	.18	.20	.34	.35	.48	.45	1.00					
17	.32	.27	.28	.33	.28	.32	.22	.31	.37	.50	.36	.44	.38	1.00				
18	.33	.15	.22	.29	.20	.28	.15	.28	.40	.36	.28	.28	.21	.42	1.00			
19	.36	.15	.23	.28	.19	.26	.14	.31	.46	.39	.30	.30	.25	.38	.65	1.00		
20	.30	.17	.21	.22	.21	.25	.13	.27	.39	.36	.28	.30	.24	.34	.63	.53	1.00	
21	.39	.15	.24	.30	.20	.31	.16	.33	.48	.39	.25	.29	.21	.40	.63	.72	.56	1.00
22	.33	.14	.26	.35	.18	.32	.16	.25	.34	.32	.23	.25	.24	.33	.44	.50	.40	.59
23	.09	.12	.19	.23	.18	.16	.08	.16	.25	.27	.25	.20	.27	.27	.19	.20	.19	.22
24	.08	.16	.20	.24	.22	.19	.08	.11	.20	.21	.26	.14	.19	.24	.14	.13	.14	.16
25	.07	.09	.21	.22	.16	.20	.11	.08	.17	.20	.29	.14	.24	.22	.13	.16	.14	.16
26	-.01	.06	.20	.28	.20	.13	.13	.13	.22	.31	.36	.20	.27	.23	.16	.15	.17	.18
27	.29	.16	.24	.29	.21	.30	.23	.25	.32	.40	.32	.29	.30	.37	.34	.35	.25	.39
28	.25	.17	.21	.31	.22	.29	.19	.26	.37	.31	.29	.27	.31	.28	.38	.36	.32	.41
29	.12	.12	.17	.24	.24	.25	.15	.21	.29	.22	.26	.27	.32	.27	.20	.26	.18	.29

30	.13	.21	.28	.32	.30	.24	.10	.16	.21	.26	.27	.32	.34	.30	.23	.21	.24	.26
31	.15	.11	.22	.14	.26	.16	.20	.19	.18	.21	.24	.16	.19	.15	.10	.08	.08	.11
33	.07	.14	.22	.17	.20	.14	.24	.09	.16	.16	.24	.14	.20	.14	.11	.09	.03	.13
34	.10	.13	.24	.23	.19	.20	.26	.23	.22	.25	.24	.18	.25	.20	.15	.13	.13	.15
35	.30	.18	.28	.40	.26	.37	.29	.28	.37	.34	.32	.34	.32	.33	.34	.41	.31	.41
36	.24	.15	.24	.36	.24	.25	.19	.20	.34	.34	.32	.27	.28	.35	.38	.37	.31	.43
37	.10	.17	.21	.28	.26	.25	.10	.20	.24	.29	.27	.19	.31	.24	.26	.18	.24	.23
38	.11	.10	.21	.25	.26	.20	.14	.25	.29	.31	.34	.24	.30	.27	.27	.24	.29	.26
40	.11	.12	.16	.23	.21	.21	.17	.10	.24	.29	.26	.27	.24	.20	.23	.25	.16	.21
41	.21	.15	.17	.28	.20	.26	.14	.26	.37	.33	.30	.24	.36	.30	.29	.34	.30	.37
42	.20	.11	.27	.25	.20	.29	.13	.19	.31	.33	.32	.26	.25	.29	.47	.50	.39	.48
43	.18	.13	.18	.31	.25	.29	.17	.22	.28	.30	.31	.23	.29	.28	.28	.29	.25	.26
44	.20	.05	.17	.34	.25	.29	.22	.22	.33	.33	.27	.29	.33	.32	.35	.34	.27	.36
45	.25	.09	.21	.32	.21	.31	.28	.22	.31	.31	.30	.28	.32	.25	.31	.28	.29	.31
46	.15	.20	.20	.23	.24	.19	.17	.16	.19	.23	.27	.18	.24	.23	.12	.11	.06	.17
47	.14	.07	.13	.21	.11	.17	.23	.19	.22	.24	.21	.18	.17	.20	.20	.28	.16	.25
48	.05	.12	.13	.18	.18	.16	.14	.11	.18	.19	.19	.14	.25	.22	.15	.14	.11	.18
49	.29	.15	.18	.31	.18	.30	.16	.29	.39	.43	.35	.29	.30	.35	.43	.44	.45	.44
50	.34	.09	.21	.29	.22	.30	.19	.34	.48	.39	.26	.24	.24	.33	.51	.50	.44	.60
51	.28	.17	.20	.26	.23	.31	.19	.24	.36	.35	.26	.22	.25	.31	.40	.40	.32	.44
52	.07	.13	.23	.16	.22	.18	.09	.20	.27	.24	.31	.14	.25	.23	.26	.24	.25	.28
53	.37	.21	.23	.33	.28	.31	.23	.23	.36	.41	.34	.33	.33	.35	.31	.39	.31	.39
55	.13	.15	.20	.21	.19	.19	.10	.13	.18	.21	.23	.10	.21	.21	.15	.16	.19	.19
56	.17	.18	.22	.28	.20	.19	.15	.19	.29	.26	.27	.28	.33	.27	.24	.25	.17	.29
M	2.55	2.66	2.64	3.06	2.91	2.82	2.58	2.53	3.10	3.22	3.09	2.87	2.68	3.06	3.80	3.57	3.94	3.62
SD	1.68	1.45	1.47	1.59	1.40	1.56	1.56	1.55	1.63	1.61	1.45	1.61	1.55	1.63	1.66	1.76	1.56	1.80

Item	22	23	24	25	26	27	28	29	30	31	33	34	35	36	37	38	40	41
22	1.00																	
23	.20	1.00																
24	.24	.44	1.00															
25	.19	.35	.45	1.00														
26	.22	.29	.38	.41	1.00													
27	.42	.25	.28	.30	.29	1.00												
28	.43	.23	.24	.20	.27	.42	1.00											
29	.27	.25	.24	.21	.29	.28	.44	1.00										
30	.29	.23	.25	.27	.27	.30	.31	.35	1.00									
31	.19	.18	.21	.20	.17	.21	.18	.20	.21	1.00								
33	.14	.19	.21	.22	.22	.27	.23	.21	.24	.29	1.00							
34	.20	.16	.16	.15	.31	.26	.31	.25	.26	.26	.31	1.00						
35	.42	.27	.26	.25	.32	.39	.43	.38	.39	.23	.27	.39	1.00					
36	.36	.32	.21	.22	.31	.30	.33	.29	.30	.17	.19	.29	.41	1.00				
37	.27	.35	.28	.26	.29	.26	.26	.25	.29	.26	.24	.23	.33	.44	1.00			
38	.30	.31	.29	.25	.30	.29	.27	.28	.29	.26	.24	.21	.34	.31	.52	1.00		
40	.24	.25	.20	.21	.34	.28	.32	.34	.26	.24	.28	.32	.39	.34	.30	.38	1.00	
41	.35	.25	.27	.30	.32	.38	.34	.35	.32	.23	.23	.29	.41	.39	.40	.46	.42	1.00
42	.42	.27	.27	.22	.23	.33	.30	.21	.27	.19	.16	.27	.38	.36	.34	.34	.28	.37
43	.30	.29	.34	.33	.33	.30	.30	.29	.32	.25	.24	.30	.39	.39	.37	.39	.40	.39
44	.38	.29	.25	.25	.39	.40	.32	.29	.33	.20	.21	.30	.45	.35	.32	.33	.43	.39
45	.40	.25	.23	.21	.32	.42	.38	.26	.30	.21	.18	.33	.41	.34	.31	.35	.39	.39
46	.19	.23	.19	.25	.27	.27	.29	.20	.20	.21	.25	.30	.26	.27	.18	.18	.33	.26
47	.21	.18	.13	.18	.17	.27	.28	.17	.20	.16	.19	.29	.34	.32	.19	.18	.28	.31
48	.21	.29	.23	.24	.27	.25	.27	.24	.28	.18	.17	.20	.21	.25	.22	.25	.27	.37
49	.41	.23	.23	.23	.30	.35	.37	.26	.29	.18	.17	.26	.43	.37	.31	.33	.31	.41
50	.50	.24	.24	.23	.27	.41	.41	.31	.30	.18	.15	.25	.43	.40	.30	.31	.32	.43
51	.39	.28	.25	.22	.27	.33	.36	.30	.27	.16	.17	.26	.43	.41	.32	.28	.28	.37
52	.30	.31	.23	.29	.29	.24	.30	.24	.27	.32	.23	.26	.30	.33	.36	.34	.37	.39
53	.39	.28	.29	.19	.24	.34	.36	.28	.29	.23	.16	.27	.39	.37	.26	.26	.32	.38
55	.19	.32	.51	.38	.30	.24	.16	.17	.22	.19	.20	.15	.23	.25	.25	.29	.22	.28
56	.32	.28	.25	.23	.30	.33	.30	.28	.35	.26	.29	.33	.33	.40	.32	.29	.36	.41
M	3.42	2.72	2.91	2.59	3.13	3.00	3.00	2.63	3.23	2.44	2.28	3.04	3.44	3.58	3.21	3.12	3.17	3.12
SD	1.66	1.53	1.64	1.59	1.58	1.56	1.52	1.45	1.48	1.51	1.47	1.52	1.55	1.55	1.52	1.54	1.59	1.62

Item	42	43	44	45	46	47	48	49	50	51	52	53	55	56
42	1.00													
43	.42	1.00												
44	.40	.41	1.00											
45	.33	.36	.58	1.00										
46	.21	.26	.28	.35	1.00									
47	.31	.28	.25	.31	.25	1.00								
48	.22	.22	.25	.27	.29	.23	1.00							
49	.39	.38	.38	.38	.21	.29	.27	1.00						
50	.41	.37	.46	.42	.25	.26	.27	.61	1.00					
51	.39	.38	.41	.40	.23	.30	.25	.48	.59	1.00				
52	.33	.37	.34	.32	.26	.26	.29	.38	.40	.39	1.00			
53	.40	.35	.37	.45	.27	.27	.20	.39	.44	.41	.35	1.00		
55	.28	.41	.25	.26	.19	.23	.21	.27	.30	.32	.31	.28	1.00	
56	.29	.35	.36	.37	.27	.32	.27	.32	.38	.35	.32	.37	.30	1.00
M	3.42	3.28	3.45	3.16	2.56	2.85	2.63	3.64	3.55	3.28	3.13	3.06	3.24	3.20
SD	1.66	1.60	1.54	1.54	1.56	1.69	1.54	1.60	1.75	1.70	1.59	1.58	1.74	1.59

Note: M is Mean of the given items and SD is Standard Deviation.

Scree plot is used to determine the number of factors to be retained and from the figure 4.1 it can be observed that it suggested 6 factors. The other approach to determine the number of factors is to consider the Kaiser's Eigen values that are greater than one. In this analysis, when considered Eigen values, a ten factor structure was suggested with values greater than one. Therefore, a ten factor structure was obtained for ADOSS. The items with less than 0.4 factor loadings towards the identified factors were suppressed and eliminated (Osborne et al., 2008). This resulted in a final scale with 31 items and ten dimensions. The items of the scale, and the pattern coefficients (factor loadings) are reported in Table 4.4.

Table 4.4

Pattern matrix of 10 factor solution of ADOSS

Final item number and content		Pattern coefficients
Factor 1- Major loss induced stress		
Item 9	Death of friend	.898
Item 8	Death of family member	.839
Item 11	Death of parent	.833
Item 10	Death of grandparent	.685
Item 23	Meeting with an accident	.523
Item 12	Failure in exams	.446
Factor 2- Enforcement or conflict induced stress		
Item 26	Problems with girlfriend/boyfriend	.714
Item 19	High academic pressure	.476
Item 22	Lack of sleep	.467
Item 31	Not getting what you had asked for	.415
Factor 3- Phobic stress		
Item 14	Fear of dark places	.909
Item 30	Fear of ghosts, etc	.719
Item 15	Fear of hospitals	.620
Item 13	Fear of animals	.448
Factor 4- Interpersonal conflict induced stress		
Item 5	Quarrel with parents	.741
Item 6	Quarrel with brother/sister	.634
Item 4	Quarrel with friends	.590
Item 3	Quarrel between parents	.551
Item 7	Quarrels in family	.468
Factor 5- Punishment induced stress		
Item 2	Beating by teacher	.513
Item 18	Being punished	.423
Factor 6- Illness & injury induced stress		
Item 20	Ill health of self	.774
Item 21	Injury to self	.629
Factor 7- Performance stress		
Item 25	Not meeting expectations in other activities (self/others)	.610
Item 24	Not meeting academic expectations (self/others)	.496
Factor 8- Imposition induced stress		
Item 17	Forced to participate in an activity	.610
Item 16	Forced to do disliked task	.421
Factor 9- Insecurity induced stress		
Item 28	Separation from parent	.731
Item 27	Separation from loved ones (grandparents/ cousins/ friends)	.487
Item 29	Someone touching me wrongly	.409

Factor 10- Unhealthy environment induced stress		
Item 1	Alcoholic parent (drinking problem)	.534

Note. Extraction method: maximum likelihood; Rotation method: Promax with Kaiser normalization, rotation converged in 22 iterations.

The factors identified through factor analysis were labelled based on the content and meaning of the items they consists of. The first factor is named as Major loss induced stress and it consists of six items. These six items are death of a family member (item 8), death of a friend (item 9), death of a grandparent (item 10), death of parent (item 11), Failing in an examination (item 12), Meeting with an accident (item 23). These items refer to either irreversible changes in anybody's life, or major changes that occur upon events of examination failure, or accident. These are the stressors that require socio-emotional adjustment, and may alter the perception of one's worldview. Second factor was labelled as *Enforcement, or Conflict induced stress.* This factor consists of four items. These are item 26- problems with girlfriend/boyfriend, item 19-High academic pressure; item 22- lack of sleep, item 31- not getting what you had asked for. This points to dual forms of intrapersonal stress that arise from forced participation, dealing with academic pressure, or conflicts with an identified romantic partner commonly experienced by adolescents. Third factor is *Phobic stress.* This factor consists four items. These are item 14- fear of dark places, item 30- fear of ghosts, item 13- fear of animals, item 15- fear of hospitals owing to the irrationally founded fears as indicated by the 4 items. Factor 4 was named *'Interpersonal conflict induced stress'* and consists of five items. Item 5- Quarrel with parents, item 6- Quarrel with brother/sister, item 4- Quarrel with friends, item 3- Quarrel between parents, item 7- Quarrels in family which indicate the aspects of distress due to witnessing, or being a part of quarrels with either family, or friends. Factor 5 was named *'Punishment induced stress'* comprised of two items (item 2- beating by teacher, item 18- being punished) indicative of the fear of punishment. The 6th factor derived from two factors was named *'Illness & Injury induced stress'* (item 20- Ill health of self, item 21- Injury to self) denoting the anguish from sickness, disease state, or

the trauma of an individual as indicated by the 2 items. The 7th factor (2 items) was categorized as 'Performance stress'. The items under this dimension are item 24- not meeting academic expectations (self/others), item 25- not meeting expectations in other activities (self/others). The items indicate the stress of performing with excellence in academics as well as other activities. The 8th factor (2 items) was labelled '*Imposition induced stress'* (item 16- forced to do disliked task, item 17- forced to participate in an activity) as the items were indicative of stress arising from obligatory or forced participation in activities. The 9th factor (3 items) is called *'insecurity induced stress'* with item 27- separation from loved ones (grandparents/cousins/friends), item 28- separation from parent, item 29- Someone touching me wrongly which harness the feelings of physical separation related distress, and also feeling of being unsafe, or subject to wrongful contact, or sexual harassment. The last and 10th factor was a single item measure labelled as *'Unhealthy environment induced stress'* (item 1- alcoholic parents (drinking problem)) because it represented an inconducive scenario of being with an alcoholic parent.

Percentage of variance explained by each dimension of stress is- Major loss (29.07%), Enforcement or conflict (5.66%), Phobia (3.93%), Interpersonal conflict (3.18%), Punishment (2.52%), Illness & injury (2.44%), Performance (2.21%), Imposition (2.13%), Insecurity (2.08%), Unhealthy environment (2.05%).

Confirmatory Factor Analysis of ADOSS

The ten factor model identified in exploratory factor analysis was further checked for goodness fit through confirmatory factor analysis. This analysis was carried out on a sample of 1104 adolescents. As shown in the table 4.5 the results indicated a good fit model with acceptable goodness fit indices of chi-square/df (1.667), GFI (.902), AGFI (.876), CFI (.933) and RMSEA (.043). The composite reliability of scale was found to be .90.

Table 4.5

Confirmatory Factor Analysis of Adolescence stress scale

Measures	Chi square/df	GFI	AGFI	CFI	RMSEA	Composite reliability
Adolescence Stress Scale	1.667	.902	.876	.933	.043	0.902

Reliability and Validity Testing

To establish the psychometric properties of the scale the final adolescence stress scale consisting of 31 items and ten defined dimensions was administered on a sample of 227 adolescents (11 to 18 years) belonging to class 6th through 1st year of under-graduation.

Reliability – To test the reliability of the scale means to check if the constructed scale is consistent in measuring the construct. The objective was to establish the internal and external reliability of the scale. Cronbach's alpha was calculated to test the internal consistency of the scale. The scores for each dimension were calculated by adding the individual scores of the items under each factor. The internal consistency for the whole 31 item scale was α= .90. The Cronbach's alpha for the dimensions ranged from α= .50 to .80. For individual subscales the internal consistency is as follows: for Major loss (α= .80); for Enforcement, or Conflict (α= .55); for Phobia (α = .74); for Interpersonal conflict (α=.68); for Punishment (α= .50); for Illness & Injury (α= .63); for Performance (α= .69); for Imposition (α= .51), and for Insecurity (α= .70). The split-half reliability of the scale was also calculated which was found to be .85 with spearman brown coefficient of .92.

The external reliability of the scale was tested through test-retest reliability. The scale was administered on a subsample of 100 participants after three weeks from the first

administration. These participants were spread across. The results of test-retest reliability indicate the acceptable reliability of the scale with the Pearson's correlation coefficient being .57($p<0.01$).

Table 4.6

Internal consistency for total scale and each dimension

S.no.	Dimensions	No. of Items	Cronbach's alpha
1	Childhood Stress Scale	31	.90
2	Major Loss Induced (F1)	6	.80
3	Enforcement/Conflict Induced (F2)	4	.55
4	Phobic Stress (F3)	4	.74
5	Interpersonal Conflict Induced (F4)	5	.68
6	Punishment Induced (F5)	2	.50
7	Illness & Injury Induced (F6)	2	.63
8	Performance Stress (F7)	2	.69
9	Imposition induced (F8)	2	.51
10	Insecurity Induced (F9)	3	.70
11	Unhealthy Environment Induced (F10)	1	NA

Validity- To test the validity of the scale is to verify if the scale is gauging what is expected to gauge. To establish the validity of the ADOSS convergent and discriminant validity were carried out. Convergent validity is the extent to which the constructs share a common variance with each other. Discriminant validity, on the other hand, is the degree to which a construct is actually unique from other construct (Hair et al., 2011). To establish the discriminant validity of the scale Children's happiness scale (Morgan, 2014) was used and General health questionnaire-12 (GHQ-12) (Goldberg & Williams, 1988) was used to establish convergent validity. From the table 4.6 it can be observed that the Pearson's correlation is significant ($p < 0.01$). A positive correlation between the ADOSS and General Health Questionnaire (GHQ-12) can be observer with $r = .29$ establishing convergent validity. Discriminant validity is established with the negative correlation between ADOSS and Happiness scale with $r = -.20$.

Table 4.7

Pearson's correlation coefficients for convergent and discriminant validity

Construct variables	Stress levels
Stress levels	1
Happiness	-.20**
GHQ	.29**

Note ** Correlation is significant at the 0.01 level (2-tailed).

Scoring

The scoring of the total scale was determined using the formula Mean +/-2 Standard Deviation. The total Mean (M) was 96.23 and Standard Deviation (SD) was 23.27. This resulted in three cut-off points. A shown in table 4.8, scores ranged from 31 to 49, 50 to 143 and 144 to 155 representing low, medium and high stress levels respectively. From the sample of 1104, 4.2% belonged to low stress group, 95.6% to moderate stress group and .3% had high stress levels.

Table 4.8

Cut offs established using M+/-2SD

	Low	**Moderate**	**High**
Scores	31 to 49	50 to143	144 to 155
Frequency	46	1055	3
Percentage	4.2%	95.6%	.3%

Note. Mean =96.23, Standard Deviation = 23.27

Objective 2: Differences in Stress Levels Based on Gender, Class and Age Groups

. To fulfil the objective t test and one-way ANOVA were carried out using SPSS v. 26.

2a. Difference in stress levels between girls and boys

After evolving the factors, the 31 item scale was administered on a sample of 1104 boys and girls studying in class 6 through first year under graduation. To investigate if there is a significant difference in stress levels of adolescents belonging to different gender, 11 independent t- tests were computed. The sample consisted of two groups- girls (n=540) and boys (n=564). The dependent variables were the total stress levels of the participants and ten dimensions of stress. The results are presented in Table 4.8.

Table 4.9

Means, Standard deviations and t test of stress levels across gender

Variables	Gender				t	Cohen's d
	Girls (n= 540)		Boys (n= 564)			
	M	SD	M	SD		
Stress levels	**99.39**	**23.32**	**93.21**	**22.82**	**4.44*** **	**0.27**
Major loss induced stress	**22.51**	**6.81**	**21.55**	**6.43**	**2.42** **	**0.15**
Enforcement or Conflict induced stress	12.37	3.74	12.06	4.03	1.31	
Phobic stress	**11.94**	**4.61**	**10.13**	**4.31**	**6.72*** **	**0.41**
Interpersonal Conflict induced stress	**14.91**	**4.81**	**14.03**	**4.89**	**3.02** **	**0.18**
Punishment induced stress	5.84	2.17	5.80	2.25	0.28	
Illness & Injury induced stress	**6.12**	**2.40**	**5.79**	**2.43**	**2.30***	**0.14**
Performance stress	**6.62**	**2.55**	**6.30**	**2.61**	**2.06***	**0.12**
Imposition induced stress	**5.61**	**2.19**	**5.21**	**2.28**	**3.00** **	**0.18**
Insecurity induced stress	**11.15**	**3.76**	**10.16**	**3.69**	**4.45*** **	**0.27**
Unhealthy environment induced stress	2.31	1.46	2.20	1.45	1.35	

*Note: M=Mean, SD= Standard deviation, ***p<0.001, **p< 0.01, *p< 0.05*

The results of independent t-test comparing total stress levels indicated a significant difference between girls and boys ($t(1102) = 4.44$, $p<0.001$). Girls had a mean score of 99.39 (SD = 23.32), while boys had a mean score of 93.21 (SD = 22.84). The effect size was moderate, with Cohen's d= .27. According to the results, girls are having higher stress levels than boys.

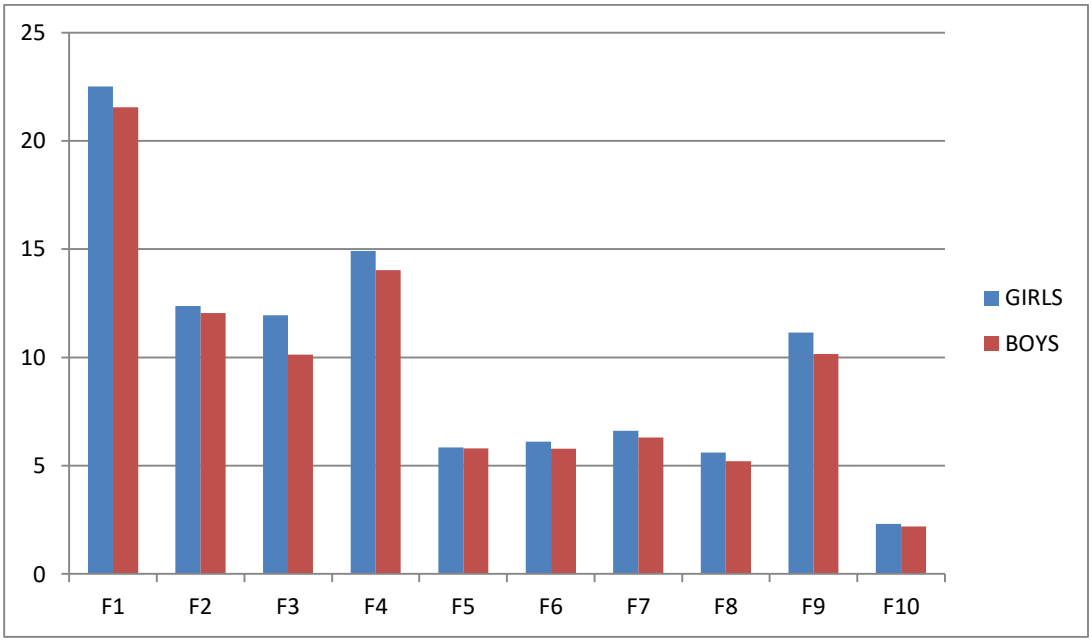
The results implied that the girls are significantly experiencing higher levels of stress when compared to those of boys in seven out of ten dimension, viz-Major loss induced stress, phobic stress, stress due to interpersonal conflict, Illness and injury, Performance, Imposition, and Insecurity. For the dimension, major loss induced stress, results of ($t(1102) = 2.42$, $p<0.01$) girls (22.51 (SD = 6.81) experienced high major loss induced stress when compared to boys (21.55 (SD = 6.43). The effect size was small, with Cohen's d= .15. For phobic stress $t(1102) = 6.72$, $p<0.001$ suggested significant difference were found in girls (M=11.94, SD = 4.61) having higher phobic stress than boys (M=10.13, SD = 4.31). The effect size was moderate with Cohen's d = .41. The independent t test ($t(1102) = 3.02$) was significant at $p<0.01$ for interpersonal conflict induced stress. Girls (M = 14.91, SD = 4.81) were found to have higher stress than boys (M= 14.03, SD = 4.89) with Cohen's d = .18, showing small effect size. Illness & Injury induced stress dimension had a significant result with $t(1102) = 2.30$, $p<0.05$. It can be observed that girls (M=6.12, SD = 2.40) had higher stress levels than boys (M=5.79, SD = 2.43) with a small effect size of Cohen's d = .14. Similar to the above findings, dimension of performance induced stress also indicated ($t(1102) = 2.06$, $p<0.05$) a significant difference with girls (M=6.62, SD = 2.55) having higher levels of stress when compared to boys (M=6.30, SD = 2.61) with an effect size of Cohen's d = .12. For, imposition induced stress $t(1102) = 3.00$ was significant at $p<0.01$ with girls (M=5.61, SD=2.19) having higher levels of stress than (M=5.21, SD= 2.28). The effect size was small with cohen's d = 0.18. The dimension, insecurity induced stress, indicated significant

differences (t (1102) = 4.45, p<0.001) with girls (11.15, SD = 3.76) having higher stress than boys (10.16, SD = 3.69). The effect size was small with Cohen's d = .27. There were no significant differences for three dimensions where stress is caused due to enforcement/conflict, punishment, and unhealthy environment.

The graphical representation of mean differences between girls and boys for each stress dimension is shown in figure 4.2.

Figure 4.2

Graphical representation of group differences for each stress dimension



Note: F1=Major loss, F2 = Enforcement/conflict, F3 = Phobia, F4 = Interpersonal conflict, F5 = Punishment, F6 = Illness & Injury, F7 = Performance, F8 = Imposition, F9 = Insecurity, F10 = unhealthy environment.

2b. Difference in stress levels between early adolescents and late adolescents.

To investigate if there are any significant differences in stress levels age wise, participants were categorized into early adolescents (11 to 14 years, n=521) and late adolescents (15 to 18 years, n=583). Independent t tests were computed to compare the means of the groups. Dependent variables are total stress levels and the ten dimensions of stress. Table 4.10 shows the results of the analysis.

Table 4.10

Means, Standard deviations and t test of stress levels across adolescent age groups

Dependent Variables	Adolescent age groups				T	Cohens d
	Early adolescent n=521		Late adolescent n=583			
	M	SD	M	SD		
Stress levels	**101.75**	**20.49**	**91.30**	**24.49**	**7.636*** **	**0.46**
Major loss induced stress	**23.44**	**6.00**	**20.75**	**6.91**	**6.852*** **	**0.42**
Enforcement or Conflict induced stress	**12.70**	**3.79**	**11.77**	**3.94**	**3.998*** **	**0.24**
Phobic stress	**12.00**	**4.54**	**10.13**	**4.37**	**6.973*** **	**0.42**
Interpersonal Conflict induced stress	**14.83**	**4.60**	**14.12**	**5.08**	**2.436** **	**0.15**
Punishment induced stress	**6.21**	**2.12**	**5.46**	**2.22**	**5.760*** **	**0.35**
Illness & Injury induced stress	**6.39**	**2.30**	**5.56**	**2.46**	**5.724*** **	**0.35**
Performance stress	**6.92**	**2.46**	**6.04**	**2.62**	**5.777*** **	**0.35**
Imposition induced stress	5.53	2.23	5.30	2.25	1.696	
Insecurity induced stress	**11.35**	**3.44**	**10.02**	**3.91**	**5.981*** **	**0.36**
Unhealthy environment induced stress	**2.37**	**1.53**	**2.15**	**1.38**	**2.471***	**0.15**

*Note: M=Mean, SD= Standard deviation, ***p<0.001, **p< 0.01, *p< 0.05*

The results revealed that early adolescents experienced high stress than late adolescents in overall stress as well as in the nine out of ten dimensions, barring Imposition induced stress.

The results obtained after performing the independent t-test for total stress levels indicated a significant difference between adolescent age groups ($t(1102)=7.636$, $p<0.001$). Early adolescents had a mean score of 101.75 (SD = 20.49), while late adolescents had a mean score of 91.30 (SD = 24.49). Cohen's d= .46, indicating a moderate effect size. These results suggest early adolescents are having higher stress levels than late adolescents.

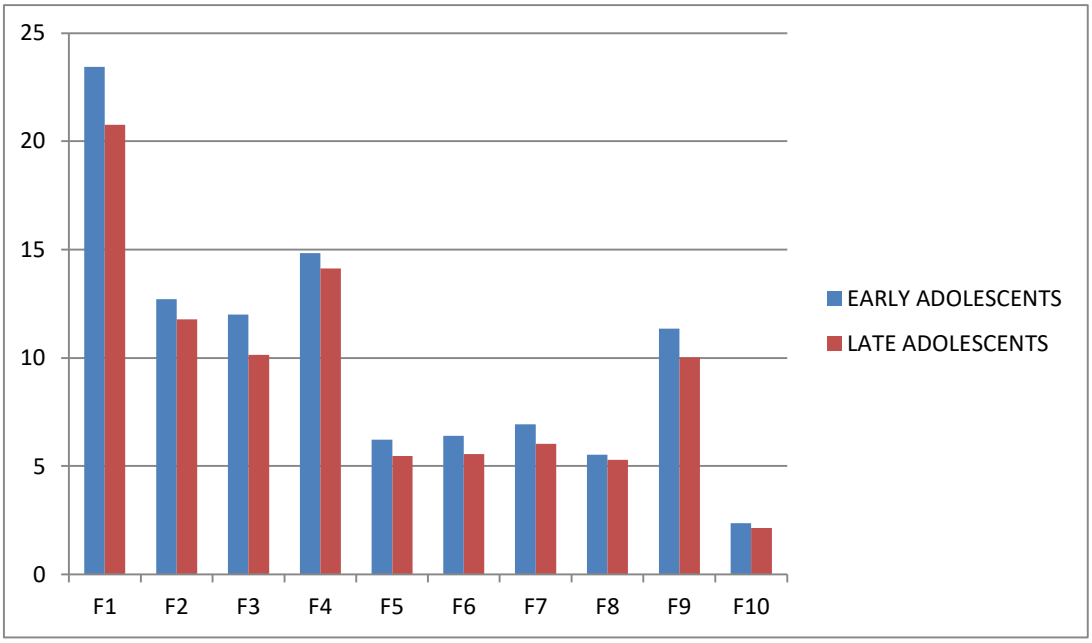
The independent t test for major loss induced stress was found to be significant with $t(1102) = 6.852$, $p<0.001$. It can be observed that early adolescents (M=23.44, SD= 6.00) had higher stress levels of stress when compared to that of late adolescents (M = 20.75, SD = 6.91). Cohen's d= .42, indicating a moderate effect size. For enforcement or conflict induced stress the result was significant ($t(1102) = 3.998$, $p<0.001$ indicating a significant difference between adolescent groups. Early adolescents had a mean score of 12.70 (SD = 3.79) which is higher than that of late adolescents (M= 11.77, SD = 3.94). Cohen's d= .24, indicating a small effect size. For phobic stress ($t(1102)=6.973$, $p<0.001$) a significant difference was found between the stress levels of early adolescents (M = 12.00, SD = 4.54), and late adolescents (M= 10.13 , SD = 4.37). It is evident that early adolescents had higher stress induced by phobias than late adolescents. Cohen's d= .42, indicating a moderate effect size. Interpersonal conflict induced stress also had significant differences ($t(1102)=2.436$, $p<0.01$). Early adolescents had a mean score (M=14.83,SD = 4.60) higher than of while late adolescents (M=14.12 , SD = 5.08). Cohen's d= .15, with small effect size. The results for the dimension punishment induced stress indicated a significant difference between adolescent age groups ($t(1102) = 5.760$, $p<0.001$). Stress induced due to punishment was found to be higher in early adolescents (M = 6.21, SD = 2.12), than that of late adolescents (M = 5.46, SD

= 2.22). Cohen's d= .35, indicating a moderate effect size. From the table it can be observed that Illness and Injury induced stress had significant differences between adolescent groups with t(1102) = 5.72 significant at p<0.01. Early adolescents (M=6.39, SD = 2.30) had higher levels of stress than that of late adolescents (M = 5.56, SD = 2.46). Cohen's d= .35, with a moderate effect size. For the dimension performance stress (t (1102) = 5.777, p<0.001) results indicated a significance difference between the adolescent groups with early adolescents (M=6.92, SD = 2.46) having higher levels of stress when compared to late adolescents (M=6.04, SD = 2.62). Cohen's d= .35, indicating a moderate effect size. Insecurity induced stress (t (1102) = 5.981, p<0.001) was found to be significantly differing between early adolescents (M=11.35, SD = 3.44 and late adolescents (M=10.02, SD = 3.91). Early adolescents had higher levels of stress due to insecurity than late adolescents with a moderate effect size Cohen's d= .36. Similarly, stress induced due to unhealthy environment (t(1102)=2.471, p<0.05) was also found to significantly differing between the adolescent groups with early adolescents (M=2.37, SD = 1.53), experiencing higher stress than late adolescents (M=2.15, SD = 1.38). Cohen's d was found to be .15, indicating a small effect size.

A graphical representation of mean differences in dimensions of stress between early adolescents and late adolescents in presented in figure 4.3.

Figure 4.3

A graphical representation of mean differences between early adolescents and late adolescents



Note: F1=Major loss, F2 = Enforcement/conflict, F3 = Phobia, F4 = Interpersonal conflic, F5 = Punishment, F6 = Illness & Injury, F7 = Performance, F8 = Imposition, F9 = Insecurity, F10 = unhealthy environment.

Table 4.11

Means, Standard deviations and One way Analysis of Variance of stress levels across each class

Dependent Variables	Class																	
	6 n=128		7 n=139		8 n=142		9 n=137		10 n=134		11 n=161		12 n=138		13 n=125			
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	F	**η2**
Stress levels	103.32	23.10	100.89	18.18	105.48	16.54	96.16	21.90	95.13	25.03	93.16	22.92	93.92	25.34	81.07	24.09	15.16***	.09
Major loss	23.21	6.39	23.96	5.24	24.89	4.66	20.88	7.12	22.21	6.69	20.78	6.66	21.29	6.90	18.81	7.16	12.80***	.08
Enforcement or Conflict	12.86	4.10	12.84	3.66	12.37	3.52	12.49	3.78	12.59	4.09	12.23	3.54	12.05	4.02	10.12	3.95	6.75***	.04
Phobic stress	12.25	4.50	11.94	4.73	12.48	3.99	11.64	4.40	9.75	4.76	10.24	4.71	10.09	4.22	9.76	3.99	9.44***	.06
Interpersonal Conflict	15.39	4.55	14.57	4.16	15.39	4.87	13.82	4.90	14.33	5.15	13.75	4.90	14.92	4.87	13.56	5.22	3.07**	.02
Punishment	6.27	2.09	6.01	2.08	6.27	2.13	6.06	2.39	5.83	2.09	5.84	2.07	5.32	2.23	4.86	2.25	6.64***	.04
Illness & Injury	6.51	2.45	6.32	2.27	6.79	2.05	6.04	2.33	5.71	2.47	5.59	2.26	5.97	2.55	4.64	2.43	10.42***	.06
Performance stress	7.05	2.43	6.36	2.53	7.37	2.19	6.79	2.50	6.51	2.58	6.30	2.53	6.51	2.54	4.62	2.53	14.07***	.08
Imposition	5.52	2.29	5.62	2.18	5.59	2.19	5.54	2.25	5.40	2.17	5.54	2.26	5.47	2.30	4.46	2.15	3.74***	.02
Insecurity	11.50	3.56	11.28	3.53	11.79	2.95	10.77	3.55	10.73	3.41	10.51	4.14	10.14	3.80	8.25	3.92	11.8***	.07
Unhealthy environment	2.76	1.69	1.99	1.34	2.54	1.50	2.12	1.41	2.07	1.36	2.37	1.52	2.15	1.33	2.00	1.28	5.00***	.03

*Note: M=Mean, SD= Standard deviation, ***p<0.001, **p< 0.01, *p< 0.05, Degrees of freedom(df)=7,1096*

Table 4.12

Tukey's HSD multiple group comparisons for stress levels across eight academic class groups

Multiple group comparisons	Total Stress levels	Major loss	Enforcement/ Conflict	Phobia	Interpersonal conflict	Punishment	Illness & injury	Performance	Imposition	Insecurity	Unhealthy environment
6 ~ 7	2.42	**-**.746	.018	0.315	0.822	0.251	0.184	0.695	**-**0.095	0.219	**.765***
6 ~ 8	**-**2.15	**-**1.683	.493	**-**0.229	0.003	**-**0.009	**-**0.281	**-**0.312	**-**0.068	**-**0.289	0.216
6 ~ 9	7.16	2.328	.370	0.608	1.566	0.207	0.471	0.266	**-**0.017	0.726	**.634***
6 ~ 10	8.19	1.002	.270	**2.496***	1.062	0.437	0.799	0.547	0.128	0.769	**.683***
6 ~ 11	**10.16***	**2.428***	.630	**2.014***	1.639	0.427	**.918***	0.750	**-**0.017	0.991	0.385
6 ~ 12	9.40	1.921	.809	**2.163***	0.470	**.947***	0.537	0.540	0.052	**1.355***	**.606***
6 ~ UG	**22.24***	**4.403***	**2.74***	**2.490***	1.831	**1.410***	**1.868***	**2.439***	**1.059***	**3.252***	**.758***
7 ~ 8	**-**4.587	**-**.938	.476	**-**0.544	**-**0.819	**-**0.260	**-**0.465	**-1.006***	0.027	**-**0.508	**-.549***
7 ~ 9	4.732	**3.07***	.353	0.293	0.744	**-**0.044	0.287	**-**0.429	0.079	0.507	**-**0.131
7 ~ 10	5.765	1.748	.252	**2.182***	0.240	0.186	0.615	**-**0.148	0.223	0.549	**-**0.082
7 ~ 11	7.737	**3.174***	.612	**1.699***	0.817	0.176	0.734	0.055	0.078	0.771	**-**0.380
7 ~ 12	6.972	**2.667***	.791	**1.848***	**-**0.352	0.696	0.353	**-**0.155	0.148	1.136	**-**0.159
7 ~ UG	**19.82***	**5.149***	**2.72***	**2.175***	1.008	**1.158***	**1.684***	**1.744***	**1.155***	**3.033***	**-**0.007
8 ~ 9	**9.312***	**4.011***	**-**.123	0.837	1.563	0.216	0.752	0.578	0.051	1.015	0.418
8 ~ 10	**10.35***	**2.685***	**-**.223	**2.725***	1.059	0.446	**1.080***	0.859	0.196	1.057	0.468
8 ~ 11	**12.32***	**4.112***	.136	**2.243***	1.636	0.436	**1.199***	**1.062***	0.051	**1.279***	0.170
8 ~ 12	**11.56***	**3.605***	.315	**2.392***	0.467	**.956***	0.818	0.852	0.121	**1.644***	0.390
8 ~ UG	**24.41***	**6.086***	**2.25***	**2.719***	**1.827***	**1.419***	**2.149***	**2.750***	**1.128***	**3.541***	**.542***
9 ~ 10	1.034	**-**1.326	**-**.101	**1.889***	**-**0.504	0.230	0.328	0.281	0.145	0.042	0.049
9 ~ 11	3.005	.101	.259	1.406	0.073	0.220	0.446	0.484	0.000	0.264	**-**0.249
9 ~ 12	2.240	**-**.407	.438	1.555	**-**1.095	0.740	0.065	0.274	0.069	0.629	**-**0.028
9 ~ UG	**15.09***	2.075	**2.37***	**1.882***	0.265	**1.202***	**1.396***	**2.172***	**1.076***	**2.526***	0.124
10 ~ 11	1.972	1.426	.360	**-**0.482	0.577	**-**0.010	0.119	0.203	**-**0.145	0.222	**-**0.298
10 ~ 12	1.207	.919	.539	**-**0.333	**-**0.592	0.510	**-**0.262	**-**0.007	**-**0.075	0.586	**-**0.078
10~ UG	**14.06***	**3.40***	**2.47***	**-**0.006	0.768	**.972***	**1.069***	**1.891***	**.932***	**2.483***	0.075
11 ~ 12	**-**.765	**-**.507	.179	0.149	**-**1.169	0.520	**-**0.381	**-**0.210	0.069	0.364	0.220
11~ UG	**12.08***	1.975	**2.11***	0.476	0.192	**.983***	**.950***	**1.688***	**1.076***	**2.261***	0.373
12~ UG	**12.85***	**2.48***	**1.93***	0.327	1.360	0.463	**1.331***	**1.898***	**1.007***	**1.897***	0.152

2c Differences in stress levels among academic classes

One way Analysis of Variance (ANOVA) was computed to examine the mean differences across eight academic classes i.e., from class 6 to under-graduation. The dependent variables were the total stress levels of the participants and the dimension-wise scores for all the ten dimensions of adolescence stress scale. After conducting the ANOVA, Tukey's HSD post hoc test was carried out to check the significant differences among the class for all the dependent variable. The tables 4.10 and 4.11 show the ANOVA results and post hoc test findings respectively. Following is the description of the results for each dependent variable.

Total stress levels. The results of one-way ANOVA indicated a significant differences among the academic classes on the overall stress ($F (7, 1096) = 15.16$, $p < .001$) as well as the ten dimensions. Following are the descriptive statistics of each class - Class 6 ($M = 103.32$, $SD = 23.10$), Class 7 ($M = 100.89$, $SD = 18.18$), Class 8 ($M = 105.48$, $SD = 16.54$), Class 9 ($M = 96.16$, $SD = 21.90$), Class 10 ($M = 95.13$, $SD = 25.031$), Class 11 ($M = 93.16$, $SD = 22.92$), Class 12 ($M = 93.92$, $SD = 25.34$), and Under-graduation ($M = 81.07$, $SD = 24.09$). Post-hoc comparisons using the Tukey HSD test revealed that Under-graduate participants had significantly low stress than participants from all other classes. Stress levels of participants belonging to 8^{th} class were significantly high when compared to participants from classes 9, 10, 11, 12. Stress levels of 6^{th} class participants were found to be significantly higher than that of class 11. The effect size was medium with eta-squared (η^2) = .09. There were no significant differences among other groups of class.

Major loss induced stress. The results indicated a significant differences ($F (7, 1096) = 12.80$, $p < .001$). mean and standard deviations of each class are- Class 6 ($M = 23.21$, $SD = 6.39$), Class 7 ($M = 23.96$, $SD = 5.24$), Class 8 ($M = 24.89$, $SD = 4.66$), Class 9 ($M = 20.88$, $SD = 7.12$), Class 10 ($M = 22.21$, $SD = 6.69$), Class 11 ($M = 20.78$, $SD = 6.66$), Class 12 (M

= 21.29, SD = 6.9), and Under-graduation (M = 18.81, SD = 7.16). Post-hoc comparisons using the Tukey HSD test revealed that Under graduate participants had significantly low levels of stress when compared to participants from classes 6, 7, 8, 10 and 12. Stress levels of 8th class participants were significantly high in comparison to stress levels of participants belonging to the classes 9,10,11,12. Participants from 6th class were seen to be experiencing significantly high stress induced due to major loss when compared to 11th class participants. Similarly 7th class participants had significantly higher stress on the dimension of Major loss induced stress than 9th and 11th class participants. The effect size was moderate, with eta-squared (η^2) = .08. According to the results, no statistically significant differences were found among other groups of class.

Enforcement or conflict induced stress. The ANOVA results for enforcement or conflict induced stress indicated a significant differences among the classes ($F(7, 1096) = 6.75$, $p < .001$). Further comparisons using the Tukey HSD post-hoc test revealed that, Under-graduate (M =12.12, SD =3.95) participants had significantly low stress levels when compared to participants of all other classes- Class 6 (M = 12.86, SD =4.1), Class 7 (M =12.84, SD =3.66), Class 8 (M =12.37, SD =3.52), Class 9 (M = 12.49, SD =3.78), Class 10 (M =12.59, SD =4.09), Class 11 (M =12.23, SD = 3.54), Class 12 (M =12.05, SD = 4.02). The effect size was small, with eta-squared (η^2) = .04. There were no significant differences among other groups of class

Phobic stress. The results comparing the mean scores of phobic stress across eight academic class groups indicated a significant differences among the groups ($F (7, 1096) = 9.44$, $p < .001$). Further comparison of mean values using the Tukey HSD post-hoc test implied that participants belonging to Class 6 (M = 12.25 , SD =4.50), Class 7 (M =11.94, SD =4.73) and Class 8 (M =12.48, SD =3.99) had significantly higher stress levels than participants of Class 10 (M =9.75, SD =4.76), Class 11 (M =10.24, SD =4.71), Class 12 (M

=10.09, SD =4.22), and Under-graduation (M =4.22, SD =9.76). Class 9 participants (M =11.64, SD =4.40) had higher phobic stress than participants from Class 10 (M =9.75, SD =4.76) Under-graduation (M =4.22, SD =9.76). The effect size was moderate, with eta-squared (η^2) = .06. There were no significant differences among other groups of class

Interpersonal conflict induced stress. The one-way ANOVA results, comparing the mean scores of stress induced due to interpersonal conflict across the eight groups of academic classes indicated a significant differences among the groups ($F(7, 1096) = 3.07$, $p < .01$). Further analysis of comparisons using the Tukey HSD post-hoc test revealed only one significant difference under this dimension which indicated that participants from class 8 (M =15.39, SD =4.87) had significantly higher levels of stress than Under-graduate participants (M = 13.56, SD =5.22). The effect size was small, with eta-squared (η^2) = .02

Punishment induced stress. A one-way ANOVA was conducted to compare the mean scores across the three groups. The results specified a significant differences among the class groups ($F(7, 1096) = 6.64$, $p < .001$). Further comparisons using the Tukey HSD post-hoc test revealed that participants belonging to Under-graduation (M =4.86, SD =2.25) had significantly low stress levels than all other classes- Class 6 (M = 6.27, SD =2.09), Class 7 (M =6.01, SD =2.08), Class 8 (M =6.27, SD =2.13), Class 9 (M = 6.06, SD =2.39), Class 10 (M =5.83, SD =2.09), Class 11 (M =5.84, SD = 2.07), Class 12 (M =5.32, SD =2.23). Another significant difference observed was that participants from 12th Class (M =5.32, SD =2.23 had significantly low stress levels than participants from class 6 (M = 6.27, SD =2.09) and Class 8 (M =6.27, SD =2.13). The effect size was small, with eta-squared (η^2) = .04. There were no other significant mean differences observed under this dimension.

Illness & injury induced stress. The results indicated a the stress levels induced due to illness & injury significantly differ among the academic classes ($F (7, 1096) = 10.42$, $p < .001$). Further comparison analysis using the Tukey HSD post-hoc test revealed that

Undergraduate participants (M =4.64, SD =2.43) had significantly low stress levels when compared to participants from all other classes - Class 6 (M = 6.51, SD =2.45), Class 7 (M =6.32, SD =2.27), Class 8 (M =6.79, SD =2.05), Class 9 (M =6.04 , SD =2.33), Class 10 (M =5.71, SD =2.47), Class 11 (M =5.59, SD =2.26), Class 12 (M =5.97, SD =2.55). Another significant difference observed which revealed that participants from 6th class (M = 6.51, SD =2.45) had higher levels than 11th class participants (M =5.59, SD =2.26). The effect size was moderate, with eta-squared (η^2) = .06. There were no other significant mean differences among these classes.

Performance stress. The results comparing means of performance stress across all academic classes indicated a significant group differences ($F(7, 1096) = 14.07$, $p < .001$). Further analysis of comparisons using the Tukey HSD post-hoc test revealed undergraduate participants (M =4.62, SD =2.53) had significantly low stress levels when compared to all the other class groups class 6 (M = 7.05 , SD =2.43), Class 7 (M =6.36, SD =2.53), Class 8 (M =7.37, SD =2.19), Class 9 (M =6.79 , SD =2.50), Class 10 (M =6.51, SD =2.58), Class 11 (M =6.30, SD =2.53), Class 12 (M =6.51, SD =2.54). Participants of Class 8 (M =7.37, SD = 2.19) were also found to be having significantly high stress levels when compared to Class 7 (M =6.36, SD =2.53) and Class 11 (M =6.30, SD =2.53). The effect size was moderate, with eta-squared (η^2) = .08. No other significant mean differences were observed.

Imposition induced stress. The results indicated a significant group differences ($F (7, 1096) = 3.74$, $p < .001$). Further comparisons of the mean values using the Tukey HSD post-hoc test revealed that under-graduate participants (M =4.46, SD =2.15) had significantly low stress when compared to all other classes- Class 6 (M =5.52 , SD =2.29), Class 7 (M =5.62, SD =2.18), Class 8 (M =5.59, SD =2.19), Class 9 (M = 5.54, SD =2.25), Class 10 (M =5.40, SD =2.17), Class 11 (M =5.54, SD = 2.26), Class 12 (M =5.47, SD =2.30). The effect size was small, with eta-squared (η^2) = .02.

Insecurity induced stress. The results indicated a significant differences across all classes for stress induced due to insecurity ($F(7, 1096) = 11.8$, $p < .001$). Further analysis of comparisons using the Tukey HSD post-hoc test revealed that Under-graduate participants (M =8.25, SD =3.92) had significantly low stress when compared to all other classes- Class 6 (M =11.50 , SD =3.56), Class 7 (M =11.28, SD =3.53), Class 8 (M =11.78, SD =2.95), Class 9 (M =10.77 , SD =3.55), Class 10 (M =10.73, SD =3.41), Class 11 (M =10.51, SD =4.14), Class 12 (M =10.14, SD =3.80). Other significant mean differences revealed that participants belonging to class 6 (M =11.50 , SD =3.56) had high stress when compared to 12 (M =10.14, SD =3.80) and another significant difference observed was that participants of class 8 (M =11.78, SD =2.95) had significantly high stress when compared to classes 11(M =10.51, SD =4.14) and 12 (M =10.14, SD =3.80). The effect size was moderate, with eta-squared (η^2) = .07

Unhealthy environment induced stress. The results indicated a significant group differences ($F (27, 1096) = 5.00$, $p < .001$). Post-hoc comparisons using the Tukey's HSD test revealed that participants of Class 6 (M = 2.76, SD =1.69) were found to have significantly higher stress levels than participants of class 7 (M =1.99, SD =1.34), class 9 (M = 2.12, SD =1.41), class 10 (M =2.07, SD =1.36), class 11 (M =2.37, SD = 1.52), class 12 (M =2.15, SD =1.33) and Under-graduation (M =2.00, SD =1.28). Another significant difference observed was that Class 8 participants (M =2.54, SD =1.50) had significantly high stress levels related to unhealthy environemnt when compared to class 7 (M =1.99, SD =1.34), and under-graduation (M =2.00, SD =1.28). The effect size was small, with eta-squared (η^2) = .03.

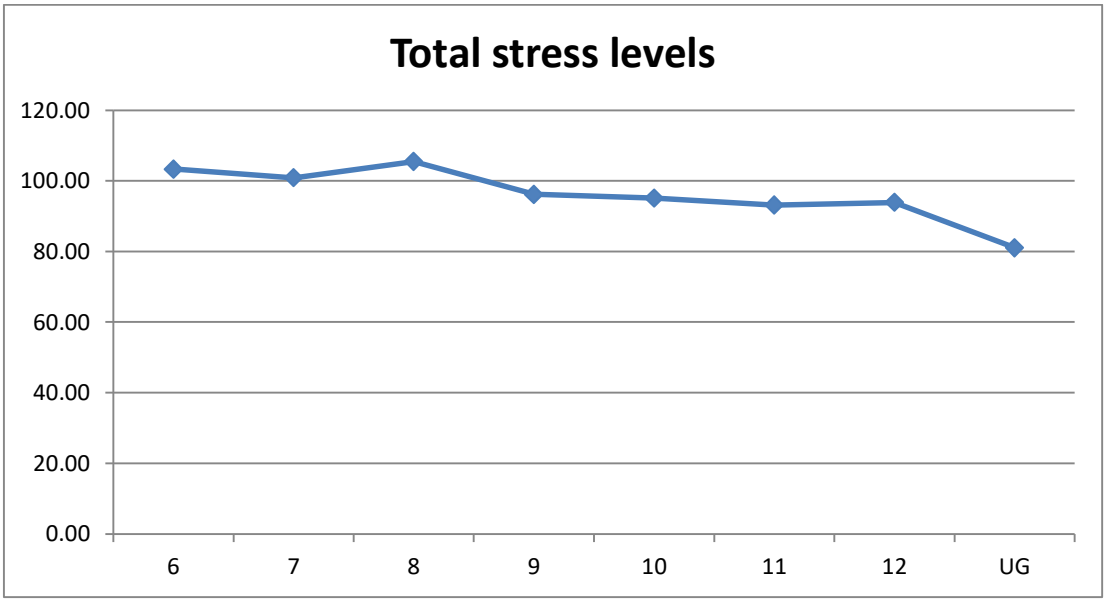
It may be of interest to see if the overall stress and the ten dimensions of stress follow any progressive or declining trend across academic classes.

From the graphical representation presented in figures 4.4 to 4.14 it can be observed

that participants from 8th class had the higher stress levels in all dimensions except for the stress induced due to enforcement/conflict and unhealthy environment where 6th class is seen having higher stress levels. Under-graduation had lower stress levels in comparison to all other classes. The trend is observed and explained for the overall as well as the dimensions of stress following every graph

Figure 4.4

Graph showing the group differences in Overall stress levels



It may be observed from figure 4.4 that the overall stress is showing a progressively declining trend across academic classes except for 8th class where it shows a peak.

Figure 4.5

Graph showing the group differences in major loss induced stress

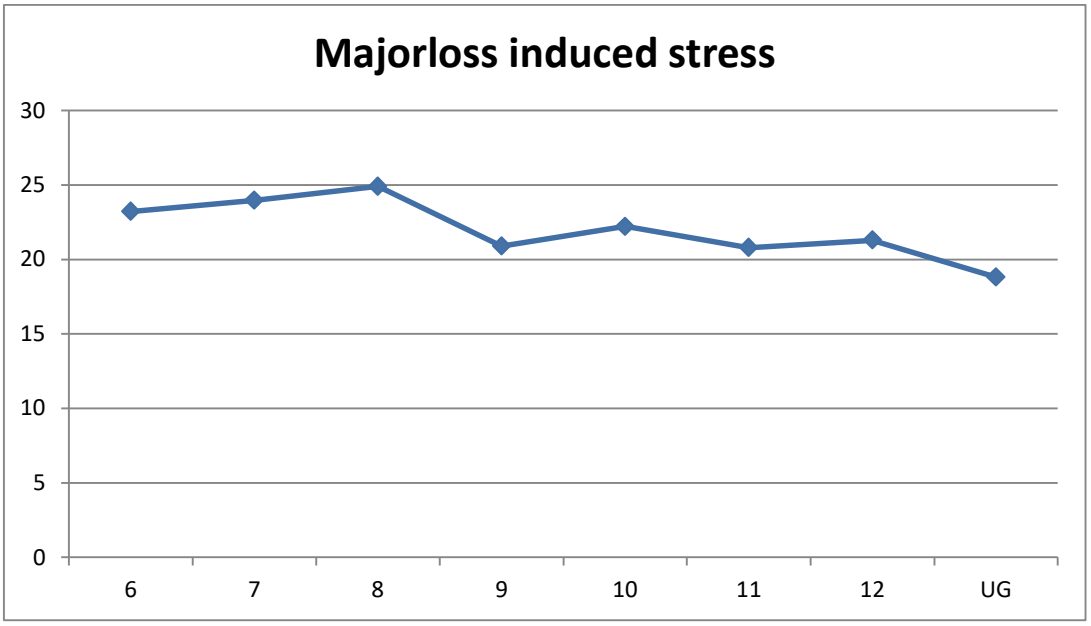


Figure 4.5 depicting the Major loss induced stress shows a significant peak in class 8 and an equally significantly observable dip in 9th class. By and large there is a progressive decline in the stress levels across academic classes.

Figure 4.6

Graph showing the group differences in enforcement or conflict induced stress

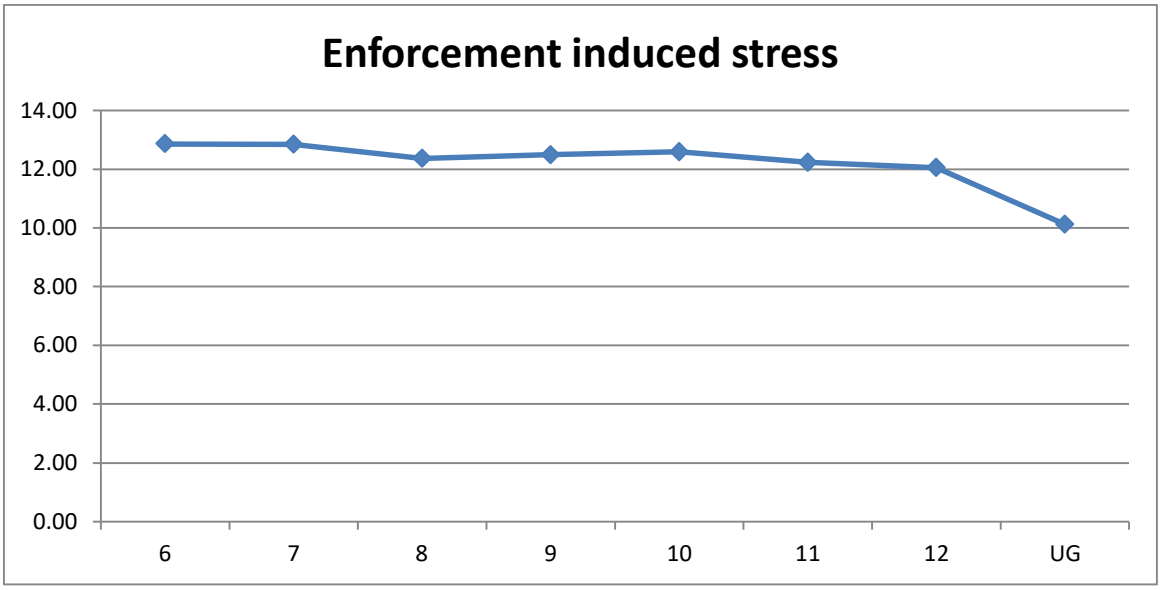
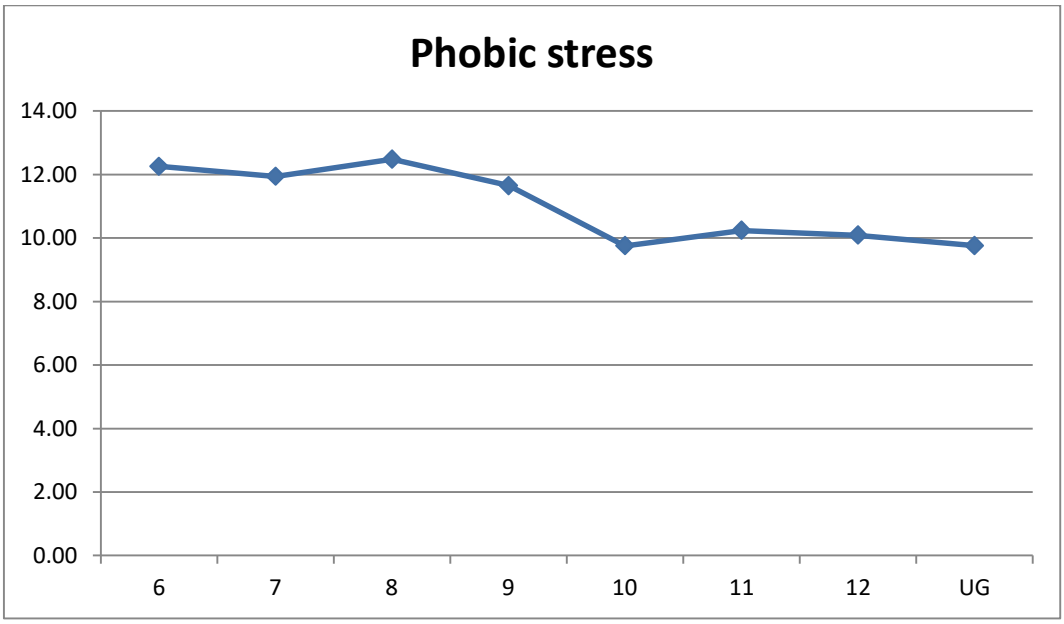


Figure 4.6 clearly depicts a smooth declining curve in the level of stress related to Enforcement or conflict induced stress. The drop is steep between 12th class and under graduate level

Figure 4.7

Graph showing the group differences in Phobic stress



It may be observed from figure 4.7 that there seems to be a peak of phobic stress in 8th class, thereafter a sharp decline till 10th class. However, it is surprising to observe that there is only a marginal change between class 11 and under graduation in phobic stress. This suggests that phobia is a reality at all ages.

Figure 4.8

Graph showing the group differences in interpersonal conflict induced stress

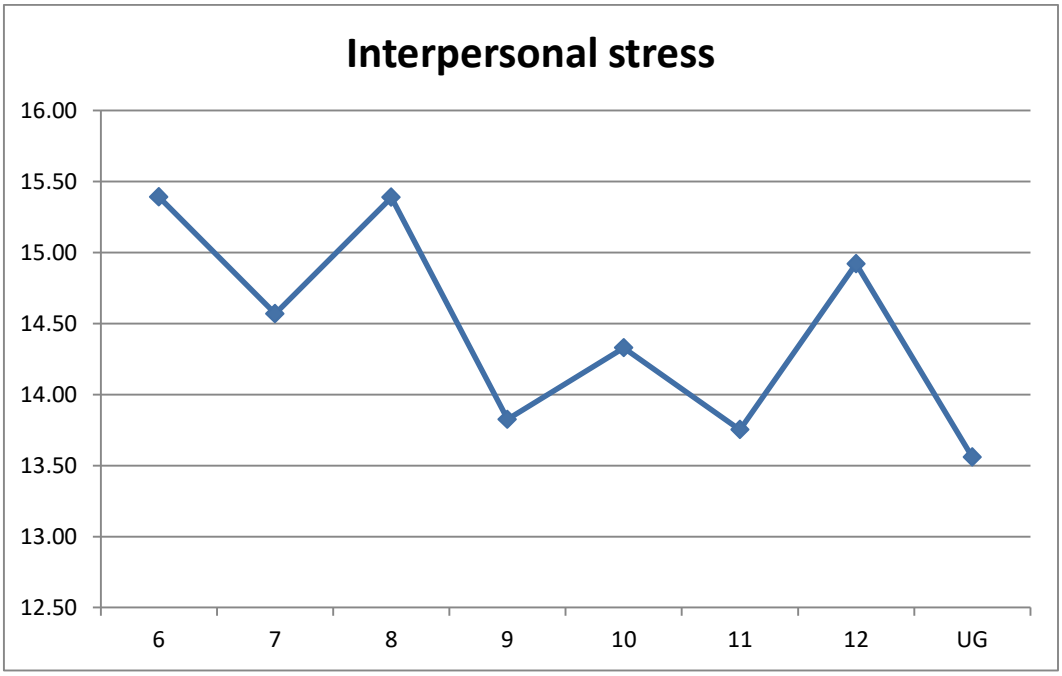


Figure 4.8 depicts a perfect jigsaw graph. This indicates that the stress induced by interpersonal conflicts are quite unpredictable in various steps across the classes. However, the stress related to interpersonal conflicts reduce drastically at under graduation stage.

Figure 4.9

Graph showing the group differences in punishment induced stress

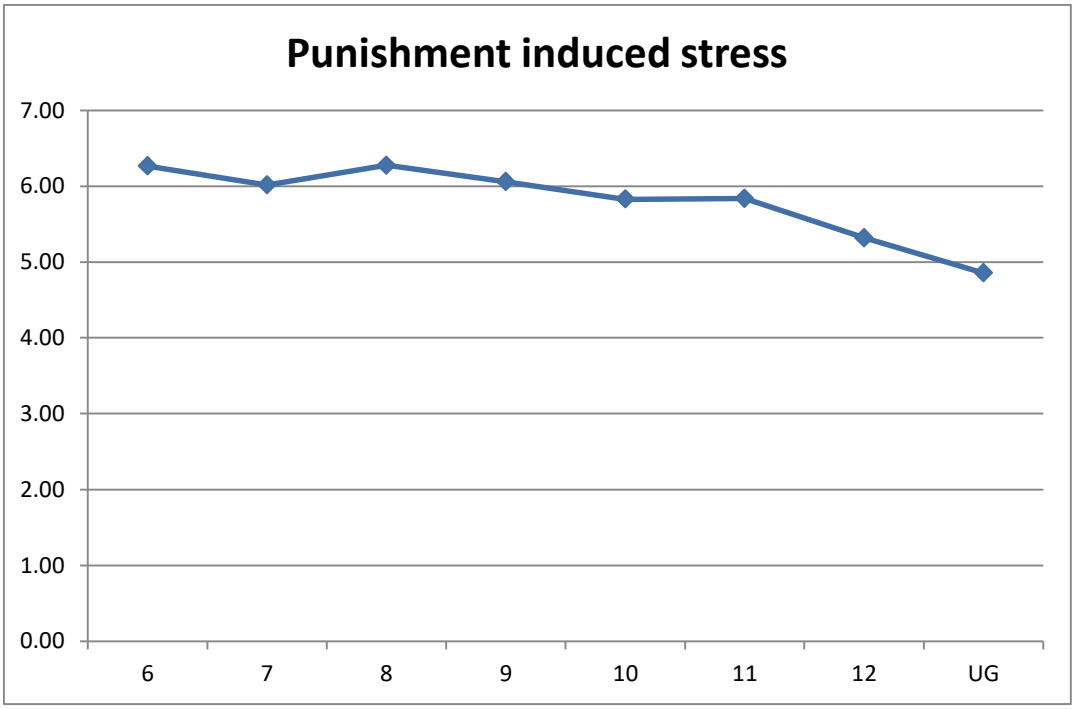


Figure 4.9 shows a slight upward slope between 7th and 8th class after which there is a progressive downward slope. This indicates that as the students progress in class, their stress due to apprehension of punishment gradually reduces

Figure 4.10

Graph showing the group differences in stress induced due to illness & injury

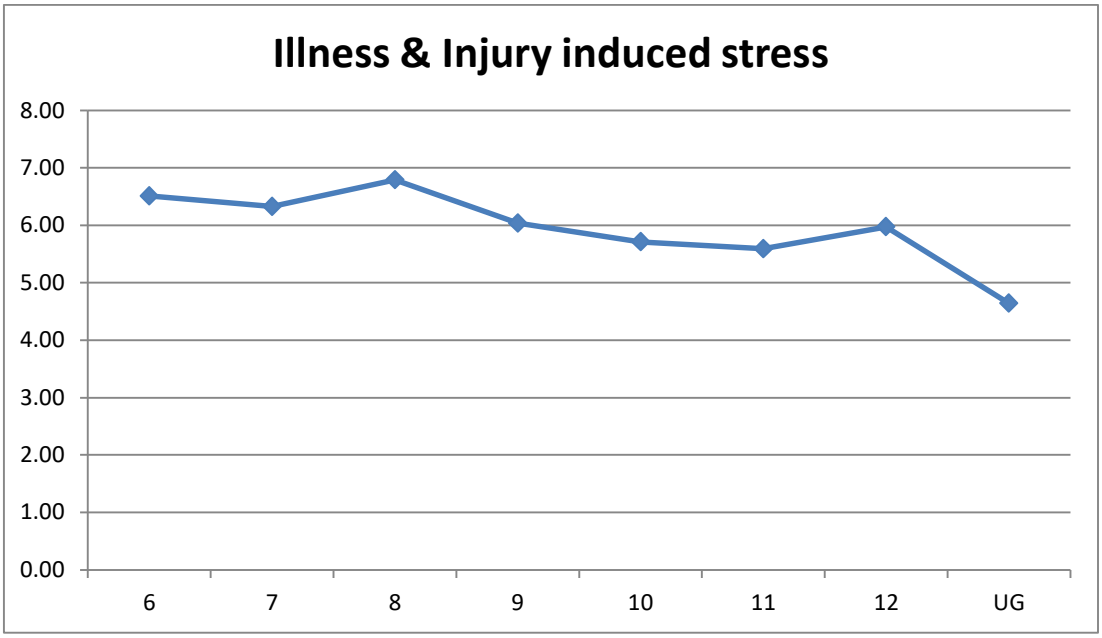


Figure 4.10 presenting the stress induced by illness or injury shows two perceivable peaks, first in class 8 and then in class 12. After the peak in class 12, there is a significant decline in the stress level.

Figure 4.11

Graph showing the group differences in performance stress

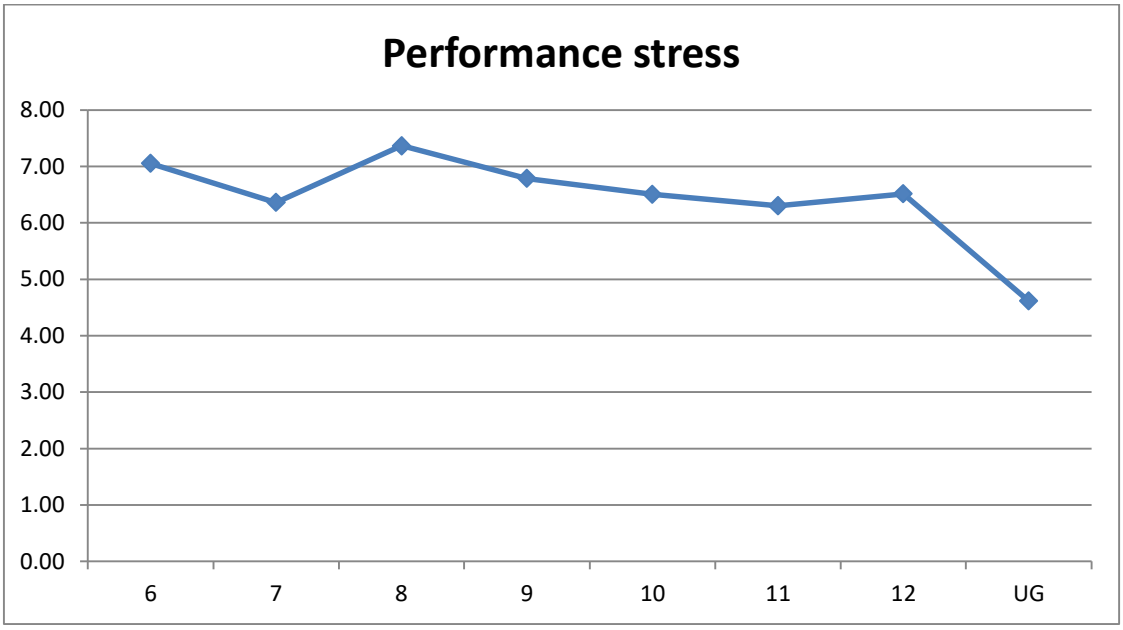


Figure 4.11 showing the trend of Performance stress is portraying a peak at 8th class, thereafter a progressive decline till class 11 after which there is a sudden pick up at class 12 and then a sudden steep drop. This indicates that the performance stress is high in 8th class and 12th class and the adolescent is suddenly relieved of this at under graduation.

Figure 4.12

Graph showing the group differences in imposition induced stress

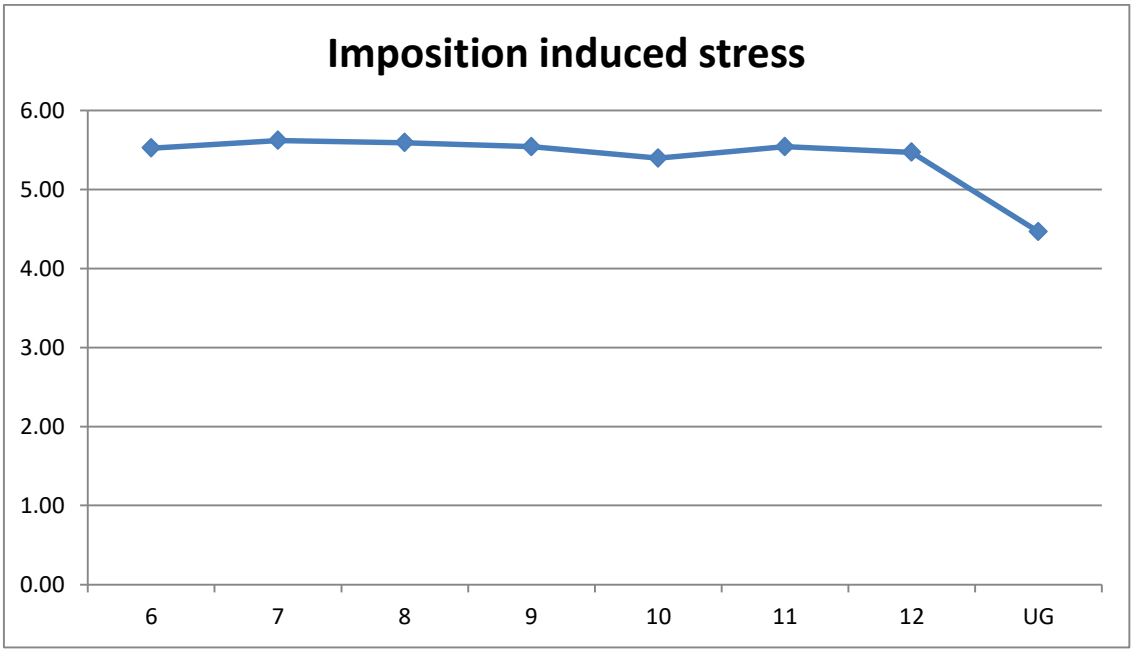


Figure 4.12 presents the levels of imposition induced stress. This refers to the stress induced when one is compelled to act in a particular way because of the force applied by social norm or expectations of significant others. This shows almost a plateau from class 6 to 10 then a marginal increase in 11th and 12th class, thereafter dropping significantly.

Figure 4.13

Graph showing the group differences in insecurity induced stress

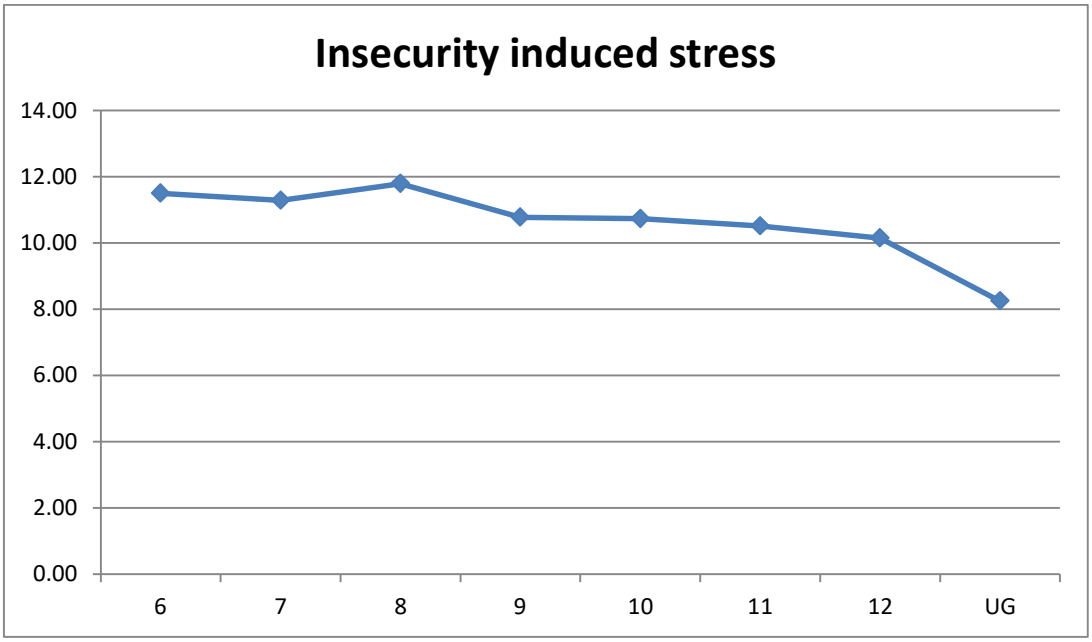


Figure 4.13 that reflects the stress due to insecurity shows a peak in class 8 thereafter showing a progressive decline with a sudden slide at under graduation stage. This suggests that the adolescents at under graduation stage feel less insecure.

Figure 4.14

Graph showing the group differences in unhealthy environment induced stress

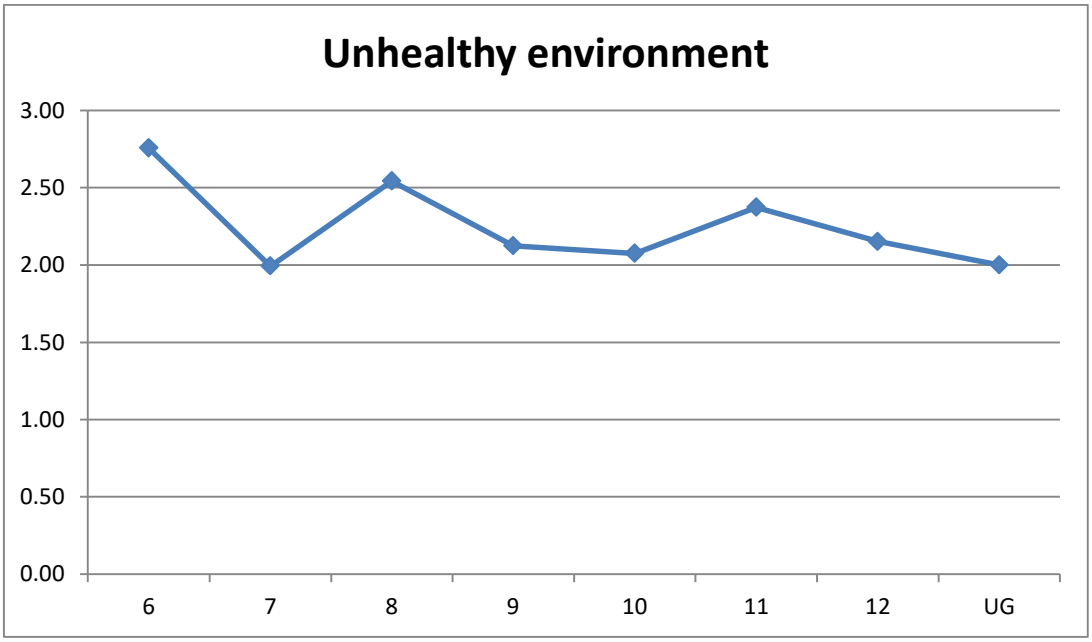


Figure 4.14 showing the stress caused by unhealthy environment shows no definite trend. It shows three peaks- 6th class, 8th class and 11th class. The drop at under graduate level is not as sharp as in case of other dimensions. This suggests limitations in control of the unhealthy environment where perhaps the Locus of Control is more external.

Objective 3: Identification of Psychosocial Factors Contributing to Adolescence Stress

Third objective of the study was to identify the psychosocial factors contributing to stress in adolescents. Towards this objective regression analysis and path analysis were carried out to investigate the direct effect of predictor variables on stress and the mediating and indirect effects of psychosocial variables on the stress levels of adolescents. This was examined by first identifying the factors contributing to Adolescence Stress by carrying out Hierarchical multiple regression Analysis. In the second step, a serial mediation model was

investigated into through application of path analysis. The details of the findings are discussed under two separate sub-headings.

3a - To examine the role of psychosocial factors in predicting stress levels of adolescents

Towards this objective hierarchical regression analysis was computed. By employing hierarchical regression, predictor variables are entered into the regression equation in a predetermined order, to examine the unique contribution of each predictor variable to the dependent variable, while controlling for other variables (Aiken and West, 1991). Predictors for the regression analysis were determined after computing the Pearson's correlation between the psychosocial factors and stress levels. Variables with significant correlation to the overall stress levels were considered as predictors. It may be observed from the table 4.12 that out of 16 variables, 12 variables significantly correlated with Stress levels. These 12 variables were Frustrative non-reward responsiveness ($r=.0.61$, $p<.05$), Ill health experiences($r=.0.62$, $p<.05$), Social Skills ($r=-.082$, $p<.01$), Health risk habits ($r= -.85$, $p<.01$), Family Health ($r=0.95$, $p<.01$), Openness ($r=0.95$, $p<.01$), Protective factors ($r=.11$, $p<.01$), Agreeableness ($r=.113$, $p<.01$), Promotive factors ($r=.12$, $p<.01$), Psycho-social support ($r=.13$, $p<.01$), Conscientiousness ($r=.15$, $p<.01$), Emotional Instability ($r=.15$, $p<.01$). Table 4.13 presents the summary of Hierarchical Multiple regression analysis for a range of psychosocial variables predicting stress in adolescents.

Table 4.13

Means, Standard deviations and Correlations of predictor variables with total stress levels

Predictor variables	M(SD)	Stress
Perceived physical environment	31.16(7.49)	-0.034
Self-efficacy	78.96(10.40)	0.042
Self-esteem	16.52(2.48)	0.045
Extraversion	41.57(8.18)	0.054
Frustrative Non Reward Responsiveness	10.53(2.70)	.061*
Ill health experiences	30.32(7.93)	.062*
Social skills	60.84(10.39)	.082**
Health risk habits	6.05(1.98)	-.085**
Family health	116.24(15.27)	.095**
Openness	37.54(7.12)	.095**
Protective factors	181.90(29.04)	.107**
Agreeableness	33.22(6.44)	.113**
Promotive factors	105.38(17.71)	.118**
Psycho-social support	88.50(12.30)	.129**
Conscientiousness	39.05(8.35)	.146**
Emotional Instability	29.08(6.22)	.147**

Table 4.14

Summary table of Hierarchical Multiple regression analysis for a range of psychosocial variables predicting stress in adolescents

Model and predictor variable	R	R^2	Adjusted R^2	R^2 change	B	SE	β	t
Model 1 (C=32.18, F=4.15*)	.061	.004	.003	.004*				
Frustrative non-reward responsiveness					.528	.259	.061	2.04*
Model 2 (C=24.32, F=3.57*)	.080	.006	.005	.003				
Frustrative non-reward responsiveness					.442	.264	.051	1.68
Ill health experiences					.155	.090	.053	1.72
Model 3 (C=11.54, F=6.26*)**	.130	.017	.014	.010***				
Frustrative non-reward responsiveness					.550	.264	.064	2.08*
Ill health experiences					.202	.090	.069	2.24*
Social Skills					.233	.069	.104	3.40***
Model 4 (C=12.05, F=7.47*)**	.163	.026	.023	.010**				
Frustrative non-reward responsiveness					.559	.263	.065	2.13*
Ill health experiences					.278	.093	.095	2.99**
Social Skills					.215	.068	.096	3.15**
Health risk behaviours					-1.208	.365	-.102	-3.31***
Model 5 (C=6.811, F=7.58)**	.183	.033	.029	.007**				
Frustrative non-reward responsiveness					.638	.264	.074	2.42*
Ill health experiences					.320	.094	.109	3.41**
Social Skills					.169	.070	.075	2.40*
Health risk behaviours					-.990	.372	-.084	-2.66**
Family Health					.140	.050	.092	2.79**
Model 6 (C= 5.28, F=7.18*)**	.236	.056	.048	.022***				
Frustrative non-reward responsiveness					.451	.271	.052	1.67
Ill health experiences					.252	.095	.086	2.66**
Social Skills					.079	.077	.035	1.02
Health risk behaviours					-.754	.372	-.064	-2.02*
Family Health					.119	.050	.078	2.37*
Openness					-.072	.138	-.022	-.52
Agreeableness					-.030	.146	-.008	-.21
Conscientiousness					.362	.130	.130	2.79**
Emotional Instability					.397	.118	.106	3.38***

Model 7 (C=4.49, F=6.87*)**	.243	.059	.051	.003*				
Frustrative non-reward responsiveness					.466	.270	.054	1.72
Ill health experiences					.279	.096	.095	2.91**
Social Skills					.026	.081	.012	.32
Health risk behaviours					-.691	.373	-.059	-1.85
Family Health					.104	.050	.068	2.06*
Openness					-.076	.138	-.023	-0.55
Agreeableness					-.035	.146	-.010	-0.24
Conscientiousness					.337	.130	.121	2.58**
Emotional Instability					.399	.117	.107	3.40***
Protective factors					.056	.028	.070	1.97*
Model 8 (C= 4.26, F=6.66*)**	.251	.063	.053	.004*				
Frustrative non-reward responsiveness					.434	.270	.050	1.61
Ill health experiences					.292	.096	.099	3.05**
Social Skills					.018	.081	.008	0.22
Health risk behaviors					-.700	.373	-.059	-1.88
Family Health					.078	.052	.051	1.51
Openness					-.088	.138	-.027	-0.64
Agreeableness					-.041	.145	-.011	-0.28
Conscientiousness					.335	.130	.120	2.58**
Emotional Instability					.413	.117	.110	3.52***
Protective factors					.029	.031	.036	0.92
Promotive factors					.102	.049	.078	2.08*
Model 9 (C=3.54, F=6.77*)**	.263	.069	.059	.006**				
Frustrative non-reward responsiveness					.460	.270	.053	1.70
Ill health experiences					.311	.096	.106	3.25**
Social Skills					-.008	.082	-.003	-.09
Health risk behaviours					-.684	.372	-.058	-1.84
Family Health					.019	.056	.012	.34
Openness					-.089	.137	-.027	-.65
Agreeableness					-.056	.145	-.015	-.39
Conscientiousness					.336	.130	.120	2.59**
Emotional Instability					.435	.117	.116	3.71***
Protective factors					.019	.031	.024	.60
Promotive factors					.082	.049	.062	1.65
Psycho-social support					.196	.071	.104	2.75**

From the table 4.13, it can be observed that the psychosocial variables having a significant correlation with stress levels were entered into each model in a hierarchical way. This resulted in nine models- model 1 (Frustrative non-reward responsiveness), model 2 (Frustrative non-reward responsiveness, Ill health experiences), model 3 (Frustrative non-reward responsiveness, Ill health experiences, Social skills), model 4 (Frustrative non-reward responsiveness, Ill health experiences, Social skills, Health risk behaviours), model 5 (Frustrative non-reward responsiveness, Ill health experiences, Social skills, Health risk behaviours, Family health), model 6 (Frustrative non-reward responsiveness, Ill health experiences, Social skills, Health risk behaviours, Family health, Openness, Agreeableness, Conscientiousness, Emotional Instability), model 7 (Frustrative non-reward responsiveness, Ill health experiences, Social skills, Health risk behaviours, Family health, Openness, Agreeableness, Conscientiousness, Emotional Instability, Protective factors), model 8 (Frustrative non-reward responsiveness, Ill health experiences, Social skills, Health risk behaviours, Family health, Openness, Agreeableness, Conscientiousness, Emotional Instability, Protective factors, promotive factors), and model 9 (Frustrative non-reward responsiveness, Ill health experiences, Social skills, Health risk behaviours, Family health, Openness, Agreeableness, Conscientiousness, Emotional Instability, Protective factors, promotive factors, Psycho-social support).

In the first model of hierarchical multiple regression, one predictor was entered i.e, Frustrative non-reward responsiveness. The model 1 was statistically significant $F(1, 1102) = 4.15$; $p < .05$ and explained .3% of significant proportion variance (Adjusted $R^2 = .003$.) in stress levels. From analysis frustrative non reward responsiveness (beta=0.061, $p < .05$) was found to be a positively and significantly predicting stress levels. After the entry of ill health experiences in model two in addition to frustrative non reward responsiveness, the model was significant, $F(2,1101) = 3.57$; $p < .05$, and the model did not explain additional significant

proportion of variance in stress levels (Adjusted R^2 = .005). The results revealed that both the predictors were not significant in predicting stress levels.

In third model, after the entry of social skills in addition to frustrative non reward responsiveness and ill health experiences, the model was found to be significant, F (3,1100) = 6.26; p<0.001, the model explained 1% of additional significant proportion of variance (R^2 change = .01, p< 0.001) amounting to total 1.4% significant proportion of variance of stress levels (Adjusted R^2= 0.14). The results revealed that in model three frustrative non reward responsiveness (beta = .064, p< .05) ill health experiences (beta = .069, p< .05) and social skills (beta = .104 p< .001) were found to be positively and significantly predicting the stress levels.

In model four, Health risk behaviour was entered in addition to frustrative non reward responsiveness, ill health experiences and social skills. The model was found to be significant, F(4,1099) = 7.47; p< .001, the model explained 1% of additional significant proportion of variance (R^2 change = .01, p< .01) amounting to total 2.3% significant proportion of variance of stress levels (Adjusted R^2 = .023). The results revealed that frustrative non-reward responsiveness (beta = .065, p< .05), ill health experiences (beta = .095, p< .01) and social skills (beta = .096, p< .01) were found to be significant and positive predictors of stress levels where as health risk behaviours (beta = -102, p< .001) was also found to be significant and negatively predicting stress levels

Family health was entered as a predictor in model five in addition to the psychosocial variables entered in the previous model. The model was found to be significant, F(5,1098)= 7.58; p< .001, the model explained 0.7% of additional significant proportion of variance (R^2 change = .007, p< .01) amounting to total 3% significant proportion of variance of stress levels (Adjusted R^2= .029). The results revealed that frustrative non-reward responsiveness (beta = .074, p< .05), ill health experiences (beta = .109, p< .01) social skills (beta = .075, p<

.05) health risk behaviours (beta = -.084, p< .01) family health (beta = .092, p< .01) were found to be significant predictor for stress levels.

In sixth model, in addition to the predictors in previous model, four personality traits viz. openness, agreeableness, conscientiousness, emotional instability were entered. The model was found to be significant, F (9,1094)= 7.18.; p< .001, the model explained 2.2% of additional significant proportion of variance (R^2 change = .022, p< .001) amounting to total 4.8% significant proportion of variance of stress levels (Adjusted R^2= .048). The results revealed that, ill health experiences (beta = .086, p< .01), family health (beta = .078, p< .05) conscientiousness (beta = .13, p< .01), emotional instability (beta = .106, p< .001) were significant and positively predicting stress levels. Health risk behaviours (beta = -.064, p< .05) was found to be a significant and negatively predicting the stress levels. Whereas other predictors- Frustrative non-reward responsiveness, social skills, openness, and agreeableness didn't have a significant role in predicting the stress levels.

In model seven, after the entry of protective factors in addition to frustrative non-reward responsiveness, ill health experiences, social skills, health risk behaviours, family health, openness, agreeableness, conscientiousness and emotional instability. The model was found to be significant, F (10,1093)= 6.87; p< .001, the model explained 0.3% of additional significant proportion of variance (R^2 change = .003, p< 0.5) amounting to total 5.1% significant proportion of variance of stress levels (Adjusted R^2= .051). The results revealed that ill health experiences (beta = .095, p< .01), family health (beta = .068, p< .05), conscientiousness (beta = .121, p< .01), emotional instability (beta = .107, p< .001) and protective factors (beta = .07, p< .05) were significant predictors for stress levels. Frustrative non-reward responsiveness, social skills, health risk behaviours, openness, agreeableness were not significant predictors in this model.

In model eight, promotive factors were added to the list of predictors. The model was found to be significant, F (11,1092)= 6.66; p< 0.01, the model explained 0.4% of additional significant proportion of variance (R^2 change = .004, p< .05) amounting to total 5.3% significant proportion of variance of stress levels (Adjusted R^2= .053). The results revealed that Ill health experiences (beta = .099, p< .01), Conscientiousness (beta = .12, p< .01) Emotional Instability (beta = .11, p< .001) and promotive factors.(beta = .078, p< .05) were significantly and positively predicting stress levels. Whereas the predictors- frustrative non-reward responsiveness, social skills, health risk behaviours, family health, openness, agreeableness and protective factors were found to be non-significant.

In ninth and the final model, psychosocial support was added as a predictor in addition to frustrative non-reward responsiveness, ill health experiences, social skills, health risk behaviours, family health, openness, agreeableness, conscientiousness, emotional instability, protective factors, promotive factors, psycho-social. The model was found to be significant, F(12,1091)= 6.77; p< .001, the model explained 0.6% of additional significant proportion of variance (R^2 change = .006, p< .01) amounting to total 6% significant proportion of variance of stress levels (Adjusted R^2= .059). The results revealed that, ill health experiences (beta = .106, p< .01), conscientiousness(beta = .12, p< .01) emotional instability (beta = .116, p< .001) and psycho-social support (beta = .104, p< .01) was found to be a significant predictor for stress levels. Frustrative non-reward responsiveness, social skills, health risk behaviours, family health, openness, agreeableness, protective factors, and promotive factors were not significant in this model.

The results highlighted that frustrative non-reward responsiveness was significant predictor in model one, in model two there were no significant predictors and in model three frustrative non-reward responsiveness, ill health experiences and social skills were the significant predictors. In the next model, frustrative non-reward responsiveness, ill health

experiences, social skills and health risk behaviours were the significantly predicting the stress levels. In model five, family health was found to be significant predictors in addition to other significant predictors - frustrative non-reward responsiveness, ill health experiences, social skills, and health risk behaviours. In model six ill health experiences, family health, conscientiousness and emotional instability were significantly and positively predicting the stress levels whereas health risk behaviours were negatively predicting the stress in adolescents. In model seven, ill health experiences, family health, conscientiousness, emotional instability, and protective factors were significant predictors. In model eight ill health experiences, conscientiousness, emotional instability, and promotive factors were found to be the significant predictors. In the final model, the significant predictors were ill health experiences, conscientiousness, emotional instability, and psychosocial support. It is evident that emotional instability is highly predicting stress when compared to other predictor variables. It may be summarised that the psychosocial factors identified in this study were able to explain only 6% of variance in adolescent stress levels. This indicates that there are other variables beyond the scope of this study that majorly contribute to stress among the adolescents.

3b- To investigate the serial mediation model using path analysis

An attempt was made to develop a serial mediation model using path structural analysis to assess the significance of direct and indirect effects of psychosocial factors on stress. This analysis followed a series of steps involving confirmatory factor analysis, testing hypothetical model and model confirmation. Each of these steps is explained below in detail in two sections 1. Measurement model, 2. Structural model.

Measurement Model. The measurement model is a prerequisite to the structural model in Structural Equation modelling (SEM). For this purpose Confirmatory factor analysis was executed to assess the validity of the indicators for each construct (Collier, 2020).

Confirmatory factor Analysis (CFA). Here CFA is used to test how well the measured variables are representing the construct. Confirmatory Factor Analysis was conducted on a sample data of 1104 different from the sample of 643 on which the Exploratory Factor Analysis was conducted.

The measured variables which had the factor loadings less than .3 and less than .4 for some scales were considered as poorly representing and are subjected to elimination from the scale (Comrey & Lee, 1992). Items which were not contributing significantly to the construct were also removed. Several fit indices were also considered to evaluate overall model fit. These are: The goodness-of-fit statistic, chi-square divided by the degrees of freedom ($\chi 2/df$), the goodness-of-fit index (GFI), the adjusted goodness-of-fit index (AGFI), the comparative fit index (CFI), and the root mean square error of approximation (RMSEA). A model is considered to have very good fit if the statistic is non-significant, chi-square divided by the degrees of freedom ($\chi 2/df$) value is 5 or less, GFI, AGFI, and CFI are greater than 0.95, and the RMSEA is below 0.05. RMSEA values less than .08 are considered as an acceptable fit. The chi-square can be sensitive to the sample size which might cause it being significant with a large sample size (Hu & Bentler, 1999). Therefore, several fit indices are reported for all the scales.

This procedure was followed for all the psychological tools used in this study. Following are the details of the items eliminated from each scale and the model fit indices of the scales.

Self-Efficacy Questionnaire for Children (SEQ-C) had three dimensions viz. Emotional efficacy, Academic efficacy, and Social efficacy with eight items each. Social efficacy had two items and emotional efficacy dimension had one item with factor loadings less the .3. These 3 items were removed from the construct and the model fit was evaluated. The model fit indices are as follows the value of chi square ($\chi 2$ / df) was found to be 2.790.

The other indices were—GFI=0.957, AGFI=.957, CFI=.912, and RMSEA=.040, PCLOSE=1.000—which met with ideal cut-offs specified in literature.

Self-esteem scale. This scale originally had ten items. Confirmatory factor analysis of this scale resulted in five items with factor loadings below 0.3. After eliminating these items, the model fit indices are as follows - the value of chi square ($\chi 2$ / df) was found to be 1.257. The other indices were—GFI=0.998, AGFI=.993, CFI=.937, and RMSEA=.015, PCLOSE=.969—which met with ideal cut-offs specified in literature.

Frustrative non-reward responsiveness scale had 5 items in total. After CFA, an item with low factor loading of .387 was eliminated for better model fit. The model fit indices are as follows- The value of chi square ($\chi 2$ / df) was found to be .835, GFI=0.999, AGFI=.996, CFI=1.000, and RMSEA=.00, PCLOSE=.913—which met with ideal cut-offs specified in literature.

Big Five Questionnaire for Children (BFQ – C) had five dimensions Extraversion, Agreeableness, Conscientiousness, Emotional Instability, Intellect /Openness, each having 13 items. CFA for each dimension was carried out exclusively. For the dimension, agreeableness four items were eliminated with low factor loadings below 0.4 and the model fit indices are- The value of chi square ($\chi 2$ / df) was found to be 3.805, GFI=0.979, AGFI=.966, CFI=.948, and RMSEA=.050, PCLOSE=0.453. For the dimension, conscientiousness two items which had factor loadings below 0.3 were eliminated and the model fit indices of the scale are- the value of chi square ($\chi 2$ / df) was found to be 4.490. The other indices were—GFI=0.966, AGFI=.949, CFI=.936, and RMSEA=.056, PCLOSE=0.94. For the dimension, emotional instability three items were deleted. The value of chi square ($\chi 2$ / df) was found to be 4.652. The other indices were—GFI=0.970, AGFI=.953, CFI=.863, and RMSEA=.063, PCLOSE=.000. For the dimension, extraversion one item was removed and

the value of chi square (χ2 / df) was found to be 5.445. The other indices were—GFI=.949, AGFI=.928, CFI=.863, and RMSEA=.063, PCLOSE=0.000. For the dimension, Openness After eliminating two items with factor loading below .3, the model fit indices are as follows -the value of chi square (χ2 / df) was found to be 5.818, GFI=0.958, AGFI=.937, CFI=.880, and RMSEA=.066, PCLOSE=0.000. As most of the indices met with ideal cut-offs, the model fit was considered good for all the dimensions.

Social skills scale. This scale was taken as a whole with all 23 items to execute CFA. Though it had dimensions namely leadership skills, team integration skills, affiliative skills, interpersonal skills, social engagement skills, these constructs were not put into CFA as the number of items representing some dimensions were below three. After performing CFA for the scale as a whole, two items were observed with factor loadings less than 0.3. It is worth mentioning that two items belonged to the same dimension - team integration skills. After dropping these items the model fit indices are as follows - the value of chi square (χ2 / df) was found to be 4.157. The other indices were—GFI=0.928, AGFI=.912, CFI=.866, and RMSEA=.054, PCLOSE=.067—which met with ideal cut-offs specified in literature.

Physical Health scale had three parts - Health History, Health habits and health experiences. CFA was conducted for each part exclusively. For part I of the scale no items eliminated as the factor loadings were adequate and the model fit was good. For part II of the scale ten items were eliminated as the factor loadings were less than 0.3. After eliminating these items - the value of chi square (χ2 / df) was found to be 5.331. The other indices were—GFI=0.991, AGFI=.973, CFI=.982, and RMSEA=.063, PCLOSE=0.161. For part III of the scale four items were eliminated as the factor loadings were less than 0.4. After eliminating these items, the model fit indices are as follows –the value of chi square (χ2 / df) was found to be 5.126 The other indices were—GFI=0.931, AGFI=.912, CFI=.867, and

RMSEA=.061, PCLOSE=0.000. Most of the indices are observed to be meeting with ideal cut-offs specified in literature making the model a good fit.

Protective factors, this scale 24 items in total and two items were deleted with factor loadings less than or close to 0.4. After eliminating these items, the model fit indices are as follows - the value of chi square (χ2 / df) was found to be 3.805. The other indices were—GFI=0.930, AGFI=.917, CFI=.922, and RMSEA=.050, PCLOSE=.415—which met with ideal cut-offs specified in literature.

Promotive factors scale has 14 items in total and two items with factor loadings below 0.5 were eliminated for better model fit indices. After eliminating these items, the model fit indices are as follows - the value of chi square (χ2 / df) was found to be 9.570. The other indices were—GFI=0.910, AGFI=.874, CFI=.872, and RMSEA=.088, PCLOSE=0.000. The model was considered acceptable with the above range of model fit indices.

Family Health scale has four dimensions- family social & emotional health processes, family healthy lifestyle, family health resources, and family external social support. Family social & emotional health processes had two items and family health resources had one item with factor loadings 0.4. After dropping these three items, the model fit indices are as follows - the value of chi square (χ2 / df) was found to be 3.642. The other indices were—GFI=0.918, AGFI=.904, CFI=.911, and RMSEA=.049, PCLOSE=0.727—which met with ideal cut-offs specified in literature.

Perceived physical environment, this scale had 16 items with factor loadings less than .3. After eliminating 16 items from whole 32 item scale, the model fit indices are as follows - the value of chi square (χ2 / df) was found to be 6.534, GFI=0.922, AGFI=.900,

CFI=.777, and RMSEA=.071, PCLOSE=0.000. The model fit was good as most of the indices met with ideal cut-offs.

Adolescent stress scale and psychosocial support scale were also put into factor analysis, which resulted in measurement items with adequate factor loadings and the model fit being good. Therefore no items were eliminated from these scales. The measurement models for each scale have been established and the composite scores were computed for each construct.

Table 4.15

Goodness fit statistics for the tools measuring psychosocial variables and the number of items deleted after conducting CFA

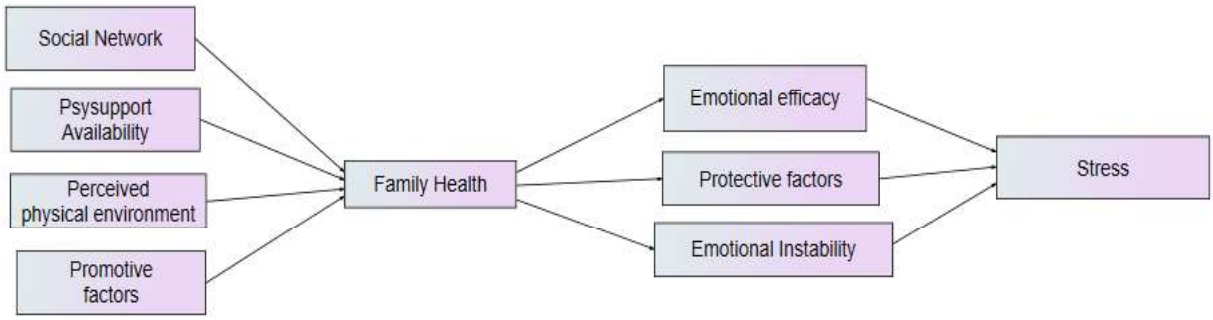
Measures	Chi square/df	GFI	AGFI	CFI	RMSEA	No. items deleted post CFA
Self-efficacy scale	2.790	0.957	0.957	0.912	.04	3
Self-esteem scale	1.257	0.998	0.993	0.937	.015	5
Frustration Non-reward Responsiveness (FNR) scale	.835	0.999	0.996	1.000	.00	1
Social Skills Scale	4.157	0.928	0.912	.866	.054	2
Family health Questionnaire	3.642	0.918	0.904	0.911	.049	3
Physical Health –II (risk behaviors)	5.331	0.991	0.973	.982	.063	10
Physical Health –III (ill health experiences)	5.126	0.931	.912	.867	.061	4
Physical environment scale	6.534	0.922	.900	.777	.071	16
Protective Factors scale	3.805	0.930	.917	.922	.050	2
Promotive Factors scale	9.570	0.910	.874	.872	.088	2
Openness	5.818	0.958	0.737	0.880	.06	2
Agreeableness	3.805	0.979	0.966	0.948	.05	4
Extraversion	5.445	.949	.928	.863	.06	1
Conscientiousness	4.49	0.966	.949	.936	.056	2
Emotional instability	4.652	0.970	.953	.863	.63	3
Psychosocial support scale	3.841	.941	.923	.912	.05	-
Adolescence Stress Scale	1.667	.902	.876	.933	.043	-

Structural Model. After executing the measurement model, structural model was analysed. Structural model is a confirmatory approach where the model of relationships is examined for its directionality and significance. The objective was to investigate the serial mediation model using path analysis. Serial mediation model is when a model has more than one mediators between the independent and dependent variables and the first mediator has direct relationship with a second mediator before having a relationship with the dependent variable (Collier, 2020). This analysis is useful to determine the direct and indirect effects of the contributing factors towards the dependent variable. Path analysis was executed, with IBM Analysis of Moment Structures (AMOS) version 21, to create a thorough pathway and evaluate the mediation. Path analysis is a type of structural model without latent variable, which is used to assess the relationship between constructs and no measurement model items are included. In this analysis structural relationships are examined through the composite variables. Serial mediation path analysis is explained in two steps- Hypothetical model and Model confirmation.

Hypothetical model. In this phase of analysis, the composite score variables established through measurement model are used to conceptualise and test the mediation model. A model was hypothesised after a thorough review of literature where social network, psychosocial support availability, perceived physical environment, and promotive factors are considered as independent variables. Family health was hypothesised to be mediator one which had direct relation with are emotional efficacy, protective factors and emotional instability which act as mediator two toward the dependent variable, stress. The hypothetical model is presented in the figure 4.15

Figure 4. 15

Hypothetical model for depicting serial mediation path model between psychosocial factors and stress in adolescents.

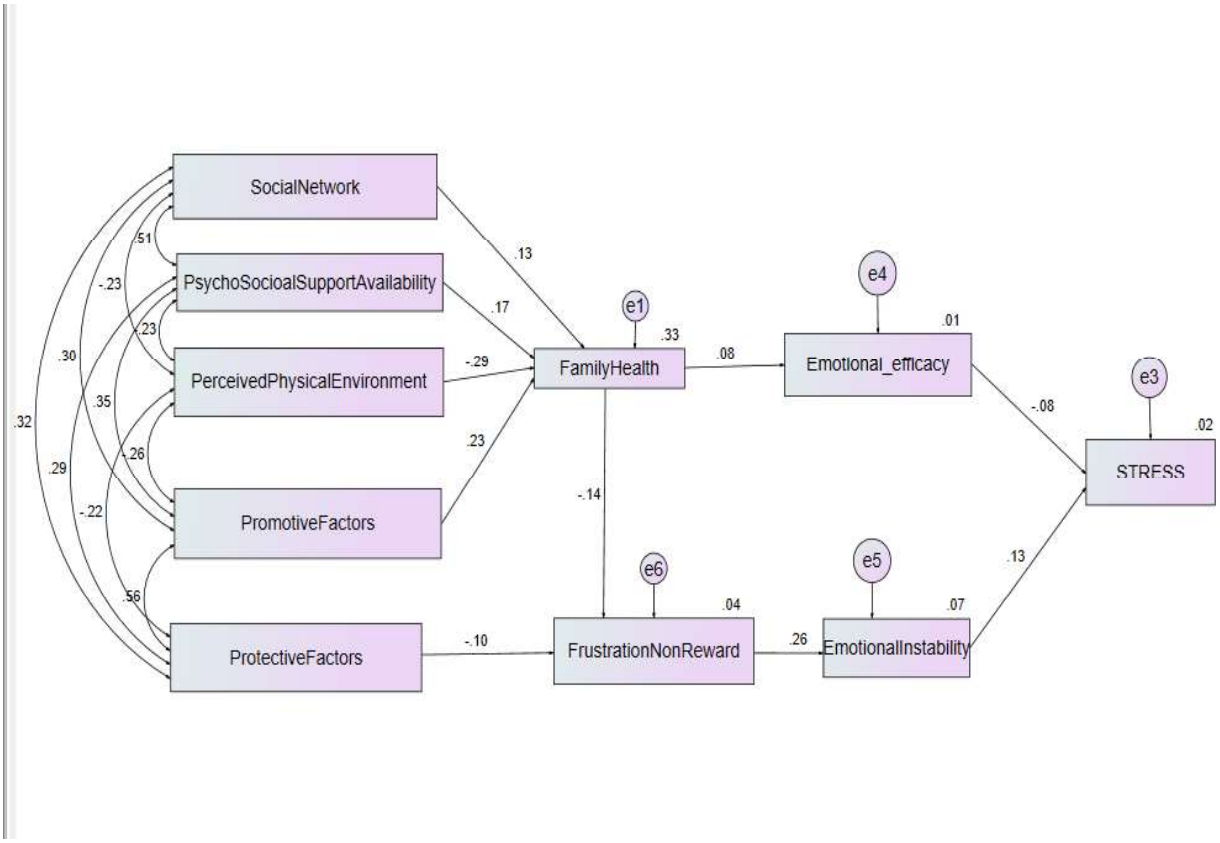


Note. The model above conceptualises that factors social network, psychosocial support availability, perceived physical environment, promotive factors contributes to family health of adolescents. The family health, as a mediator, is then hypothesized to be contributing to the emotional efficacy, protective factors and emotional instability which further act as second mediators towards stress.

Model confirmation. The conceptualized hypothetical model was tested for confirmation. The direction and the significance of the pathways were observed and the necessary changes were made to evolve a final structural model. The confirmed final structural path model is presented in figure 4.16.

Figure 4.16

Serial Mediation Path Model



From the figure 4.16, it can be observed that the independent variables are social network, psychosocial support availability, perceived physical environment and promotive factors contribute to the family health which acts as a mediator one towards the dependent variable (stress). Family health can be seen to having a direct relationship with emotional efficacy (mediator 2) and Frustrative non-reward responsiveness (mediator 3). Another independent variable, Protective factors can be observed contributing to Frustrative non-reward responsiveness which is further contributing to emotional instability (mediator 4). Mediators 3 and 4 can be seen having a direct relationship with stress, the dependent variable.

Table 4.16

Estimates, Standard errors, Critical ratios for structural path model

Path	Estimate	S.E	C.R.	p
Social network →Family Health	0.13	0.187	4.58	<0.001
Psychosocial support Availability→Family Health	0.17	0.178	5.86	<0.001
Perceived physical environment→Family Health	-0.29	0.053	-11.30	<0.001
Promotive factors→Family Health	0.23	0.023	8.43	<0.001
Protective factors→Frustration Non Reward responsiveness	-0.10	0.003	-3.26	<0.001
Family Health→Frustration Non Reward responsiveness	-0.14	0.005	-4.65	<0.001
Family Health→Emotional efficacy	0.08	0.009	2.53	<0.01
Frustration Non Reward →Emotional Instability	0.26	0.067	8.81	<0.001
Emotional efficacy →Stress	-0.08	0.144	-2.55	<0.01
Emotional Instability →Stress	0.13	0.111	4.44	<0.001

Note: S.E= Standard Error, C.R.= Critical Ratio

The standardized estimates for the all the paths were analysed and presented in 4.14. The contributing effects of the direct pathways in the model are explained here. The contributions of social network to family health was found to be 0.13($p<0.001$). Psychosocial support availability on the Family health was found to be 0.17 ($p<0.001$). The perceived physical environment was found to be contributing towards family health with an effect of -0.29 ($p<0.001$). The negative sign of the estimate indicates the direction of the effect implying that increase in adverse perceived environment decreases the family health. A contribution of promotive factors to family health is observed as 0.23 ($p<0.001$). The

contribution of protective factors to frustrative non reward responsiveness is observed to be -0.10($p<0.001$). The negative sign implies that as the protective factors increase frustrative non reward responsiveness decreases. The contribution of Family Health to Frustration Non Reward responsiveness is observed to be -0.14($p<0.001$) indicating that better the family health lower the frustrative non reward responsiveness. Family Health was found to have a contributing effect of 0.08($p<0.01$) on Emotional efficacy. Frustration Non Reward is found to be having a contributing effect of 0.26($p<0.001$) on Emotional Instability. The direct effect of emotional efficacy on stress is found to be -0.08($p<0.01$), explaining a variance of 8% is stress levels of adolescents where in the increase in emotional efficacy decreases the stress. The direct effect of Emotional Instability on Stress is observed to be 0.13 ($p<0.001$), explaining a variance of 12% in stress.

The model fit indices of the structural path model were analysed and are as follows The value of chi square ($\chi 2$/df) was found to be 162.813 (*df* = 25; *p*=.00). The value of chi square divided by degrees of freedom ($\chi 2$/df) is 6.513. The other indices were—GFI=0.972, AGFI=.939, CFI=.923, and RMSEA=.071, PCLOSE=.000. The ideal fit indices to interpret a model as good are that the value of chi square divided by degrees of freedom ($\chi 2$/df) is 5 or less and a non-significant model statistic, and is highly sensitive towards sample size of the . Therefore, a value of 6.5 is considered acceptable here This is sensitive to the large sample size of the study sample. The values of GFI, AGFI and CFI above .90 are considered as a good fit. And RMSEA less than .08 are considered acceptable. This shows that model fit indices indicated good model fitness and data fitting with the framework. Hence, this model was accepted.

Table 4.17

Indirect effects, lower bounds and upper bounds at 95% Confidence interval

Indirect Paths	Indirect effect	Lower bound 95% CI	Upper bound 95% CI
Social network →Stress	-0.001***	-0.003	-0.001
Psychosocial support availability→Stress	-0.002***	-0.004	-0.001
Perceived physical environment→Stress	0.003***	0.001	0.006
Promotive factors→Stress	-0.002***	-0.005	-0.001
Protective factors →Stress	-0.003***	-0.007	-0.001
Family health→Stress	-0.011***	-0.02	-0.005
Frustrative non- reward responsiveness→Stress	0.034***	0.018	0.052

*Note: ***p<0.001*

Table 4.15 presents the indirect effects of the psychosocial factors in the structural model contributing to stress. From the table, it can be observed that the indirect effect of social network on stress is -0.001 ($p<0.001$). The indirect effect of psychosocial support availability on stress is -0.002 ($p<0.001$). The indirect effect of perceived physical environment on stress is 0.003 ($p<0.001$). The indirect effect of promotive factors on stress is -0.002 ($p<0.001$). The indirect effect of protective factors on stress is -0.003 ($p<0.001$). The indirect effect of family health on stress is -0.011 ($p<0.001$). The indirect effect of frustrative non reward responsiveness on stress is 0.034 ($p<0.001$). The negative signs of the indirect effects indicate the directionality of the relationship where the increase in that psychosocial factor results in decrease in stress levels. It can be observed from the results that though the indirect effects explain low variance, all of them are found to be significant. The significance of the relationship can also be observed with the lower bounds and upper bounds at 95% CI not containing the value of zero (Collier, 2020).

This explains the direct and indirect effects of psychosocial variables on stress levels of adolescents. The serial mediation path model indicates a partial mediation in the pathway as all the direct and indirect paths were found to significant.

Objective 4 Stress experiences and coping strategies of adolescents with high and low stress level: A qualitative analyses

Qualitative approach was utilized to investigate the stress experiences and coping strategies of adolescents with high and low levels of stress. Interpretative phenomenological analysis was carried out and the qualitative data was analysed using thematic analysis. In this phase, data was gathered through semi-structured, in-depth interviews. This allows the researcher to elicit a wealth of information from the participants about their stress experiences and coping mechanisms that the quantitative data could not capture, which might augment the quantitative findings. Participants described a wide range of experiences pertaining to their stress and the coping strategy they adopted.

To understand the stress experiences and coping strategies of a sub sample of eight participants were interviewed. These eight participants consisted of four participants with high stress scores ranging from 4.5 to 5 and four with low stress scores ranging from 1 to 1.06 on a range of 1 to 5

As the objective was to expand the current knowledge on stress experiences and coping strategies in adolescents with high and low levels of stress, thematic analysis was carried out separately for high stress group and low stress group. The participants were interviewed using six leading questions developed for gaining a better understanding at stress experiences of adolescents. Analysis was carried out thorough reading, re-reading and understanding of the transcripts of the interviews. Summary of thematic analysis for low stress group and high stress group are presented in tables 4.18 and 4.19 respectively.

Table 4.18

Summary of thematic analysis of low stress group

Leading question	Themes	Excerpts
Major Causes of stress	Academic pressure	"I experience a lot of stress when I study without sleeping. I experience this mostly during exams" (11 years) "I feel stressed when I have exams, especially IIT subjects. This year I feel more stressed" (13 years)
	Interpersonal conflicts	"When someone says something about me and teases me I get angry and I feel stressed" (15 years)
	Physical injuries	"Getting injured causes more stress in me because, it is very painful" (15 years)
Manifestation of stress	Emotional	"I get angry when I feel stressed" (15 years) "I feel anger and I think, why is this happening to me?" (11 years) "I get angry when I am stressed" (18 years)
	Behavioural	"When I feel stressed I feel different than normal that whole day, I keep on thinking and worrying about studying" (13 years)
Impact on physical health	Headache	"I get severe headaches" (13 years)
	Pain in limbs	"I feel pain in my limbs like my nerves are getting pulled when I am stressed" (11 years)
Immediate response to stress	Isolating	"I don't feel like talking to anyone and I sit silently" (15 years)
	Seeking support	"I will spend my time and enjoy with my family and friends when stressed" (13 years)
	Engaging in leisure activities	"When I get stressed I meditate in dhyanamudra for some time and listen to songs" (11 years) "Sometimes I go out for cycling and go shopping with my family" (13 years) "I listen to Lord Krishna songs and watch movies" (18 years)
Coping Strategies	Seeking social support	"When I am stressed I take help from my parents, they give me tips on how to study easily" (11 years) "I go talk to my mom and she understands me and makes fun out of it which will help me get over my stress" (18 years)
	Use of humour	"I don't take it seriously, when I feel stressed I make jokes out of it and laugh it out with my friends" (13 years)
	Exercise based strategy	"I meditate daily for 5 to 10 min in the morning" (11 years) "Daily I practice suryanamaskara and cardio for 15 to 30 minutes" (18 years)
Aware of counselling services	Yes	✓✓✓✓
	No	

Table 4.19

Summary of thematic analysis of high stress group

Leading question	Themes	Excerpts
Major Causes of stress	Quarrels in family	"I feel stressed when I have quarrels in my family" (16 years)
		"I feel stressed due to family problems as my uncle got separated from us, I also feel stressed when I miss my father, who works in another town and visits me once in a month" (11 years)
	Not meeting parental expectations	"I feel stressed when my parents compare me with others and they scold me when I get less marks" (15 years)
	Academic pressure	"During studying if I'm unable to understand certain topics I feel stressed" (11 years)
		"I used to feel stressed when I just started college because a lot of topics I was learning were new to me. My studies got affected due to COVID and I have missed many important topics and syllabus related to these subjects" (15 years)
Manifestation of stress	Emotional	"I feel angry" (16 years)
		"I feel angry and sad" (11 years)
		"I feel scared when I am stressed" (11 years)
	Behavioural	"I cry when I feel stressed" (15 years)
Impact on physical health	Headache	"I suffer from headache" (11 years)
	Fever	"I get fever" (11 years)
	Cold	"I get cold due to lot of crying" (15 years)
Immediate response to stress	Isolating	"I sit silently and mind my business" (16 years)
		"I try to sit quietly without thinking about anything" (11 years)
		" I don't talk to anyone, I isolate myself and sit without getting disturbed and then i get back to solve the problem that is causing me stress" (15 years)
	Engaging in leisure activities	"I sleep and play games when I am stressed" (11 years)
Coping Strategies	Self-control	"I will not talk to anyone, I go to an isolated place & sit silently" (16 years)
	Seeking social support	"My mom makes me study every day, she teaches me and after studying I revise the topics as well" (11 yrs)
		"Sometimes I talk to my friends and take help from my mother when I have problems" (11 years)
	Plan-full problem solving	"I used to get stressed a lot due to my poor marks, but now I read more and study for extra time. This decreased my stress. i also took help from my teachers and online sources" (15 years)
Aware of counselling services	Yes	✓✓
	No	X X

Thematic Analysis for Low Stress Group

From the table 4.16, it can be observed that the themes were emerged for each of the leading questions of the semi structured interview. Following is the detailed description of each theme under each leading question.

Major Causes of Stress. Participants were asked about major causes of stress experienced by them. Major cause of stress refers to the stress experience which is most frequently experienced by them causing higher levels of stress. After analysing the transcripts, three themes emerged viz. Academic pressure, interpersonal conflicts and Physical injuries.

Academic pressure. When asked about major stressors, two out of four participants expressed concern about being stressed during exams and experiencing stress only after entering to a higher class due to continuous exams and challenging syllabus. Below are the excerpts from the interviews which prompted in developing this theme.

"I experience a lot of stress when I study without sleeping. I experience this mostly during exams"

"I feel stressed when I have exams, especially IIT subjects. This year I feel more stressed"

Interpersonal conflicts. Participant expressed major cause of stress as being teased in classroom and classmates making fun about him. The excerpt is "When someone says something about me and teases me I get angry and I feel stressed"

Physical injuries. Describing getting hurt or injured as most painful experience, the participant expressed it as a major cause of stress. Following is the excerpt.

"Getting injured causes more stress in me because, it is very painful"

Manifestation of stress. Stress is manifested in several other forms and different individuals experience and express in different ways. From the responses received by the participants, two broad themes were developed for this leading question. These themes are

emotional manifestation of stress such as expressing anger while stressed and behavioural manifestation of stress such as worrying and overthinking about the problem. Following are the excerpts from the interviews.

"I feel anger and I think why is this happening to me?"

"When I feel stressed I feel different than normal that whole day, I keep on thinking and worrying about studying"

Impact on Physical Health. Stress, when left unnoticed, can lead to severe mental and physical health consequences. Frequent experience of stress can also lead to psychosomatic symptoms such as headache, which was found to have been experienced by all the participants interviewed and pain in limbs leading to further discomfort in individual. Following are the excerpts from the interviews.

"I get severe headaches"

"I feel pain in my limbs like my nerves are getting pulled when I am stressed"

Immediate Response to Stress. Immediate response to stress is how a person reacts and responds to a stressful situation immediately rather than coping with it later. This has a huge impact on stress experiences of the participants. From the responses of the participants three themes have merged, which are as follows.

Isolating. Most of the participants from low as well as high stress experiencers responded that they prefer to sit alone with their thoughts, go to a private space and have some time for themselves as their immediate response and they say that this helps them deal with the emotions at that point.

"I don't feel like talking to anyone and I sit silently"

Seeking support. Seeking support and comfort in family and friends can be an effective way to deal with stress.

"I will spend my time and enjoy with my family and friends when stressed"

Engaging in Leisure Activities. Engaging leisure activities such as listening to music, meditating, shopping and cycling as expressed by the participants can be a refreshing experience to gain immediate relief from stress

"When I get stressed I meditate in dhyanamudra for some time and listen to songs"

"Sometimes I go out for cycling and go shopping with my family"

"I listen to krishna songs and watch movies"

Coping Strategies. The themes emerged for coping strategies are seeking social support, use of humour, exercise based strategies.

Seeking social support. Most of the participants can be seen opting for seeking social support which can be an effective coping strategy for adolescent age group to learn and develop various coping strategies.

"When I am stressed I take help from my parents, they give me tips on how to study easily"

"I go talk to my mom and she understands me and makes fun out of it which will help me get over my stress"

Surprisingly no one mentioned peer support or support from outside the family. This suggests that the peer and community support is scarce.

Use of humour. Participant expressed that talking to friends and making fun out of the stressful situations helps him to cope with stressful events.

"I don't take it seriously, when I feel stressed I make jokes out of it and laugh it out with my friends" This indicates the coping strategy of distancing as classified by Folkman and Lazarus (1984).

Exercise based strategy. Participants expressed that they follow a regimen of physical activity every day for 15 minutes to 30 minutes which helps them with dealing with their stress experiences

"I meditate daily for 5 to 10 min in the morning"

"Daily I practice suryanamaskara and cardio for 15 to 30 minutes"

Aware of counselling services – all of the participants from low stress group were aware of the counselling services available and further questioning revealed that they never felt a need to avail the services.

Thematic Analysis for High Stress Group

From the table 4.17, it can be observed that the themes were emerged for each of the leading questions of the semi structured interview. Following is the detailed description of each theme under each leading question.

Major Causes of stress. The sources of stress for high stress group differed from that of the low stress group, though academic source seems to be common. Major causes of stress expressed by the participants were emerged into three themes viz. quarrels in family, not meeting parental expectations and academic pressure

Quarrels in family. Quarrels in family, disputes and quarrel with parents are the major causes expressed by the participants.

"I feel stressed when I have quarrels in my family"

"I feel stressed due to family problems as my uncle got separated from us, I also feel stressed when I miss my father, who works in another town and visits me once in a month"

Not meeting parental expectations. Not meeting parental expectations in academics can be major source of stress to most of the adolescents similar to the participant here.

"I feel stressed when my parents compare me with others and when they scold me"

Academic pressure. Stress caused due to continuous exams, fear of failure in exams, failing to understand the concepts in classroom can be considered as major causes under academic pressure. Following are the excerpts of the participants

"During studying if I'm unable to understand certain topics I feel stressed"

"I used to feel stressed when I just started college because a lot of topics I was learning were new to me. My studies got affected due to COVID and I have missed many important topics and syllabus related to these subjects"

Manifestation of stress. From the interviews it was found that manifestation of stress to be emotional and behavioural. Participants associated emotions such as anger and sadness with stress and some of them were found to be expressing their stress through behaviours such as crying.

Emotional

"I feel angry"

"I feel angry and sad"

"I feel scared when I am stressed"

Behavioural

"I cry when I feel stressed"

Impact on Physical Health. Participants were seen to be experiencing a wide range of physical impact of stress from severe headaches, to cold developed due to crying when stressed and suffering from fever.

"I suffer from headache"

"I get fever"

"I get cold due to lot of crying"

Immediate response to stress

Isolating. This was the most common response observed among the participants where the participants try to get isolated and distance themselves from the situations and people causing them stress. Isolating self is seen common between the low and high stress experience groups. This indicates a serious concern because not having an immediate stress absorber is something that may drive a person to isolation and suffer the stress alone. For an

adolescent to take recourse to this response is not a welcome sign because this leaves a scope for perpetuating irrational and dysfunctional thoughts.

"I sit silently and mind my business"

"I try to sit quietly without thinking about anything"

"I don't talk to anyone, I isolate myself and sit without getting disturbed and then i get back to solve the problem that is causing me stress"

Engaging in leisure activities. One of the participants response to stress was expressed as sleeping and playing games

"I sleep and play games when I am stressed"

Coping Strategies

Self-control. Participants were seen to adopt self-control as a coping strategy to cope with stress by isolating themselves, not expressing their feelings and not reaching out for help when required. Such example is explained through this excerpt below.

"I will not talk to anyone, I go to an isolated place & sit silently"

Seeking Social Support. Participants were seen to reach out for support from their family and friends only when they couldn't handle it by themselves.

"My mom makes me study every day, she teaches me and after studying I revise the topics as well"

"Sometimes i talk to my friends and take help from my mother when I have problems"

Planful problem solving. One of the participants was actively adopting planful problem solving as a coping strategy by directly dealing with the cause of stress and coming up with an effective solution. The participant expressed that she has been using this coping strategy and noticing development

"I used to get stressed a lot due to my poor marks, but now I read more and study for extra time. This decreased my stress. I also took help from my teachers and online sources"

Aware of counselling services- two of the participants from this group of four were aware of the availability of counselling services whereas other two participants were not aware of them.

In summary, the themes developed under each leading question were both common and exclusive to both the groups. Some common themes were academic pressure as a major source of stress, anger as emotional manifestation of stress was expressed by the participants in both the groups. Headache can be observed as a common physical symptom caused due to stress. In both the groups the themes isolating and engaging in leisure activities evolved under the immediate response to stress. Seeking social support was the common theme that emerged under the coping strategy adapted by the participants.

Some major differences to be noted are, though the manifestation of stress has same themes for both the groups, the emotions and behaviours presented differed. While emotional manifestation of stress in low stress group was anger, it was anger, sadness and scared in high stress group and the behavioural manifestations also differed as it was overthinking and worrying in low stress group, it was crying in high stress group. The major cause of stress for high stress group were associated with familial relations such as quarrels in family and parental expectations whereas none of the major cause in low stress group was associated with family. The common immediate response in the high stress group was isolating while in low stress group it was seeking support and comfort in friends and family. The participants from low stress group were also found to be engaging in physical exercise and meditation on a daily basis which was not observed in high stress group. Lastly, talking about the awareness of availability of counselling services, all the participants from low stress group were aware but only half of the participants from high stress group were aware and none of them attempted to avail the services.

Chapter V

DISCUSSION

Chapter V

DISCUSSION

In this study, the primary objective was to develop and standardize a stress scale for adolescents. Secondly, it was aimed to investigate if there are any significant differences in stress levels based on gender, class and age groups. Thirdly, it was aimed to identify the psychosocial factors contributing to adolescence stress. At last, it was aimed to understand the stress experiences and coping strategies of adolescents with high and low stress levels through qualitative approach. This chapter discusses the findings obtained through these objectives. Implications and limitations of the study are also discussed.

Development and Standardization of Adolescence Stress Scale

The major objective was to develop and standardize Adolescence Stress Scale (ADOSS). To fulfil this purpose, stressors of the adolescents were identified, filtered, reduced, analysed and finalised in four phases. The objective of the study was fulfilled through a systematic evolution of a 31 item adolescence stress scale with ten dimensions and well-established psychometric properties.

The ADOSS was developed following a series of standard steps. The standardized version of ADOSS has 31 items that measures 10 dimensions of stress. These dimensions measure stress that is induced due to several aspects such as Major loss, Interpersonal conflict, Punishment, Enforcement/Conflict, Phobia, Imposition, Insecurity, Unhealthy environment, Illness & Injury, and Performance. The ten factors have satisfactory internal consistency and content validity. They were also found to be interrelated, and interdependent. All 31 items represent the stressors experienced by the adolescents. The 31 items evolved out of 112 items were pooled based on the real-life experiences of adolescents. This needs to be

identified as one of the basic strengths of the scale, which gathered the real stress experiences of the target population rather than completely depending upon the review of literature. Stress experiences are culturally contextualised. Hence, it is desirable that the measurement tool incorporated the cultural factors at the right from the base level during the process of scale construction. This study was able to make the sociocultural factors integral in the process of scale construction. As a result certain items typical to the Indian context (Ex: Fear of being punished by the teacher) could find a place in the scale.

Through review of literature, it was definite that there is a huge gap in measurement of stress in adolescents, specifically in India. Though there are several scales developed to measure stress in children and adolescents, they majorly focus on academic and educational stress of the adolescents (Sun et al., 2011; Kim, 1970; Rajendran & Kaliappan, 1990; Rao, 2012; Ang & Haun, 2006). Some other scales were not exclusively developed to measure stress in adolescents and most of them were developed by constructing the items through review of previous studies rather than consulting the adolescents and gathering their stressors (Goldberg, 1978; Lovibond & Lovibond, 1995; Lin & Yosuff, 2013; Cohen et al., 1983; Mooney & Gordon, 1950). Using such scales to measure adolescence stress might result in missing out the major stressful experiences of adolescents and non- accurate measurement of their stress levels. Though there are some scales that gathered the stressors from adolescents themselves and had well established psychometric properties, they were originally developed in other countries and might not be relevant for Indian population (Byrne et al., 2007).

The current scale is useful for the adolescents of the age group 11 to 18 years. Stress experience is dynamic. The sources of stress vary with age. Adolescence is a phase when the child is likely to face stress from multiple sources that encompass biological, psychological and social dimensions which are different in nature from that of an adult. Though the adults also experience stress from all these three sources, the type of stress for an adolescent is

different from that of an adult. For example, one of the psychosocial stress common at both the groups is interpersonal stress. However, the interpersonal stress of an adult may be attributed to strained relationship with one's spouse, boss, and colleagues while the one related to the adolescent may point to peers, siblings and parents. In view of this, there cannot be a common scale to measure the stress of these two groups. Even among the adolescents, the current study found a difference in some types of stress playing a dominant role in certain age groups. However, the 31 items included in the scale proved that stress sources of all the ten factors were present in some quantity at all age groups though some age groups showed peaks of certain types of stress. This indicates that the scale consisting of 31 items could successfully cover the factors appropriate for the adolescents (11 to 18 years).

The ADOSS is constituted with the instructions for the scale, visual analogue scale and 31 items of the scale. The scale has three columns- a column with the stressors, a column for giving rating and a third column which records the experience of the participants with that particular stressor using a dichotomous response of yes or no. The unique feature of this standardized scale is the additional column that required the respondents to mark if they encountered the stated stressful situation in their real life. This helps in measuring the real stressful experience rather than expecting the adolescent to respond hypothetically. Thus, the scale has a provision to record the stressors experienced along with their severity. This enables the Adolescence Stress Scale to be used as a diagnostic tool that can identify the specific dimension in which there is high loading of stress.

The Adolescence Stress Scale developed in this study stood the test of robust scrutiny for reliability and validity. The total stress scores were correlated with the scores of two standardized scales to test convergent and discriminant validity. To establish reliability of the scale Cronbach's alpha, split half reliability and test- retest reliability were computed. The

results indicated satisfactory values confirming that the scale is sufficiently reliable and valid to measure stress in adolescents.

This scale fills all the research gaps in stress measurement and provides a scope to understand several stress experiences of Indian adolescents. This stress scale is easy to comprehend and administer. It can be useful in several settings such as clinics, hospitals, schools and in research to measure various aspects of adolescence stress. Thus, the scale developed and standardized, to measure adolescence stress, in this study can be used both for research and diagnostic purposes with a provision to focus on the specific stress inducing factors of stress at individual and group levels. Thus, the major contribution of this study is the well- constructed stress scale that stood the robust psychometric scrutiny.

While the major focus of the study was standardization of the adolescence stress scale, it also administered the standardized scale on an adequate sample from the target population to find out group differences on basic demographic characteristics.

Stress Differences Based on Demographic Characteristics

The secondary objective of the study was to investigate if there are differences in stress levels of adolescents belonging to different gender, age group and academic class.

The results indicated that girls experience high stress on the dimensions of major loss, phobia, interpersonal conflict, illness & injury, performance, imposition and insecurity. There were no significant differences between gender for the dimensions of stress induced due to enforcement, punishment and unhealthy environment. The gender differences between the stress levels can be attributed to the several factors such as the different physiological and psychological changes they go through at this stage of life. Girls are known to experience puberty at an early age with significant bodily changes than boys which makes them more vulnerable to their environment. Earlier research suggested that girls are prone to experience

more stressful events than boys and have high stress reactivity (Bangasser et al, 2018). Research findings from the literature also indicate that boys do not perceive stress in situations of external locus of control whereas girls were found to experience meta-worry in uncontrollable situations resulting in high stress arousal (Bahrami & Yousefi, 2011). These differences in stress perception and stress reactivity along with the different coping mechanisms adopted by them imply that gender specific interventions would be highly effective to manage stress in adolescents. These differences provide scope to gain deep understanding of the stressors experienced by both the genders.

There were no significant differences for three dimensions. These are enforcement induced stress, punishment induced stress and stress due to unhealthy environment. This implies that there are few stressors where both boys and girls perceive equally stressful. There were also few studies which revealed that there were no significant differences between the academic stress levels of girls and boys (Wright et al., 2022; Shaj, 2021).

The study investigated if there are any differences in stress levels between early adolescents and late adolescents. Results revealed significant differences in stress levels of two age groups. Early adolescents experienced higher level of stress compared to late adolescents in overall stress as well as in the nine out of ten dimensions, barring Imposition induced stress.

Coping techniques are by and large learned behaviours. The quality and quantity of coping enhances with age, exposure and experience. Early adolescence is the initial phase of transition from childhood to adulthood. This is the phase where the child is placed at a confused state about one's own identity due to biochemical induced physical and psychological changes. While the changes are quite pronounced, the child is not yet well equipped with appropriate coping strategies to assimilate, accommodate and adapt to them. In

the absence of evolved coping techniques, the child tends to experience the heavy burden of the demands of the internal and external environment. Studies have found them to experience high range of negative affect and have difficulties in emotional regulation (Salmela-Aro, 2011) leading to increase in their stress perception. Unlike the early phase, the later phase of adolescence provides ample time, exposure and experience to the adolescence to comprehend the bio-psychological changes in one self. The additional years of exposure and experience armours the adolescent to confront the stress with enhanced level of confidence so that the burden of stress is slightly lower on them. In late adolescence, strong friendships develop providing a stable support system for the adolescents helping them to manage their stress levels more efficiently (Way & Greene, 2006; Miething et al., 2016). They develop a sense of autonomy and firm identity as they approach adulthood which might influence their stress perception, making them more responsible to manage their stress effectively even without other's support (Salmela-Aro, 2011; Fram et al., 2022). The implications of these findings in terms of interventional plans are significant. Early adolescents require more guidance and need to be equipped with efficient stress management and coping skills and should be encouraged to seek social support to handle their stress. Hence, schools should particularly concentrate on the children from 6^{th} to 8^{th} class to prevent them from using dysfunctional coping behaviour.

As a part of investigation on the differences in stress levels among the adolescents belonging to different academic classes (6^{th} class to under graduation 1^{st} year), the results revealed that there are significant differences. Further analysis through Tukey's HSD multiple group comparison revealed following differences.

The levels of stress manifested a pattern along the academic classes. The stress levels were found to peak up in class eight after which there is either marginal increments or plateau till class 12 after which there is a sudden slope in the under-graduation stage. The peak of

stress levels in 8th class might be attributed to the pubertal stage with high hormonal changes and imbalance as they belong to the same age group as early adolescents. According to National Education Policy (2020) 8th class is the end of middle school which acts as a transition phase to high school with higher goals and demands academically. At this stage having a role in social groups and maintaining social relations is of high significance. Such transitions and expectations might lead to high stress perception and reactivity in this adolescents stage belonging to this class. Ostberg et al. (2015) in their study on sample of adolescents belonging to 8th grade provide supporting evidence in their results. They found that 8th grade students manifested high stress than other grade students. They attributed it to high academic pressure and lack of leisure.

The drastic decline in stress levels in 1st year of under-graduation can be attributed to the effective coping skills acquired by the participants by this stage through past experiences. Once in college, the late adolescents are more guided by self-accountability than the regimented need for compliance. This gives them control over their present and future leading to less stress in life. Not having to be under the strict vigilance of an authority continuously monitoring one's behaviour perhaps helps in lowering the stress. Nevertheless these differences in stress levels can vary for each stream of study (Towbes & Cohen,1996; Elias et al., 2011).

Along with 8th class, 6th class was also found to have higher stress levels when compared to other classes for the dimensions of stress caused due to enforcement or conflict and unhealthy environment. This suggests the younger group prone to stress under conditions of insecurity and denial of their demands that perhaps is perceived as deprivation. This can be interpreted as a consequence of different set of rules applied on them in high schools after their immediate transition from the primary class. At 11 years their perceptions get sharper because of their gradually developing abstract thinking that is characteristic of formal

operation stage. In this phase it is possible that they start applying logic in interpreting things around them, which may take them on surprise. It is also possible that the application of logic is not syllogistic and fallacies in interpretations lead them to perception of insecurity in the environment and distortion of facts such as denial of the demands by parents as deprivations. However, this interpretation needs to be confirmed with studies designed with a focus on the logical application of daily events in the children of 6^{th} standard.

This study made a modest attempt to identify the psychosocial factors contributing to adolescent stress. The findings are interpreted below.

Factors Contributing to Stress in Adolescence

The study first made an attempt to identify the factors predicting Adolescence Stress by carrying out hierarchical multiple regression analysis. In the second step, a serial mediation model was investigated into through application of path analysis. The details of the findings are discussed under two separate sub-headings.

Psychosocial predictors of Stress in Adolescents

The results of hierarchical regression analysis revealed that 13 variables together predicted the stress in adolescence. They are Frustrative non-reward responsiveness, Ill health experiences, Social skills, Health risk behaviours, Family health, four personality traits-openness, agreeableness, conscientiousness, emotional instability, protective factors, promotive factors and psycho-social support. In the final model the psychosocial factors significantly predicting stress were ill health experiences, conscientiousness, emotional instability and psychosocial support where all them are found to be positively predicting stress. The personality trait emotional instability was seen to have high contribution on stress among all the variables. However, together they contributed only to 6% of variance. This

indicated that the present study has missed out on some of the major variables which contribute to adolescence stress.

In line with the previous studies frustrative non reward responsiveness, ill health experiences, and emotional instability are found to be positively predicting the stress levels in adolescents. Frustrative non reward responsiveness and emotional instability are highly associated with negative affect. Frustration in adolescents is caused by not receiving the expected reward and results in lack of satisfaction and fulfilment which leads to increased distress in individuals (Vasile & Albu, 2011; Baskin-Sommers et al, 2012). Stress and physical health are closely associated with each other where experiencing chronic stress can lead to several physical ailments which in turn cause distress an individual. Conscientiousness, though, seen as a protective factor towards stress experience (Bartley & Roesch, 2011), high levels of this personality trait can lead to overthinking and high stress. This might be due to the pressure individuals with high conscientiousness put on themselves to perform without any flaw.

This study has resulted in some findings contrast to the previous findings where psychosocial support is positively predicting the stress levels in adolescents. The dynamics of the psychosocial support have taken a drastic change in past few years. With the increase of nuclear families and working parents the proximity of social support has decreased and the increase in virtual social network has increased. High social networks or social support availability virtually might not indicate the presence of actual support in an individual's life leading to high stress perception. During adolescence when one gears up for autonomy, unsolicited support may also be viewed as intrusion and interference. Further, the support in the form of close monitoring by parents imposing restrictions in the freedom may add to the stress of the adolescent. Stress can also be induced if the social support received does not

reach the requirements or needs of the receiver and when perceived as unhelpful (Rui & Guo, 2022). High perceived social support with low received support might further result in high stress (Barrera, 2000).

It is also evident that the personality trait, emotional instability is the major predictor towards stress among all the other variables. This finding is supported by several research studies as emotional instability is associated with negative affect such as anger and discontent leading them to perceive stress in most of the daily situations when compared to others (Rentala et al., 2019). Emotional instability is associated with the neuroticism personality. In most previous studies neuroticism has predicted the stressful life experiences (Hammen, 2006; Liu & Alloy, 2010; McAbee & Oswald, 2013).

In view of the fact that the study could identify 13 factors together contributing only to the extent of 6% of variance, it is strongly recommended for the dedicated study designs to identify factors contributing to adolescence stress. These studies are the need of the hour since it is crucial to recognize the influencing factors towards stress in adolescents.

Mediating variables and Indirect effects towards Stress

The results of serial mediation math model revealed that there is a partial mediation of the mediator variables family health, frustrative non-reward responsiveness, emotional efficacy and emotional instability with significant indirect and direct effects from independent variables to the dependent variable, stress. In the path model, a set of independent variables- social network, psychosocial support availability, perceived physical environment and promotive factors contributed to family health. Family health contributed to frustration non-reward and emotional efficacy. Another independent variable, protective factors, contributed to frustration non-reward which in turn contributed to emotional instability. Emotional efficacy and emotional instability both had direct paths towards stress

where it had negative contribution from emotional efficacy and a positive contribution from emotional instability.

First major pathway is Social network, psychosocial support availability, Perceived physical environment, and promotive factors contributing to the mediating factors Family health which is contributing to the emotional efficacy towards stress. The psycho social variables as found in the literature majorly contribute to family health which has effect on the emotional efficacy of the adolescents that further contributes to stress. Family health can play a significant role as mediator towards stress as it helps children develop emotional awareness with secure relations and high availability of resources (Bhatia, 2012). It is also found that positive family functioning such as positive parent–child relationships may buffer negative effects of stressful events and adjustments towards it (Masten & Narayan, 2012; Prime et al., 2020).

Second major pathway can be observed as independent variable, protective factors, contributing negatively to frustration non reward responsiveness which contributes to the personality trait, emotional instability, in adolescents further contributing to their stress. Emotional instability can be seen having a direct effect on the stress of adolescents higher than the emotional efficacy. From all the indirect effects frustrative non-reward responsiveness can be seen as having higher effect of stress than others as it is highly associated with negative affect (Rentala et al., 2019).

Though the variance was low in regression and path analysis, there were significant psychosocial factors contributing to stress in adolescents. According to Frost (2018), some fields of study have an inherently greater amount of unexplainable variation and are bound to have lower variance but do not negate the importance of any significant variables. Adolescence stress can be considered as one of such concepts which is broad and dynamic that can be influenced by many aspects of human life and thus resulting in huge individual

differences in stress perception, reactivity and coping. Therefore, the role of the psychosocial factors in present study cannot be dismissed.

Stress Experiences and Coping Strategies of Adolescents with High and Low Stress Levels

A qualitative approach was employed to explore participant's stress experiences and coping strategies. The results of thematic analysis revealed that low stress group and high stress group had both common and exclusive themes under each leading question. These results are further discussed below under each leading question. It is also worth mentioning that none of the participants mentioned any different stressor when questioned if they have any other sources of stress that are not mentioned in the adolescence stress scale, which indicates that adolescence stress scale includes all the of the stressors experienced by adolescents frequently.

Sources of Stress

The common source of stress emerged in both high stress group and low stress group was academic stress. It implies that academic stress is a frequent source of stress among all the school going children and some of them are able to manage their academic stress while others still in need of proper coping strategies. The sources of stress which were exclusive to low stress group were interpersonal conflicts and physical injuries. For participants with high stress levels the exclusive sources of stress were quarrels in family and parental expectations. It can be observed that the participants whose sources are related to familial relations are experiencing high stress levels than compared to the other groups which might also be difficult to manage without proper support. It is also observed that academic pressure when associated with parental expectations lead to increase in stress experience among adolescents (Nagle & Sharma, 2019). In India, every day more than 35 students are found to be

committing suicide due to failure in exams and not reaching expectations of self/ parents (NCRB, 2021). In Asian countries such as India, academics is given a high value and the stress associated with it is normalised by schools and parents anticipating it to be a drive towards achievement which leads to rather high stress levels and lack of proper coping skills to deal with it. These findings imply that family relations play a significant role in coping with stress along with its perception and reactivity of adolescents. Proper guidance to the children facing academic stress and awareness among parents and teachers may minimise the stress by enabling the adolescents to encounter such stress with appropriate coping strategies.

Immediate Response to Stress

The themes evolved under this were isolating, engaging in leisure activities and seeking support. Participants from both the groups were found to be engaging in leisure activities and isolating themselves when in stressful situation, whereas some of the participants from low stress group were found to be seeking support and comfort from friends and family when they face a stressful situation which itself explains the low stress levels in the participants. Most of the participants were found to be isolating themselves. This should ring an alarm because when the adolescents learn to cope with stress by isolating themselves, they either tend to manifest avoidance coping, self-control or may end up with suppression. None of these approaches to stress are likely to fetch productive outcomes. Hence it is time that the school children are sensitized about the counselling services and encouraged to seek professional counselling in the face of stress. Adolescents tend to emphasize peer and romantic relationships more and rely less on their parents and families (Steinberg & Morris, 2001) which might also be the reason to not seek immediate support from family by some participants and be isolated. Though the peer relations are prioritised, they might not provide the support needed by the adolescents as they all experience various stressors and are not equipped with sufficient coping skills to help each other. Peer relations in contemporary

times though are found to be wider are found to be weaker in intimacy. As a result, adolescents may find the peer support as inadequate. If they do not have an alternative in their repertoire they may tend to resort to ineffective coping strategies. Proper interventions need to be construed in this line.

Manifestation of Stress

The manifestation of stress among adolescents was emotional and behavioural. Anger was a common emotional manifestation by the participants from both the groups. Participants with high stress were found to be sad and in fear (scared) when confronted by a stressful situation whereas participants with low stress were found to be overthinking about the stressful situation. These findings imply that adolescents manifest their stress in different forms as it might be difficult for them to understand and express their own stress experiences. These behavioural changes and emotional expressions should be observed and taken as signs by the parents and teachers and provide appropriate support.

Impact on Physical Health

All of the participants had an impact on their physical health while experiencing a stressful situation. Most of them reported to be experiencing headache, while others mentioned having pain in limbs, fever and cold. Both acute and chronic stress experiences are seen to have a huge effect on their physical health. High levels stress in adolescence increases the risk of developing preventable physical health problems later in life (Salleh, 2008). The findings are clear indications recommending stress screening as the first level diagnostic tool in paediatric clinics and hospitals for the adolescence population. Many a time what appears to be a severe health problem may have its aetiology as stress.

Coping strategies

Through thematic analysis, five coping strategies evolved among which only one coping strategy was common to both the groups and four others were exclusive. The common coping strategy emerged was seeking social support, participants from both the groups were found to be actively seeking support from their parents and friends, which should be appreciated and encouraged by the support providers. This will lead to managing stress levels and developing effective skills to cope with their stress in future too. To enhance support for adolescence, parents should be counselled to support their children and not force them towards any activities that do not interest them (Tangade et al., 2011; Bedewy & Gabriel, 2015). They should also be involved in interventions and further providing a positive academic environment can also be helpful for adolescents (Neveu et al., 2012).

Exercise based strategies and using humour were coping strategies of participants with low stress. According to Galanakis et al. (2016) use of humour can be adaptive or maladaptive depending on the style of humour. A self-enhancing style of humour can aid in stress management with a humorous point of view towards life events whereas the self-defeating humour can be maladaptive way of managing stress and further lead to depression and anxiety (Stieger et al., 2011). Sharing such information to the adolescents might help them to choose adaptive coping styles for better stress management. Exercise based strategies such as including yoga and meditation to daily routine can lead to less stress perception and improve one's mental health and wellbeing (Shivaji, 2022). The participants involved in this studied followed yoga and meditation in their daily routine and were found to manage their stress levels efficiently than participants with high stress. Yoga is also found to be effective in improving one's coping and adapting strategies towards stress (Sethi et al., 2013). Therefore it is recommended for schools to adapt to yoga and meditation practice for students to enhance their wellbeing along with academic performance.

Self-control and Planful problem solving were the coping strategies used by participants with high stress. Self-control coping strategy is when an individual do not share their feelings with others and try to control them and deal with the stressful experiences by themselves. This coping strategy in adolescents might produce more stress as they are still in developing stage and not sharing their experiences can lead to internalizing behavioural issues leading to depression and anxiety (Compare et al., 2014). On the other hand planful problem solving is an adaptive coping strategy where the participants of the study were found to be using and successfully coping with their stress. Therefore, adolescents should be made aware of the effective coping strategies and should be provided with the support they need to develop such strategies to manage their stress.

Awareness of Counselling Services

Among all the participants six of them were aware of counselling services and mental health resources that are available whereas two of them were not aware and belonged to high stress group. Though, most of them were aware, neither of them availed nor were interested to avail such resources. From this, it can be implied that there is a lack of awareness among the adolescence about the mental health services that are available to them. Therefore, counselling services should be made accessible to the adolescents (Lin et al., 2013) and they should be educated about such resources and encouraged to avail them by parents and teachers whenever needed.

Implications

Adolescence Stress Scale (ADOSS) is a standardized tool that can be used in various contexts. It can be used in research setting that call for measuring adolescence stress. In research related to educational psychology, school psychology, developmental psychology where adolescents are the sample, the ADOSS can give accurate measure of the stress in

adolescence group that can scientifically compare groups. The scale can also be used at individual levels at clinical settings. Paediatric clinics handling adolescence health can use the tool for screening purposes when the adolescent reports chronic symptoms that are found to be idiopathic. The exact source of overload of stress can be identified by the scale for planning appropriate intervention that facilitates the much-needed biopsychosocial approach to health care.

The ADOSS is an appropriate scale to be used in counselling and mental health clinics. Identifying the stress burden factor enables the counsellor/clinician to design appropriate intervention plan for the client. There may be occasions when parents will have to be counselled to change their expectations and behaviour towards adolescents to minimise the stress in them. ADOSS helps the counsellor to pin-point to the parents the stress overload in specific dimensions. This elevates the counselling to evidence-based practice.

Under-performance and under-achievement among the students are often found to be manifestations or the consequences of high stress levels. It is necessary to sensitize the teachers and the school managements to evaluate an under-performing or under-achieving student on the stress levels to understand the student better and help appropriately.

Thus, ADOSS can be a tool that can be used in various settings that involves adolescents and their parents to transform the approach to a biopsychosocial one.

Limitations and Future Directions

The first limitation of this study is that the sample does not represent all the regions of the country. Secondly, in its attempt to identify the psychosocial contributors to adolescence stress the study seems to have missed out on the major components. However, these

limitations do not overpower the development of well-structured stress scale for adolescence and unique findings of the study.

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APPENDICES

APPENDIX A1

Preliminary Adolescence Stress Scale with 56 stressors

S.No.	Stressors
1	ALCOHOLIC PARENT
2	BEATING BY SOMEONE AT HOME
3	BEATING BY TEACHER
4	BEING ALONE
5	BEING IGNORED BY FRIENDS
6	BEING PARTIAL TO SIBLING
7	BEING PUNISHED
8	BULLYING BY PEERS
9	BULLYING BY SIBLING
10	CAREER INSECURITY
11	CHANGING RESIDENCE
12	CHANGING SCHOOL/COLLEGE
13	CONFLICT BETWEEN PARENTS
14	CONFLICT WITH FRIENDS
15	CONFLICT WITH PARENTS
16	CONFLICT WITH SIBLING
17	CONFLICTS IN FAMILY
18	DEATH OF FAMILY MEMBER
19	DEATH OF FRIEND
20	DEATH OF GRANDPARENT
21	DEATH OF PARENT
22	FAILURE IN EXAMS
23	FEAR OF ANIMALS
24	FEAR OF DARK PLACES
25	FEAR OF HOSPITALS
26	FEAR OF SPECIFIC SUBJECT
27	FINANCIAL PROBLEM IN THE FAMILY
28	FORCED TO DO DISLIKED TASK
29	FORCED TO PARTICIPATE IN AN ACTIVITY
30	GETTING SCOLDED
31	GOING LATE TO SCHOOL/COLLEGE
32	GOING TO SCHOOL/COLLEGE
33	HAVING TO DO HOUSEHOLD WORK
34	HIGH ACADEMIC PRESSURE
35	HUMILIATION INFRONT OF OTHERS
36	ILL HEALTH OF LOVED ONE
37	ILL HEALTH OF SELF
38	INJURY TO SELF
39	LACK OF LEISURE TIME
40	LACK OF SLEEP
41	LOSING ONE'S BELONGINGS

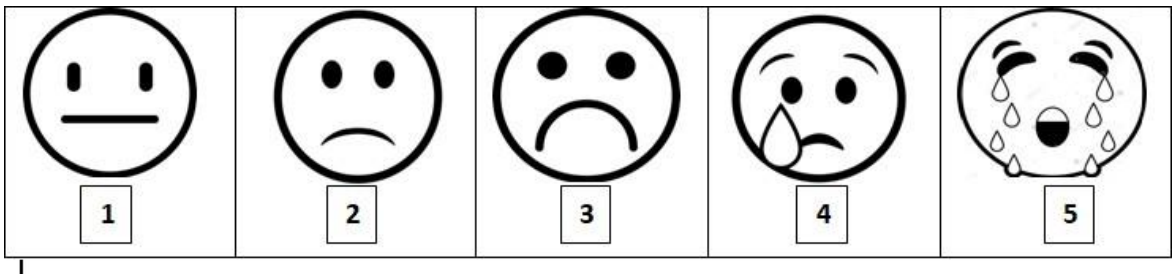
42	MEETING WITH AN ACCIDENT
43	NIGHTMARES
44	NOT MEETING ACADEMIC EXPECTATIONS (SELF/OTHERS)
45	NOT MEETING EXPECTATIONS IN OTHER ACTIVITIES (SELF/OTHERS)
46	PARENTS IMPOSING DISCIPLINE
47	PROBLEMS WITH GIRLFRIEND/BOYFRIEND
48	PUBLIC SPEAKING
49	SEPERATION FROM LOVED ONES (GRANDPARENTS/ COUSINS/ FRIENDS)
50	SEPERATION FROM PARENT
51	SOMEONE TOUCHING ME WRONGLY
52	TRAVELLING DAILY IN BAD TRAFFIC/CROWDED BUS
53	VIOLENCE AT HOME
54	WAKING UP EARLY
55	FEAR OF SUPERNATURAL PHENOMENON
56	UNFULFILLED DEMANDS

APPENDIX A2

Adolescence Stress Scale (ADOSS)

Instructions

This scale consists of a list of situations which are identified as stressful by adolescents from 11 to 18 years of age (ranging from Class 6 to University level). Please read each situation, understand it, assess the intensity of stress it causes and give it a rating based on your judgment of intensity of the stress. You need to assess each stressful situation on a 5 point scale. Supposing death of a parent is the most stressful situation, getting a rate of 5, what will be the rating for each of the items listed below? After you finish giving your rating, go to second column, and tick those ratings which you have experienced in your life. Please use the visual analog scale, provided below, for reference while rating the intensity of the stress.



S.No.	Stressors	Your Rating	Have you experienced it in your life? Yes or No
1	Alcoholic parent (drinking problem)		
2	Beating by teacher		
3	Quarrel between parents		
4	Quarrel with friends		
5	Quarrel with parents		
6	Quarrel with brother or sister		
7	Quarrels in family		
8	Death of a family member		
9	Death of friend		

10	Death of grandparent		
11	Death of parent		
12	Failure in exams		
13	Fear of animals		
14	Fear of dark places		
15	Fear of hospitals		
16	Forced to do disliked task		
17	Forced to participate in an activity		
18	Being punished		
19	High academic pressure		
20	Ill health of self		
21	Injury to self		
22	Lack of sleep		
23	Meeting with an accident		
24	Not meeting academic expectations(self or others)		
25	Not meeting expectations in other activities(self or others)		
26	Problems with girlfriend or boyfriend		
27	Separation from loved ones(grandparents or cousins or friends)		
28	Separation from parent		
29	Someone touching me wrongly		
30	Fear of ghosts, etc.		
31	Not getting what you had asked for		

APPENDIX A3

Self-Efficacy Questionnaire for Children

***Instructions*:** This scale has 24 questions related to how well you do things in different contexts related to experiences of daily life. Please read each question carefully and think of how well you do the things described in the question. There are 5 columns each one describing how well you do it. Tick in the appropriate column against the question based on your judgement of how well you do it.

For example, if the question is "*How well can you patch up a conflict between two of your friends*?" In case you think that you are extremely good in bringing two friends together who parted because of a fight, you should put a tick in the column 'Very Well'. If you feel that though you are not successful in every case you are able to bring together two conflicting friends in most of the cases and are satisfied with that, you should tick in the column 'Satisfactorily Well'. In case your success is limited only to a few cases and you feel that you could do better than that you must tick in the column 'Somewhat Well'. On the other hand, if you feel that you don't attempt to do such things you must tick in the column 'Not Well'. However, if you feel that things worsen if you must tick in the column 'Not at all well'.

You must remember that each of the description should be answered imagining yourself in the situation, and answer honestly. There is no right and wrong answers since experiences of children vary widely. So whatever is true in your case is the correct answer for you.

	STATEMENTS	**Very well**	**Satisfactorily well**	**Somewhat well**	**Not well**	**Not at all well**
1	How well can you get teachers to help you when you get stuck on schoolwork?					
2	How well can you express your opinions when other classmates disagree with you?					
3	How well do you succeed in cheering yourself up when an unpleasant event has happened?					
4	How well can you study when there are other interesting things to do?					
5	How well do you succeed in becoming calm again when you are very scared?					

6	How well can you become friends with other children?					
7	How well can you study a chapter for a test?					
8	How well can you have a chat with an unfamiliar person?					
9	How well can you prevent to become nervous?					
10	How well do you succeed in finishing all your homework every day?					
11	How well can you work in harmony with your classmates?					
12	How well can you control your feelings?					
13	How well can you pay attention during every class?					
14	How well can you tell other children that they are doing something that you don't like?					
15	How well can you give yourself a pep-talk when you feel low?					
16	How well do you succeed in understanding all subjects in school?					
17	How well can you tell a funny event to a group of children?					
18	How well can you tell a friend that you don't feel well?					
19	How well do you succeed in satisfying your parents with your schoolwork?					
20	How well do you succeed in staying friends with other children?					
21	How well do you succeed in suppressing unpleasant thoughts?					
22	How well do you succeed in passing a test?					
23	How well do you succeed in preventing quarrels with other children?					
24	How well do you succeed in not worrying about things that might happen?					

APPENDIX A4

Self-Esteem Scale

Instructions: Below is a list of statements dealing with your general feelings about yourself. Pleaseindicate how strongly you agree or disagree with each statement.

S.No.	Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
1.	On the whole, I am satisfied with myself.				
2.	At times I think I am no good at all.				
3.	I feel that I have a number of good qualities				
4.	I am able to do things as well as most other people.				
5.	I feel I do not have much to be proud of.				
6.	I certainly feel useless at times				
7.	I feel that I'm a person of worth, at least on an equal plane with others				
8.	I wish I could have more respect for myself				
9.	All in all, I am inclined to feel that I am a failure				
10.	I take a positive attitude toward myself				

APPENDIX A5

Big Five Questionnaire for Children

Instructions: This scale has 65 statements of different ways you possibly behave, feel or do things in your daily life. Please read each statement carefully and think how frequently you do/ feel/ behave that way. There are five options in the five columns indicating how frequently one behaves on the way described in the statement. Choose the appropriate column depending on how frequently you think it happens to you.

For example, if the statement is "*I feel irritated I cannot complete my homework*." In case it happens to almost every day, you must tick (✓) in the last column 'Almost Always'. In case it happens about twice a week you must tick in the column 'Often'. If it happens to you once a month or so, you must tick in the column 'Rarely'. If it happens to you only once in a while, you must tick in the column 'Rarely'. In case this never happens to you, then you should tick in the column 'Almost Never'.

There is no right or wrong answers in this. Every child's experience is different. Hence whatever is the experience in your case is the right answer for you. Hence, please answer honestly.

S.No	STATEMENTS	Almost Never	Rarely	Some times	Often	Almost Always
1.	I like to meet with other people					
2.	I share my things with other people					
3.	I do my job without carelessness and inattention					
4.	I get nervous for silly things					
5.	I know many things					
6.	I am in a bad mood					
7.	I work hard and with pleasure;					
8.	I argue with others with excitement					
9.	I like to compete with others					
10.	I have a great deal of fantasy					
11.	I behave correctly and honestly with others					
12.	I easily learn what I study at school					
13.	I understand when others need my help					
14.	I like to move and to do a great deal of activity					
15.	I easily get angry					

16.	I like to give gifts					
17.	I quarrel with others					
18.	When the teacher asks questions I am able to answer correctly					
19.	I like to be with others					
20.	I engage myself in the things I do					
21.	If someone commits an injustice to me, I forgive her/him					
22.	During class-time I am concentrated on the things I do					
23	I can easily say to others what I think					
24.	I like to read books					
25.	When I finish my homework, I check it many times to see if I did it correctly					
26.	I say what I think					
27.	I treat my peers with affection					
28.	I respect the rules and the order					
29.	I easily get offended					
30.	When the teacher explains something I understand immediately					
31.	I am sad					
32.	I behave with others with great kindness					
33.	I like scientific TV shows					
34.	If I take an engagement I keep it					
35.	I do something not to get bored					
36.	I like to watch TV news, and to know what happens in the world					
37.	My room is in order					
38.	I am polite when I talk with others					
39.	If I want to do something, I am not capable of waiting and I have to do it immediately					
40.	I like to talk with others					
41.	I am not patient					
42.	I am able to convince someone of what I think					

43.	I am able to create new games and entertainments					
44.	When I start to do something I have to finish it at all costs					
45.	If a classmate has some difficulty I help her/him					
46.	I am able to solve mathematics problems					
47.	I trust in others					
48.	I like to keep all my school things in a great order					
49.	I easily lose my calm					
50.	When I speak, the others listen to me and do what I say					
51.	I treat kindly also persons who I dislike					
52.	I like to know and to learn new things					
53.	I play only when I finished my homework					
54.	I do things with agitation					
55.	I like to joke					
56.	It is unlikely that I divert my attention					
57.	I easily make friends					
58.	I weep					
59.	I would like very much to travel and to know the habits of other countries					
60.	I think other people are good and honest					
61.	I worry about silly things					
62.	I understand immediately					
63.	I am happy and lively					
64.	I let other people use my things					
65.	I do my own duty					

APPENDIX A6

Frustrative Non-Reward Responsiveness Subscale

Instructions: Here are five statements describing a student of your age group. All the five descriptions may not fit you 100% while some may be a very correct description, the others may somewhat resemble you while yet others may not at all like you. Please read each statement carefully. Think of the description in relation to you and tick (✓) in the appropriate column. For example, if the description is— "I get upset if I lose a game". If you feel that you are a person who gets easily upset when you don't win a game, then you have to tick in the first column 'Very true for me' against the statement. On the other hand, if you get upset sometimes then tick in the second column 'Somewhat true for me'. In case you feel that you rarely get upset then tick the third column "Somewhat false for me". Finally, if you feel that you never get upset on losing a game, you should tick in the last column "Very false for me".

There are no right or wrong answers in this. Whatever is true in your case is the correct answer. Hence please answer honestly.

S.No	STATEMENTS	Very true for me	Somewhat true for me	Somewhat false for me	Very false for me
1.	When circumstances prevent me from achieving an important goal, I find it hard to keep trying				
2.	When an event I am looking forward to is cancelled, I lose the energy to arrange an alternative				
3.	When I don't get what I want, I lose interest in my day-to-day tasks				
4.	If I have been working hard at something I lose motivation if I don't get the reward I deserve				
5.	When something good I am expecting doesn't happen, I feel less enthusiastic about life for a while				

APPENDIX A7

Social Skills Scale

Instructions: For each of the following statements, please tick (✓) in only one box that describes you the best.

Please read each sentence carefully and answer honestly.

S.no.	Question	Never	Sometimes	Frequently	Always
1	I actively/patiently listen to what people have to say				
2	When I realize that it is my mistake I try to make amends with the person				
3	I can lead/manage a team				
4	I appreciate the efforts of others				
5	I am uncomfortable to work in team				
6	I am good at handling conflicts in a group				
7	I can make friends easily				
8	I keep contact with my friends				
9	I take part in group activities				
10	I volunteer to take responsibility				
11	I stand by my decisions				
12	I maintain eye contact during conversations				
13	I take responsibility for my actions				
14	I am open in my expression				
15	I feel uncomfortable when I am in a party or large groups				
16	I communicate easily with others				
17	I can manage social events easily				
18	I have a good sense of humour that keeps others in good spirits				
19	I have long lasting friendships				
20	I see the positive aspects in people				
21	I easily resolve disagreements among others				
22	I am able to inspire individuals				
23	I can nurture relationships				

APPENDIX A8

Protective Factors Scale

This sheet consists of 24 items that are considered strengths in a person. Please read the items carefully and assess how much of strength you derive from each of the items. Rate each of them on a 10 point scale (1-10) by circling the appropriate number provided on the right side of the items. What is the overall advantage of these strengths impacting your life? Give an overall rating between 1 and 10 in the section provided at the end of the sheet.

Items	**Lower strength----------More strength**									
1. Ability to perceive the situation with clarity	1	2	3	4	5	6	7	8	9	10
2. Being patient	1	2	3	4	5	6	7	8	9	10
3. Perceiving one's own self positively	1	2	3	4	5	6	7	8	9	10
4. Ability to express emotions appropriately	1	2	3	4	5	6	7	8	9	10
5.Ability to think positively	1	2	3	4	5	6	7	8	9	10
6. Having a sense of humor	1	2	3	4	5	6	7	8	9	10
7.Ability to apply knowledge productively	1	2	3	4	5	6	7	8	9	10
8. Having confidence in one's own self	1	2	3	4	5	6	7	8	9	10
9. Accepting one's own self with all the strengths and weaknesses	1	2	3	4	5	6	7	8	9	10
10. Sustaining hope at difficult times	1	2	3	4	5	6	7	8	9	10
11. Ability to mobilize resources to solve problems	1	2	3	4	5	6	7	8	9	10
12. Belief in one's own self to successfully accomplish the task	1	2	3	4	5	6	7	8	9	10
13. Getting guided by a set of values	1	2	3	4	5	6	7	8	9	10
14. Perceiving the positive side in everything	1	2	3	4	5	6	7	8	9	10
15. Ability to communicate effectively	1	2	3	4	5	6	7	8	9	10
16. Faith in a supreme power to face problems	1	2	3	4	5	6	7	8	9	10
17. Ability to confront situations in a novel way	1	2	3	4	5	6	7	8	9	10
18. Having physical energy	1	2	3	4	5	6	7	8	9	10
19. Ability to perceive and understand the emotions of others	1	2	3	4	5	6	7	8	9	10
20. Having purpose in life	1	2	3	4	5	6	7	8	9	10
21. Leading a disciplined life	1	2	3	4	5	6	7	8	9	10
22. Ability to understand one's own emotional state	1	2	3	4	5	6	7	8	9	10
23. Taking up any task for its own pleasure	1	2	3	4	5	6	7	8	9	10
24. Ability to think and act appropriately	1	2	3	4	5	6	7	8	9	10
What is the overall advantage of these resources that impact your life?	1	2	3	4	5	6	7	8	9	10

APPENDIX A9

Promoting Factors Scales

Instructions: This sheet consists of 14 items that are considered resources which you receive from the surroundings. On the right side of the sheet, you have 10 columns (1-10) where the lower scores indicate lower advantage and the higher scores indicate higher advantage of such resources. Please read each statement carefully. Decide on its advantage on a score between 1 and 10. Circle the appropriate number that matches with your rating.

Items	**Lower advantage---------- Higher advantage**									
1. Health care facilities within reach	1	2	3	4	5	6	7	8	9	10
2. A close-knit family	1	2	3	4	5	6	7	8	9	10
3. Support from person(s) outside the family	1	2	3	4	5	6	7	8	9	10
4. Supportive friends	1	2	3	4	5	6	7	8	9	10
5. A comfortable financial position	1	2	3	4	5	6	7	8	9	10
6. Democratic parents	1	2	3	4	5	6	7	8	9	10
7. Consistent support from parents	1	2	3	4	5	6	7	8	9	10
8. Emergency services within reach	1	2	3	4	5	6	7	8	9	10
9. A protective parent	1	2	3	4	5	6	7	8	9	10
10. Consistent disciplining by parents	1	2	3	4	5	6	7	8	9	10
11. Living in a supportive community	1	2	3	4	5	6	7	8	9	10
12. Living in a neighborhood that is supportive	1	2	3	4	5	6	7	8	9	10
13. An institutional membership	1	2	3	4	5	6	7	8	9	10
14. An approachable role model	1	2	3	4	5	6	7	8	9	10
What is the overall advantage of these resources that impact your life?	1	2	3	4	5	6	7	8	9	10

APPENDIX A10

Physical Health scale

Instructions: We are conducting a study to measure the physical health status of adolescents. Normally, the physical health of an individual is found to influence and be influenced by a number of factors that are psychological and social in nature. Hence, assessment of physical health is highly significant. This particular questionnaire has 3 parts, part I talks about your health history, part II talks about your health habits, and part III talks about your health experiences.

We wish to state very clearly that there are no standard right or wrong answers for these items. What we need is an honest response depending upon whatever is true in your case. Please remember that the outcome of our research largely depends upon your honest responses. We assure that your responses will be confidential and will be used only for the research purposes.

PART I

Instructions: Please read the following items carefully and put a tick mark (✓) in the column 'Yes' if you are diagnosed with that particular health condition and put a tick mark (✓) in the column 'No' if you do not have the health condition.

S. no.	Health Conditions	Yes	No
1	High Blood Pressure		
2	Type 2 Diabetes		
3	Arthritis		
4	Respiratory Diseases (example; Asthma, Chronic Obstructive Pulmonary Disease, etc.)		
5	Any Chronic Problem related to Digestive system (example: Hyper Acidity, Irritable Bowel Syndrome, etc.)		
6	Any Cardiac related diseases		
7	Any problem related to reproductive system (example: polycystic ovarian syndrome/disease etc.)		
8	Any skin disease (example: psoriasis, eczema, etc.)		
9	Migraine Headache		
10	Any Tumours		

PART II

Instructions: Below are some common habits adolescents are found to adapt. On the right side of the statements you have 4 columns each indicating a frequency (Almost always, Sometimes, Rarely and Never). After reading an item take a few moments to think and assess how frequently you go through the experience described in the statement. In case you experience it quite frequently put a tick (✓) mark in column one (Almost always) against that item. In case you experience it only sometimes you will have to tick (✓) in column two (Sometimes). If you experience what is described in the statement only once in a while you have to tick (✓) in column three (Rarely). Finally if you have not gone through that experience ever you will have to tick (✓) in column four against that item (Never). There are no right or wrong answers. Please respond honestly.

S.no.	Statement	Almost always	Sometimes	Rarely	Never
1	Sleeping for more than 9 hours in a day				
2	Skipping meals in a day				
3	Skipping brushing in a day				
4	Skipping sleep at night				
5	Skipping bath in day				
6	Use of social media for more than 2 hours				
7	Consumption of fast food				
8	Consumption of aerated drinks (example: Coca cola, Pepsi, Sprite etc.)				
9	Sniffing snuff				
10	Sniffing stimulants such as iodex, fevicol, nail polish, petrol etc.				
11	Consumption of khaini				
12	Smoking cigarette, beedi or tobacco related stuff				
13	Chewing paan				
14	Consumption of gutka				
15	Consumption of alcohol				

PART III

We have mentioned below some experiences related to one's physical health. Please read them carefully and assess how frequently you experience what is described in each statement. On the right side of the statements you have 4 columns each indicating a frequency (Almost always, Sometimes, Rarely and Never). After reading an item tale a few moments to think and assess how frequently you go through the experience described in the statement. In case you experience it quite frequently put a tick (✓) mark in column one (Almost always) against that item. In case you experience it only sometimes you will have to tick (✓) in column two (Sometimes). If you experience what is described in the statement only once in a while you have to tick (✓) in column three

(Rarely). Finally if you have not gone through that experience ever you will have to tick (✓) in column four against that item (Never).

S.no.	Statement	Almost always	Sometimes	Rarely	Never
1	I feel energetic				
2	When I wake up in the morning, I look forward to the things I need to do				
3	I wake up with a headache				
4	I do not wake up feeling fresh				
5	I feel lack of appetite				
6	I experience uneasiness in stomach				
7	I suffer from abdominal pain				
8	I have body aches				
9	I feel weak				
10	I feel drowsy				
11	I have back ache				
12	I suffer from eye infection				
13	I feel emptiness in my stomach				
14	I feel heaviness in my head				
15	I have cold/cough				
16	I experience nausea				
17	I suffer from dental problems				
18	I get ulcers in the mouth				
19	I get pain in ear/throat				
20	I suffer from ear infection				
21	I suffer from skin infection				

APPENDIX A11

Family Health Questionnaire

Instructions: Please indicate how much you agree or disagree that the statements below describe your family.

Answer these questionsbased on who you consider to be your family.

Statement	Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree
In my family…					
1. We rarely express affection to each other.					
2. There is a feeling of togetherness.					
3. We care for one another.					
4. We support each other.					
5. We rarely do things together.					
6. The things we do for each other make us feel a part of the family.					
7. We have fun together.					
8. We discuss problems and feel good about the solutions.					
9. Family members pay attention to me.					
10. Overall, I am happy with my relationship with my family members.					
11. I feel safe in my family relationships.					
12. We make a point of being physically active during daily life.					
13. We usually have fresh fruits and vegetables in our home.					
14. We help each other avoid unhealthy habits.					
15. We make a point to follow medical recommendations.					
16. We help each other in seeking health care services when needed (such as making doctor'sappointments).					
17. We help each other make healthy changes.					
18. We stay hopeful even in difficult times.					
19. We have beliefs that give us comfort.					
20. If we needed help from others, we would have real difficulty finding transportation to get to that help.					
21. If we needed outside help, we would <u>not</u> know what sort of help was available.					
22. Financial difficulties would be an obstacle to getting outside help.					
23. We do <u>not</u> trust doctors and other health professionals					
24. A lack of health insurance would prevent us from asking for medical help					
25. We have people outside of our family who we canturn to for help (such as for advice, help with childcare, a ride somewhere, or to borrow some money or something valuable)?					
26. We have people outside of our family we can turn to when we have problems at school or work.					
27. If we needed financial help, we have people outsideof our family we could turn to for a loan					

28. If we needed help, we have people outside of our family who could provide our family with a place to live.					
In the past 30 days…					
29. My MENTAL health or the MENTAL health of myfamily members got in the way of MY FAMILY's normal daily activities					
30. Family worries and problems distracted me when I was working.					
In the past 12 months…					
31. My family did not have enough money at the end of the month after bills were paid.					
32. My family did not have adequate housing.					

APPENDIX A12

Psycho-Social Support Scale

Instructions: Listed below are a few statements. Kindly read them carefully and respond appropriately by giving information regarding the support. You need to read each statement and select by putting a tick (✓) on response from the five options mentioned in columns. For example, For each of the following statements, please tick (✓) in only one box that describes you the best. Please read each sentence carefully and answer honestly.

1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree

S No.	Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	I believe I will remain close to my friends for a long time	1	2	3	4	5
2.	I can go to my friends when I need advice	1	2	3	4	5
3.	I help others without expecting anything in return	1	2	3	4	5
4.	I have long lasting friendships	1	2	3	4	5
5.	My parents/family members support my decisions	1	2	3	4	5
6.	My parents/family members understands my needs	1	2	3	4	5
7.	I am encouraged by my friends and family to follow my dreams	1	2	3	4	5
8.	I don't have friends to spend time with	1	2	3	4	5
9.	My parents give me pocket money	1	2	3	4	5
10.	There is someone to accompany me when I need them	1	2	3	4	5
11.	I feel lonely even in the presence of friends and family	1	2	3	4	5
12.	There are people to listen to me when I need to talk	1	2	3	4	5
13.	My loved ones celebrate my achievements	1	2	3	4	5
14.	When I feel lonely several people come forward to be with me	1	2	3	4	5
15	I express appreciations to others help.	1	2	3	4	5
16	There is no one I feel comfortable to discuss my personal problems	1	2	3	4	5
17	There are several people whose company I enjoy	1	2	3	4	5
18.	I provide support as long as one needs	1	2	3	4	5
19.	Once I start supporting others I continue giving support	1	2	3	4	5
20.	I provide help to others if someone needs	1	2	3	4	5
21.	I help people to get something in return	1	2	3	4	5
22.	I help others without any expectations	1	2	3	4	5

APPENDIX A13

Perceived Physical Environment Scale

Instructions: The scale described below has certain factors related to the physical environment. We are making an attempt to study the physical environment of adolescents. This scale described below has certain items related to your physical environment. Please read each item carefully and indicate how much you are in agreement about that description of physical environment in your case. In case you feel that a statement describes in the scale totally matches with your environment you have to tick (✓) in column one labelled as 'Totally Agree'. In case the described item is more like your environment, then you will have to tick (✓) in column two labelled as 'Agree'. If you find that described item is more unlike your environment you need to tick (✓) in column 3 labelled as 'Disagree'. On the other hand, if a given statement is not at all matching your environment you will have to tick (✓) in column 4 'Totally Disagree'.

We wish to mention clearly that there are no right or wrong answers. Whatever is true in your case is the right answer for you. Therefore we request you to respond to this with utmost honesty. We assure that your responses will be confidential and will be used only for the research purposes.

S.no.	Statement	Totally agree	Agree	Disagree	Totally disagree
1	My residence is spacious				
2	I enjoy a private space in my residence				
3	My home has good ventilation				
4	We have adequate water supply in the residence				
5	There is lack of air flow inside my residence				
6	My residence is dark				
7	The bad smell in and around my residence causes discomfort				
8	The noise from the neighbourhood is disturbing				
9	I feel that my home/residence is crowded with many people living under the same roof				
10	The locality in which I live is congested				
11	The approach road to our locality is not good				
12	The locality of my residence has good street-lights				
13	There is a community park for children to play				
14	Our locality has adequate greenery				
15	Our locality is well connected with good transport facility				
16	There is a good recreation club for the people of the locality				
17	The residents of the community have good relations with each other				
18	The locality of my residence caters to the daily requirements of the household				
19	There is a good medical facility nearby				
20	We live in a secure locality				
21	My residential area has good connectivity through transport to school/college/university				
22	There is a wine shop around our locality				
23	The drainage system in our locality is inadequate				

24	There is a slaughter house around our locality				
25	Our locality suffers from water logging during rainy season				
26	We get the foul smell from some garbage dumping/Industrial emission				
27	We get disturbed with the noise of domestic fights in the neighbourhood				
28	During festivals we are disturbed by loud noise from speakers				
29	We have frequent power cuts/ breakdown in supply of electricity				
30	The roads are dumped with garbage in our neighbourhood				
31	We have good Wi-Fi connectivity				
32	We have poor signals for cell-phones				

APPENDIX A14

Semi-structured Interview

The leading questions are –

i) What are your major sources of stress?

ii) Do you experience any other stressors that are not mentioned in here (Adolescence Stress Scale)?

iii) What do you do when you feel stressed?

iv) How do you feel when you are stressed?

v) How do you cope when you are stressed?

vi) Does experiencing stress impact your physical health and how?

vii) Are you aware of counselling services and mental health resources?

APPENDIX B1

UNIVERSITY OF HYDERABAD

INSTITUTIONAL ETHICS COMMITTEE DECISION LETTER

IEC No. **Application No:**	UH/IEC/2021/174	**Date of review**	21-12-2021
Project Title:	Standardization of Childhood stress scale: Identification of factors contributing to Childhood stress – A Pilot Study		
Principal Investigator/ Co-PI:	PI: Nakka Laxmi Priyanka		
Participating Institutes if any	----	Approval from Participating Institute	----
Documents received and reviewed	Protocol & ICF		
In case of renewal submission of update	----		
Decision of the IEC:	Approved Duration: One year from date of approval		
Any other Comments Requirements for conditional Approval	----		
Members Present	Dr. A.S. Sreedhar, Dr. M. Srinivas, Prof. B. R. Shamanna, Dr. M. Varalakshmi, Sri. A. Madhava Rao, Dr. Stalin Choudary, Prof. Pingali Sailaja, Dr. M. K. Aruansree and Dr. Deepa Srinivas		

Please note:

a. Any amendments in the protocol must be informed to the Ethics committee and fresh approval taken.
b. Any serious adverse event must be reported to the Ethics Committee within 48 hours in writing (mentioning the protocol No. or the study ID)
c. Any advertisement placed in the newspapers, magazines must be submitted for approval.
d. If the conduct of the study is to be continued beyond the approved period, an application for the same must be forwarded to the Ethics Committee.
e. It is hereby confirmed that neither you nor any of the members of the study team participated in the decision making/voting procedures and declared conflict of interest.

A S Sreedhar 21/12/21

Chairman

(Dr. A S Sreedhar)

21/12/21

Member Secretary

(Prof. B. R. Shamanna)

21/12/2021

Convenor

(Dr. M. Varalakshmi)

Address: School of Medical Sciences, University of Hyderabad, C. R. Rao Road, Gachibowli, Hyderabad-5000046
Tel (O): +91-040-23135470/23135471 Email: iec_uoh@uohyd.ernet.in, deanmd@uohyd.ernet.in

APPENDIX B2

UNIVERSITY OF HYDERABAD
SCHOOL OF MEDICAL SCIENCES
CENTRE FOR HEALTH PSYCHOLOGY

F. No. UH/CHP/2021

Date :

To

Sub: Permission for data collection-regarding
Madam/Sir,

N. Laxmi Priyanka, a Research Scholar at Centre for Health Psychology, University of Hyderabad is conducting her study with title "Standardization of Childhood Stress Scale and Identification of factors conuributing to childhood stress" under my supervision. As part of her research she is validating the stress scale for Indian children and identifying contributing factors to stress in children. As a part of this, she has to administer the stress scale, along with thirteen other scales related to the internal and external factors contributing to stress on the students of class □ to □ from your esteemed institution. These scales will be administered in three sessions on three consecutive days with 4 to 5 scales on each day. Her interaction will be class wise. It will not take more than 30 minutes for each class on each day. The collected data will be kept confidential and will be used for only academic purposes. She will be taking written consent from the parents and assent from the children after obtaining due permission from you. The fourteen scales she would administer are enclosed for your reference.

Request your permission to allow Ms. N. Laxmi Priyanka to collect data from your institution.

Thanking you,

Sincerely,
Prof. Meena Hariharan

Centre for Health Psychology

CENTRE FOR HEALTH PSYCHOLOGY
Central University P.O
Gachibowli
Hyderabad-500 046
UNIVERSITY OF HYDERABAD

APPENDIX B3

INFORMED CONSENT FORM

Centre for Health Psychology

University of Hyderabad

Title of the Study : Development and Standardization of Adolescence Stress Scale and Identification of factors contributing to adolescence stress

Investigator : N. Laxmi Priyanka

You are being approached to provide consent for the participation of your child in my study. Before you give consent for your child's participation in this study, it is important that you understand why the research is being done and why you are being approached. Please read the following information carefully to know more about the study and your role in it. Please contact the investigator if you have any questions or if you need more information.

What is the purpose of this study?

Aim of this study is to standardize the adolescence stress scale and identify the factors contributing to stress in them. Your child will be asked to give a rating of stressful events on a 5 point scale. Apart from this your child will also be given eleven other scales related to the internal and external factors contributing to childhood stress. This study will be carried out in four to six sessions for six consecutive days.

What is the role of your child in this study?

Your child is being approached to participate in this study with the purpose of collecting relevant information, as they are school going children with the age between 11 to 18 years. Your child is required to fill in the demographic details and the questionnaires. You child is required to respond to twelve questionnaires, two to three questionnaires in each session. These questionnaires include statements related to experiences, thoughts and behaviors related to stress and it's contributing factors. Your child will have to spend about 30-45 minutes in responding to the questions in each session.

Is the child's participation a must throughout the study?

Please note that your child is free to withdraw from the study at any time they wish to.

Will the response be confidential?

The data collected from your child will be strictly confidential and utilized strictly for research purposes only. Your child's identity will not be disclosed. Your child's name will be converted to a code number and the information provided by them will remain only with the investigator.

Are there any risks involved?

Your child will have no risk in participating in this study.

What are the benefits of participating in this study?

There are no direct benefits of participating in this study and no compensation will be provided to the participants of this study.

I request you to read the above details carefully and understand the nature of this study. In order to seek clarifications for your doubts, you may contact me through the details mentioned below. If you agree for your child to participate in this study, you will be required to sign this consent form. However, your child's participation is voluntary and can withdraw your consent at any point during participation in this study.

Investigator Details:

N. Laxmi Priyanka

Ph.: +91 9177486177

Signature of the Parent/Guardian

Signature of the Witness

APPENDIX B4

INFORMED ASSENT FORM

Centre for Health Psychology
School of Medical Sciences
University of Hyderabad

Title of the Study: Development and Standardization of Adolescence Stress Scale and Identification of factors contributing to adolescence stress

I was explained about the study on the stressful experiences of children and my role in it. My parent (mother/father) has agreed for my participation in the study. I agree to be part of this study

Signature of the student :

Name :

Class :

School :

APPENDIX C1

Original Article

Adolescence Stress Scale: Development and Standardization

Journal of Indian Association for Child and Adolescent Mental Health
1–10

DOI: 10.1177/09731342231173214
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Sage

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Abstract

Background/aim: The objective of the paper was to develop a comprehensive "Adolescence Stress Scale" and to examine different psychometric issues in the development, initial validation, and standardization of this scale.

Method: Exploratory factor analysis was conducted on the data procured from a sample of 634 (11–18 years) school-going adolescents in India.

Results: An exploratory analysis provided a 10 factor structure, namely, major loss induced stress, enforcement or conflict induced stress, phobic stress, interpersonal conflict induced stress, punishment induced stress, illness and injury induced stress, performance stress, imposition induced stress, insecurity induced stress, unhealthy environment induced stress. The 10 oblique factor solutions are found to be interrelated and interdependent with good indices of internal consistency, and content validity.

Conclusions: This scale development is a novel and powerful measure that taps onto various aspects of stress experienced by school-going adolescents. The scale can facilitate researchers, clinicians, and teachers to identify and quantify the significant sources of stress in adolescents in school, or clinic settings.

Keywords

Adolescent psychology, adolescence health, adolescence stress scale, school going adolescents, self-report measure

Introduction

Measurement of stress is of great concern to child and adolescent psychologists, educational psychologists, clinical psychologists, and health psychologists. Stressor is any agent which places a demand higher than the resources available to the target, and thus disturbs the emotional balance bringing an unpleasant response that may be internalized or externalized. Stress is an inevitable part of life, and can be experienced by an individual during any phase of life since birth.

Various global agencies have included different age groups under the umbrella of "childhood." The United Nations Convention on the Rights of the Child[1] defines *child* as "a human being below the age of 18 years unless under the law applicable to the child, majority is attained earlier" and those between the ages of 10 to 19 years are specifically defined as adolescents. This classification is adopted for the purpose of standardizing the Adolescence stress scale.

Experience of stress is a function of severity, duration, and frequency, and these factors determine its impact. Based on these factors, tolerable stress is defined as intense experience of an adversity (stressor) while toxic stress refers to the lasting impact of the stressor.[2] Timely intervention may help in preventing antagonistic impact stretching beyond childhood

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and adolescence into adulthood. Hence, stress experienced by people below 18 years of age requires focus and transparent comprehension. Stress is a debilitating factor affecting the physical and psychological health of adolescents because they are often not well-equipped with the coping skills or linguistic competence that facilitate appropriate expression and ventilation.[3] Left unattended, it may contribute to poor physical and mental health[4–6] as well as behavioral problems such as substance abuse,[7,8] structural damages in the prefrontal cortex,[9] and difficulty in controlling emotions, focusing on tasks, or establishing social relationships due to the neurobiological changes by constant exposure to stressors.[10] Evidence suggests that suicide due to stress is the fourth leading cause of death in 15 to 19 year olds.[11]

When adolescence stress has such a potential threat, its diagnosis and arrest should be priority. Thus, a valid evaluation tool based on the sociocultural context assumes great significance.

In this context, an intense search of available literature brought to light, the nonavailability of standardized Indian scales to gauge stressors faced by Indian adolescents. Research studies focusing on adolescence stress were found to be using different scales of measurement such as the General Health Questionnaire (GHQ), Depression, Anxiety, and Stress Scale, and Mooney's Problem Checklist[12–14] to name a few. Some studies adapted Western scales. The problems faced in such instances include a lack of multidimensionality and a narrow focus on the source of stress.

Many studies focused on the perception of stress faced by adults have estimated the magnitude of stress in proportion to stressful life adaptation. The popular Holmes & Rahe[15] Stress Scale used points to equate life events which evoked stress. Correspondingly, this study uses an eclectic approach to hypothesize distress symptoms in children by condensing a list of stressors that originate from their own responses. This study is an attempt to fill this vacuum in the discourse on childhood stress that have been a major concern not only in India but other developing countries. The sources of stress, the manifestations as well as coping strategies used by adolescents showed significant variations across cultures.[16] Items in a tool may be irrelevant to a culture different from it.[17] Hence, the diagnostic, or assessment tools should preferably be developed to suit the sociocultural structure.

The above facts prompted the authors to develop the Adolescence Stress scale for Indian adolescents in the age group between 11 and 18 years of age.

Research Question

The objectives of the study were to: (a) construct a self-report scale to measure stress in adolescents, (b) assess its underlying structure, and (c) examine different psychometric properties of the scale

Method

Phases in the Development of the Adolescence Stress Scale

The items to measure Adolescence Stress Scale were developed in 3 phases—item construction, validity and reliability testing, and factor analysis.

Phase I—item construction, establishing face validity: Item pooling was done taking inputs from a sample of 982 adolescents between Class 6 to Class 12, from 15 schools in urban and rural areas. They were asked to list 3 major stressors they had experienced, and rate their intensity (how stressful was the experience?) and frequency (how often they experienced it?). The verbatim was transformed to a categorical item and a unified list was developed along with its average rating and frequency. As a result, a total of 94 items emerged. Then, the preliminary set of items were screened by the experts based on an "essentiality clause." A total of 8 experts were involved in this exercise. The recommended content validity ratio (CVR) for each of the item was 0.75 and above.[18] Based on this, 20 items that showed a score of less than 0.75 were discarded. In the next step, items where the frequency of responses was less than 1% were dropped. Under this criterion 18 items were discarded. This reduced the initial version of 94 items to 56 items. This filtration was done to avoid ambiguity, duplication, overlapping, and redundancy.

Phase II—The list of 56 items was then used to formulate a questionnaire with 2 response columns—first, the participants were asked to rate the intensity of the stress between 1 and 5, 1 being least stressful to 5 being most stressful; second, they were asked to record if they have ever experienced the stress recorded through a dichotomous response of "yes" or "no." The intensity rating was aided with a Visual Analogue scale. This was administered on a sample of 643 adolescents between the age of 11 and 18 years belonging to Class 6 (n_1 = 153), Class 7 (n_2 = 109; Class 8 (n_3 = 115), Class 9 (n_3 = 145); Class 10 (n_4 =121).

The data were put through item analysis to examine for reliability using IBM SPSS Statistics 21 (IBM Corp. Released, 2012). Items were removed based on 3 exclusion criteria: (a) if the item had comparatively low item total correlation ($r < 0.3$); (b) if the mean intensity rating of the item was found to be less than 2.5, and (c), if less than 50% of the sample reported having experienced the stressor. This led to the elimination of 4 items of the scale (going to school, waking up early, partiality towards brother or sister, bullying by brother or sister). These items were also qualitatively analyzed and were found to collate in indicative meaning with other items. Hence, it was agreeably evaluated to be removed. Further, the obtained alpha value was found to have good internal consistency as it exceeded the recommended value[19] of 0.70.

Phase III—Emergence of domains through factor analysis: An Exploratory Factor Analysis (EFA) was conducted on the remaining 52 items to identify the underlying structure of the factors composing the Adolescence stress scale.

Sampling

Purposive sampling method was adopted for both the phases by drawing the sample from educational institutions. The participants were Indian school-going children (girls and boys) belonging to class 6 to 10 with age ranging between 11 to 18 years as they were deemed to have the comprehension ability to respond to the various scale development instructions and administration processes and primarily also because they belong to the concerned developmental stage of childhood. The total sample consisted of 1625 adolescents, out of which 982 adolescents participated in phase I and 643 in phase II of the scale development process. Sample size was deemed appropriate as per convenience sampling prospects. As per statistical requirements as well, the sample size was found to be adequate

Procedure

After seeking approval from the institution ethics committee with the application number UH/IEC/2020/228, the investigators initiated data collection. Written informed consent was taken from the parents of the participants and written assent from the participants. The data were collected on a one to one basis in phase I. In phase II of the study, data were collected class-wise in a group setting. In phase I the participants were asked to respond to the open ended questionnaire where they had to write the 3 most stressful experiences of their lives. In Phase II they were asked to carefully read the instructions mentioned in the scale provided to them and asked to read the items carefully and respond in the 2 columns provided. The contents were also read out aloud and any doubts raised by the participants were clarified. There was no collateral information collected from the family or teachers regarding stressors experienced by the participants.

Results

Exploratory Factor Analysis

In order to understand the latent factor structure of the scale, maximum likelihood estimation was computed followed by the promax rotation to increase interpretability of the items accounted for each of the factors which could account for common variance of variables. Promax rotation is oblique in nature that allows factors to be correlated with a quicker solution. The data were first assessed for suitability of factor analysis. The Bartlett's test of sphericity[20] was found to be highly significant ($P < .001$) and the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy value was 0.95, which fulfilled the assumptions to conduct factorability of the matrix.[21] Communalities are represented in Table 1.

Table 1. Communalities for the Initial Items of the Adolescence Stress Scale.

	Communalities	
Initial Item Number	**Initial**	**Extraction**
1	0.389	0.489
2	0.268	0.286
3	0.288	0.307
4	0.224	**0.163**
5	0.381	0.345
7	0.293	0.290
8	0.322	0.324
10	0.256	0.265
11	0.306	0.245
12	0.457	0.440
13	0.481	0.486
14	0.462	0.485
15	0.434	0.500
16	0.424	0.464
17	0.440	0.434
18	0.607	0.652
19	0.649	0.734
20	0.518	0.546
21	0.686	0.754
22	0.488	0.503
23	0.353	0.338
24	0.458	0.602
25	0.369	0.401
26	0.402	0.479
27	0.405	0.387
28	0.433	0.428
29	0.345	0.380
30	0.356	0.316
31	0.246	0.243
33	0.273	0.288
34	0.344	0.395
35	0.486	0.473
36	0.432	0.390
37	0.445	0.518
38	0.448	0.509
39	0.236	**0.184**
40	0.433	0.423
41	0.467	0.479
42	0.463	0.481
43	0.430	0.437
44	0.501	0.541
45	0.499	0.563
46	0.305	0.286
47	0.308	0.346
48	0.275	0.237
49	0.497	0.515
50	0.628	0.753
51	0.474	0.486
52	0.407	0.411
53	0.445	0.437
55	0.402	0.497
56	0.390	0.382

Note: Extraction method—maximum likelihood.

Upon first extraction, it was observed that 22 items had low communalities (lesser than 0.2)[22] and thus, were removed from the scale. The items are Item 4 (Being alone) and Item 39 (Lack of leisure time).

Next, the EFA was run again to extract newer solutions with the 50 items repeating maximum likelihood estimation and promax rotation methods. There was no predetermined number for extraction of factors. Again, the Bartlett's Test of Sphericity was highly significant ($P < .001$), and the KMO measure of sampling adequacy value was 0.95, above the recommended value of 0.6.[23,24] This clearly indicated that the sample was suitable for carrying out factor analysis for validation of the scale. Figure 1 represents the scree plot obtained in the EFA. The item means, standard deviations, and inter item correlation matrix are presented in Table 2. Based on factor extraction, the number of items in the scale was further reduced to 31 items. The mean intensity of the stress scale was marked on a 5-point scale where 1 = least stressful, and 5 = most stressful; the mean for these set of items range from 3.94 (Item: death of grandparent; SD = 1.56) to 2.50 (Item: Alcoholic parent; SD = 1.68).

To determine factor extraction, both scree plot and Kaiser's Eigen value greater than 1 were considered. Although the scree plot showed a demarcation of 6 factors, Eigen values >1 were reported for a 10 factor structure. Coefficients were sorted for size, and suppressed for less than 0.4 factor loadings. Hence, a 10 factor structure was adopted which comprised of 31 items in total.

The items of the scale, the pattern coefficients (factor loadings) are reported in Table 3.

Table 4 reports the variance accounted by each of the factors. The factors themselves were correlated, and thus are deemed interrelated and interdependent. The coefficients are accounted in Table 4.

Factor labelling was done for the 10 factors that were identified through EFA based on their content. Factor 1 (6 items) was labelled as *Major loss induced stress* as the 6 items under this factor describe death of near and dear ones, failure in exams, and incidence of accident. These items refer to either irreversible changes in anybody's life, or major changes that occur upon events of examination failure or accident. These items refer to stressors that require socio-emotional adjustment, and may alter the perception of one's worldview. Factor 2 (4 items) was named "Enforcement or Conflict induced stress" which point to dual forms of intrapersonal stress that arise from forced participation, dealing with academic pressure, or conflicts with an identified romantic partner commonly experienced by adolescents. Factor 3 was named as "Phobic stress," owing to the irrationally founded fears as indicated by the 4 items. Factor 4 (5 items) was named "Interpersonal conflict induced stress" indicate the aspects of distress due to witnessing, or being a part of quarrels with either family or friends. Factor 5 was named "Punishment induced stress" that comprised of 2 items indicative of the fear of punishment. The 6th factor derived from 2 factors was named "Illness & Injury induced stress" denoting the anguish from sickness, disease state, or the trauma of an individual as indicated by the 2 items. The 7th factor (2 items) was categorized as "Performance stress" as the items indicate the stress of performing with excellence in academics as

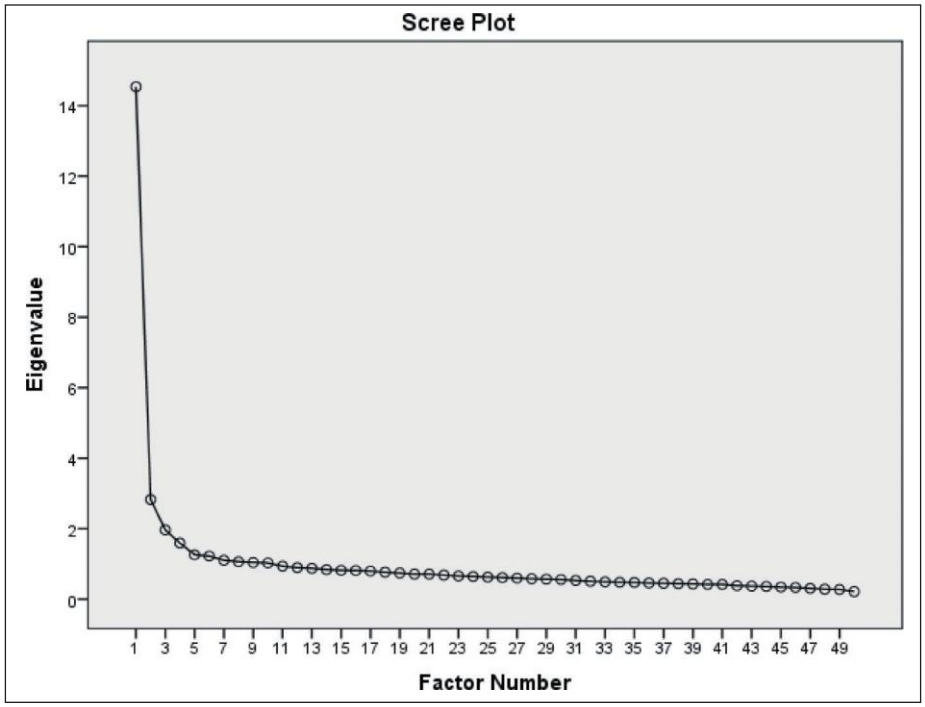

Figure 1. Scree Plot from Exploratory Factor Analysis of the Adolescence Stress Scale Data.

Table 2. Correlation Matrix, Means, and Standard Deviations for the Adolescence Stress Scale.

Item	1	2	3	5	7	8	10	11	12	13	14	15	16	17	18	19	20	21
1	1.00																	
2	0.27	1.00																
3	0.19	0.29	1.00															
5	0.30	0.23	0.24	1.00														
7	0.20	0.26	0.34	0.23	1.00													
8	0.34	0.26	0.21	0.35	0.28	1.00												
10	0.27	0.19	0.20	0.25	0.20	0.22	1.00											
11	0.25	0.12	0.17	0.19	0.23	0.24	0.16	1.00										
12	0.37	0.18	0.25	0.28	0.26	0.28	0.24	0.45	1.00									
13	0.33	0.27	0.29	0.32	0.25	0.27	0.26	0.24	0.43	1.00								
14	0.20	0.23	0.30	0.37	0.30	0.30	0.20	0.20	0.37	0.44	1.00							
15	0.32	0.25	0.22	0.30	0.24	0.29	0.26	0.20	0.31	0.47	0.43	1.00						
16	0.23	0.26	0.24	0.31	0.23	0.25	0.18	0.20	0.34	0.35	0.48	0.45	1.00					
17	0.32	0.27	0.28	0.33	0.28	0.32	0.22	0.31	0.37	0.50	0.36	0.44	0.38	1.00				
18	0.33	0.15	0.22	0.29	0.20	0.28	0.15	0.28	0.40	0.36	0.28	0.28	0.21	0.42	1.00			
19	0.36	0.15	0.23	0.28	0.19	0.26	0.14	0.31	0.46	0.39	0.30	0.30	0.25	0.38	0.65	1.00		
20	0.30	0.17	0.21	0.22	0.21	0.25	0.13	0.27	0.39	0.36	0.28	0.30	0.24	0.34	0.63	0.53	1.00	
21	0.39	0.15	0.24	0.30	0.20	0.31	0.16	0.33	0.48	0.39	0.25	0.29	0.21	0.40	0.63	0.72	0.56	1.00
22	0.33	0.14	0.26	0.35	0.18	0.32	0.16	0.25	0.34	0.32	0.23	0.25	0.24	0.33	0.44	0.50	0.40	0.59
23	0.09	0.12	0.19	0.23	0.18	0.16	0.08	0.16	0.25	0.27	0.25	0.20	0.27	0.27	0.19	0.20	0.19	0.22
24	0.08	0.16	0.20	0.24	0.22	0.19	0.08	0.11	0.20	0.21	0.26	0.14	0.19	0.24	0.14	0.13	0.14	0.16
25	0.07	0.09	0.21	0.22	0.16	0.20	0.11	0.08	0.17	0.20	0.29	0.14	0.24	0.22	0.13	0.16	0.14	0.16
26	–0.01	0.06	0.20	0.28	0.20	0.13	0.13	0.13	0.22	0.31	0.36	0.20	0.27	0.23	0.16	0.15	0.17	0.18
27	0.29	0.16	0.24	0.29	0.21	0.30	0.23	0.25	0.32	0.40	0.32	0.29	0.30	0.37	0.34	0.35	0.25	0.39
28	0.25	0.17	0.21	0.31	0.22	0.29	0.19	0.26	0.37	0.31	0.29	0.27	0.31	0.28	0.38	0.36	0.32	0.41
29	0.12	0.12	0.17	0.24	0.24	0.25	0.15	0.21	0.29	0.22	0.26	0.27	0.32	0.27	0.20	0.26	0.18	0.29
30	0.13	0.21	0.28	0.32	0.30	0.24	0.10	0.16	0.21	0.26	0.27	0.32	0.34	0.30	0.23	0.21	0.24	0.26
31	0.15	0.11	0.22	0.14	0.26	0.16	0.20	0.19	0.18	0.21	0.24	0.16	0.19	0.15	0.10	0.08	0.08	0.11
33	0.07	0.14	0.22	0.17	0.20	0.14	0.24	0.09	0.16	0.16	0.24	0.14	0.20	0.14	0.11	0.09	0.03	0.13
34	0.10	0.13	0.24	0.23	0.19	0.20	0.26	0.23	0.22	0.25	0.24	0.18	0.25	0.20	0.15	0.13	0.13	0.15
35	0.30	0.18	0.28	0.40	0.26	0.37	0.29	0.28	0.37	0.34	0.32	0.34	0.32	0.33	0.34	0.41	0.31	0.41
36	0.24	0.15	0.24	0.36	0.24	0.25	0.19	0.20	0.34	0.34	0.32	0.27	0.28	0.35	0.38	0.37	0.31	0.43
37	0.10	0.17	0.21	0.28	0.26	0.25	0.10	0.20	0.24	0.29	0.27	0.19	0.31	0.24	0.26	0.18	0.24	0.23
38	0.11	0.10	0.21	0.25	0.26	0.20	0.14	0.25	0.29	0.31	0.34	0.24	0.30	0.27	0.27	0.24	0.29	0.26
40	0.11	0.12	0.16	0.23	0.21	0.21	0.17	0.10	0.24	0.29	0.26	0.27	0.24	0.20	0.23	0.25	0.16	0.21
41	0.21	0.15	0.17	0.28	0.20	0.26	0.14	0.26	0.37	0.33	0.30	0.24	0.36	0.30	0.29	0.34	0.30	0.37
42	0.20	0.11	0.27	0.25	0.20	0.29	0.13	0.19	0.31	0.33	0.32	0.26	0.25	0.29	0.47	0.50	0.39	0.48
43	0.18	0.13	0.18	0.31	0.25	0.29	0.17	0.22	0.28	0.30	0.31	0.23	0.29	0.28	0.28	0.29	0.25	0.26
44	0.20	0.05	0.17	0.34	0.25	0.29	0.22	0.22	0.33	0.33	0.27	0.29	0.33	0.32	0.35	0.34	0.27	0.36
45	0.25	0.09	0.21	0.32	0.21	0.31	0.28	0.22	0.31	0.31	0.30	0.28	0.32	0.25	0.31	0.28	0.29	0.31
46	0.15	0.20	0.20	0.23	0.24	0.19	0.17	0.16	0.19	0.23	0.27	0.18	0.24	0.23	0.12	0.11	0.06	0.17
47	0.14	0.07	0.13	0.21	0.11	0.17	0.23	0.19	0.22	0.24	0.21	0.18	0.17	0.20	0.20	0.28	0.16	0.25
48	0.05	0.12	0.13	0.18	0.18	0.16	0.14	0.11	0.18	0.19	0.19	0.14	0.25	0.22	0.15	0.14	0.11	0.18
49	0.29	0.15	0.18	0.31	0.18	0.30	0.16	0.29	0.39	0.43	0.35	0.29	0.30	0.35	0.43	0.44	0.45	0.44
50	0.34	0.09	0.21	0.29	0.22	0.30	0.19	0.34	0.48	0.39	0.26	0.24	0.24	0.33	0.51	0.50	0.44	0.60
51	0.28	0.17	0.20	0.26	0.23	0.31	0.19	0.24	0.36	0.35	0.26	0.22	0.25	0.31	0.40	0.40	0.32	0.44
52	0.07	0.13	0.23	0.16	0.22	0.18	0.09	0.20	0.27	0.24	0.31	0.14	0.25	0.23	0.26	0.24	0.25	0.28
53	0.37	0.21	0.23	0.33	0.28	0.31	0.23	0.23	0.36	0.41	0.34	0.33	0.33	0.35	0.31	0.39	0.31	0.39
55	0.13	0.15	0.20	0.21	0.19	0.19	0.10	0.13	0.18	0.21	0.23	0.10	0.21	0.21	0.15	0.16	0.19	0.19
56	0.17	0.18	0.22	0.28	0.20	0.19	0.15	0.19	0.29	0.26	0.27	0.28	0.33	0.27	0.24	0.25	0.17	0.29
M	2.55	2.66	2.64	3.06	2.91	2.82	2.58	2.53	3.10	3.22	3.09	2.87	2.68	3.06	3.80	3.57	3.94	3.62
SD	1.68	1.45	10.47	1.59	1.40	1.56	1.56	1.55	1.63	1.61	1.45	1.61	1.55	1.63	1.66	1.76	1.56	1.80

(Table 2 continued)

(Table 2 continued)

Item	22	23	24	25	26	27	28	29	30	31	33	34	35	36	37	38	40	41
22	1.000																	
23	0.20	1.00																
24	0.24	0.44	1.00															
25	0.19	0.35	0.45	1.00														
26	0.22	0.29	0.38	0.41	1.00													
27	0.42	0.25	0.28	0.30	0.29	1.00												
28	0.43	0.23	0.24	0.20	0.27	0.42	1.00											
29	0.27	0.25	0.24	0.21	0.29	0.28	0.44	1.00										
30	0.29	0.23	0.25	0.27	0.27	0.30	0.31	0.35	1.00									
31	0.19	0.18	0.21	0.20	0.17	0.21	0.18	0.20	0.21	1.00								
33	0.14	0.19	0.21	0.22	0.22	0.27	0.23	0.21	0.24	0.29	1.00							
34	0.20	0.16	0.16	0.15	0.31	0.26	0.31	0.25	0.26	0.26	0.31	1.00						
35	0.42	0.27	0.26	0.25	0.32	0.39	0.43	0.38	0.39	0.23	0.27	0.39	1.00					
36	0.36	0.32	0.21	0.22	0.31	0.30	0.33	0.29	0.30	0.17	0.19	0.29	0.41	1.00				
37	0.27	0.35	0.28	0.26	0.29	0.26	0.26	0.25	0.29	0.26	0.24	0.23	0.33	0.44	1.00			
38	0.30	0.31	0.29	0.25	0.30	0.29	0.27	0.28	0.29	0.26	0.24	0.21	0.34	0.31	0.52	1.00		
40	0.24	0.25	0.20	0.21	0.34	0.28	0.32	0.34	0.26	0.24	0.28	0.32	0.39	0.34	0.30	0.38	1.00	
41	0.35	0.25	0.27	0.30	0.32	0.38	0.34	0.35	0.32	0.23	0.23	0.29	0.41	0.39	0.40	0.46	0.42	1.00
42	0.42	0.27	0.27	0.22	0.23	0.33	0.30	0.21	0.27	0.19	0.16	0.27	0.38	0.36	0.34	0.34	0.28	0.37
43	0.30	0.29	0.34	0.33	0.33	0.30	0.30	0.29	0.32	0.25	0.24	0.30	0.39	0.39	0.37	0.39	0.40	0.39
44	0.38	0.29	0.25	0.25	0.39	0.40	0.32	0.29	0.33	0.20	0.21	0.30	0.45	0.35	0.32	0.33	0.43	0.39
45	0.40	0.25	0.23	0.21	0.32	0.42	0.38	0.26	0.30	0.21	0.18	0.33	0.41	0.34	0.31	0.35	0.39	0.39
46	0.19	0.23	0.19	0.25	0.27	0.27	0.29	0.20	0.20	0.21	0.25	0.30	0.26	0.27	0.18	0.18	0.33	0.26
47	0.21	0.18	0.13	0.18	0.17	0.27	0.28	0.17	0.20	0.16	0.19	0.29	0.34	0.32	0.19	0.18	0.28	0.31
48	0.21	0.29	0.23	0.24	0.27	0.25	0.27	0.24	0.28	0.18	0.17	0.20	0.21	0.25	0.22	0.25	0.27	0.37
49	0.41	0.23	0.23	0.23	0.30	0.35	0.37	0.26	0.29	0.18	0.17	0.26	0.43	0.37	0.31	0.33	0.31	0.41
50	0.50	0.24	0.24	0.23	0.27	0.41	0.41	0.31	0.30	0.18	0.15	0.25	0.43	0.40	0.30	0.31	0.32	0.43
51	0.39	0.28	0.25	0.22	0.27	0.33	0.36	0.30	0.27	0.16	0.17	0.26	0.43	0.41	0.32	0.28	0.28	0.37
52	0.30	0.31	0.23	0.29	0.29	0.24	0.30	0.24	0.27	0.32	0.23	0.26	0.30	0.33	0.36	0.34	0.37	0.39
53	0.39	0.28	0.29	0.19	0.24	0.34	0.36	0.28	0.29	0.23	0.16	0.27	0.39	0.37	0.26	0.26	0.32	0.38
55	0.19	0.32	0.51	0.38	0.30	0.24	0.16	0.17	0.22	0.19	0.20	0.15	0.23	0.25	0.25	0.29	0.22	0.28
56	0.32	0.28	0.25	0.23	0.30	0.33	0.30	0.28	0.35	0.26	0.29	0.33	0.33	0.40	0.32	0.29	0.36	0.41
M	3.42	2.72	2.91	2.59	3.13	3.00	3.00	2.63	3.23	2.44	2.28	3.04	3.44	3.58	3.21	3.12	3.17	3.12
SD	1.66	1.53	1.64	1.59	1.58	1.56	1.52	1.45	1.48	1.51	1.47	1.52	1.55	1.55	1.52	1.54	1.59	1.62

Item	42	43	44	45	46	47	48	49	50	51	52	53	55	56
42	1.00													
43	0.42	1.00												
44	0.40	0.41	1.00											
45	0.33	0.36	0.58	1.00										
46	0.21	0.26	0.28	0.35	1.00									
47	0.31	0.28	0.25	0.31	0.25	1.00								
48	0.22	0.22	0.25	0.27	0.29	0.23	1.00							
49	0.39	0.38	0.38	0.38	0.21	0.29	0.27	1.00						
50	0.41	0.37	0.46	0.42	0.25	0.26	0.27	0.61	1.00					
51	0.39	0.38	0.41	0.40	0.23	0.30	0.25	0.48	0.59	1.00				
52	0.33	0.37	0.34	0.32	0.26	0.26	0.29	0.38	0.40	0.39	1.00			
53	0.40	0.35	0.37	0.45	0.27	0.27	0.20	0.39	0.44	0.41	0.35	1.00		
55	0.28	0.41	0.25	0.26	0.19	0.23	0.21	0.27	0.30	0.32	0.31	0.28	1.00	
56	0.29	0.35	0.36	0.37	0.27	0.32	0.27	0.32	0.38	0.35	0.32	0.37	0.30	1.00
M	3.42	3.28	3.45	3.16	2.56	2.85	2.63	3.64	3.55	3.28	3.13	3.06	3.24	3.20
SD	1.66	1.60	1.54	1.54	1.56	1.69	1.54	1.60	1.75	1.70	1.59	1.58	1.74	1.59

Note: M and SD refer to the Mean and Standard Deviation of the given items.

well as other activities. The 8th factor (2 items) was labelled "Imposition induced stress" as the items were indicative of stress arising from obligatory or forced participation in activities. The 9th factor (3 items) is called "insecurity induced stress" as it harnesses the feelings of physical separation related distress, and also feelings of being unsafe, or subject to wrongful contact, or sexual harassment. The last and 10th factor was a single item measure labelled as "Unhealthy

Table 3. Pattern Matrix for Maximum Likelihood with Promax Rotation of 10 Factor Solution of Adolescence Stress Scale.

Final Item Number and Content	Pattern Coefficients
Factor 1	
Item 19	0.898
Item 18	0.839
Item 21	0.833
Item 20	0.685
Item 42	0.523
Item 22	0.446
Factor 2	
Item 47	0.714
Item 34	0.476
Item 40	0.467
Item 56	0.415
Factor 3	
Item 24	0.909
Item 55	0.719
Item 25	0.620
Item 23	0.448
Factor 4	
Item 15	0.741
Item 16	0.634
Item 14	0.590
Item 13	0.551
Item 17	0.468
Factor 5	
Item 3	0.513
Item 7	0.423
Factor 6	
Item 37	0.774
Item 38	0.629
Factor 7	
Item 45	0.610
Item 44	0.496
Factor 8	
Item 29	0.610
Item 28	0.421
Factor 9	
Item 50	0.731
Item 49	0.487
Item 51	0.409
Factor 10	
Item 1	0.534

Note: Extraction method—maximum likelihood; Rotation method—Promax with Kaiser normalization, rotation converged in 22 iterations.

environment induced stress" because it represented an inconducive scenario of being with an alcoholic parent.

The subscale scores were cumulatively calculated by summing up the item scores of each of the factors. The internal consistency of the entire set of 31 items ($\alpha = 0.92$) was higher than that of the individual subscales ($\alpha = 0.87$ for Major loss induced Stress; $\alpha = 0.65$ for Enforcement, or Conflict induced Stress; $\alpha = 0.73$ for Phobia induced stress; $\alpha = 0.79$ for Interpersonal conflict induced Stress; $\alpha = 0.51$ for Punishment induced stress; $\alpha = 0.69$ for Illness and Injury induced stress; $\alpha = 0.73$ for Performance stress; $\alpha = 0.61$ for Imposition induced stress, and $\alpha = 0.79$ for Insecurity induced Stress). The reliability coefficients for each subscale were found to be within acceptable norms for individual diagnosis.[25]

Reliability and Validity Testing

For the final scale with 31 items test-retest reliability was calculated using the Pearson correlation coefficient. The 3-week test-retest reliability was 0.57 with correlation significant at the .01 level. To establish the concurrent validity of the scale Children's happiness scale[26] and GHQ-12[27] (Goldberg & Williams, 1988) were used. Adolescence stress scale was negatively correlated with Happiness scale with *r* value of –0.20 and positively correlated with *r* value of 0.29 with GHQ-12. Both the correlations were found to be significant at .01 level.

To compare the 10 subscale scores, a one-way repeated measures ANOVA was carried out. The results, as reported in Table 5, revealed a significant difference across the 10-factor scores' means, $F(9,5778) = 68.48$, $P < .001$, $h^2 = 0.096$.

Discussion

The main objective of the study was to develop a holistic self-report scale that measures stress experienced by adolescents and the different psychometric issues related to scale development.

The findings indicate that the adolescence stress scale has high internal consistency. Further, a 10 factor structure—Major loss induced stress, Enforcement or Conflict induced stress, Phobic stress, Interpersonal conflict induced stress, Punishment induced stress, Illness & Injury induced stress, Performance

Table 4. Reliability Estimates for 10 Factors of the Scale.

Scale Reliability Estimate	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8	Factor 9	Factor 10
Number of Items	6	4	4	5	2	2	2	2	2	1
Coefficient alpha	0.87	0.65	0.73	0.79	0.51	0.69	0.73	0.61	0.79	NA
Percentage of explained variance	29.07	5.66	3.93	3.18	2.52	2.44	2.21	2.13	2.08	2.05

Table 5. Mean, Standard Deviations, and One-Way Repeated Measures ANOVA.

Factors	*M*	*SD*	F(9,5778)	h^2
Factor 1	3.63	1.31	68.48***	0.096
Factor 2	3.06	1.12		
Factor 3	2.86	1.21		
Factor 4	2.98	1.16		
Factor 5	2.77	1.18		
Factor 6	3.16	1.34		
Factor 7	3.31	1.36		
Factor 8	2.81	1.26		
Factor 9	3.49	1.41		
Factor 10	2.55	1.68		

stress, Imposition induced stress, Insecurity induced stress, and Unhealthy environment induced stress—have been identified as the major stressors faced by adolescents. The 10 factors were found to be interrelated and interdependent with good markers of internal consistency and content validity.

Contingent to the portfolio of theories that justify the origin, and persistence of childhood traumatic stress disorder,[28] this scale development is a novel and powerful measure that taps onto the various aspects of stress experienced by adolescent-aged school-going children. This scale is also gender neutral which means that it is applicable for both boys and girls. In terms of comprehensibility, this scale is precise, easy to understand, and is not at all cumbersome to administer or score. The scale can facilitate researchers, clinicians, and teachers to identify the broad area(s) of stress and be able to quantify it in school or clinic settings. A norm of the scale needs to be developed for better interpretability and gender-dependent perspectives.

This study may not be generalizable to all cultures. This scale is also gender neutral which means that it is applicable for both boys and girls. The scale's main limitation is that it has been developed from the accounts of school-going adolescents only who were able to literally express their anguish. It does not capture the experiences of non-school goers. Another limitation is that participants may fail to retrieve past events accurately while naming stressors and assessing their severity, resulting in recall bias and the stressors being unnoticed.

These limitations do not overpower a well-defined structure and good reliability estimates established in this study. It is encouraged to utilize this scale in research and clinical practice to establish a variety of psychometric properties for this scale. The scores need to be assessed for stability and evaluated for its predictive property to various measures. In future it is also advisable to study the coping strategies of adolescents facing these stressors in order to understand the complete mechanism of stressor and response.

Summary

Current study reports on the development of a scale to measure the stress levels in adolescents and its psychometric properties. The adolescence stress scale provides an opportunity to clearly understand the stress levels and sources of stress in adolescents of age 11 to 18 years. A 10 factor structure was identified, namely, Major loss induced stress, Enforcement, or Conflict induced stress, Phobic stress, Interpersonal conflict induced stress, Punishment induced stress, Illness & Injury induced stress, Performance stress, Imposition induced stress, Insecurity induced stress, Unhealthy environment induced stress. This scale can be used in clinical settings, hospitals, and schools contributing to the various branches of psychology such as health psychology, developmental psychology, and school psychology.

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Declaration of Conflicting Interests

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Ethical Approval

Ethical approval was obtained from the Institutional Ethics Committee with application number UH/IEC/2020/228.

Informed Consent

Permission was obtained from the schools. Informed consent was obtained from the parents of the participants and informed assent was obtained from the children.

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Appendix

Adolescence Stress Scale

Instructions

We have prepared a list of situations which are identified as stressful by students from 5 to 18 years of age (ranging from Class 1 to University level). We are in the process of developing a measurement for the stressful situations described in the list. We request your responses to help us develop the measurement of stress.

All that you have to do is read each situation, understand it, assess the intensity of stress it causes, and give it a rating based on your judgment of intensity of the stress.

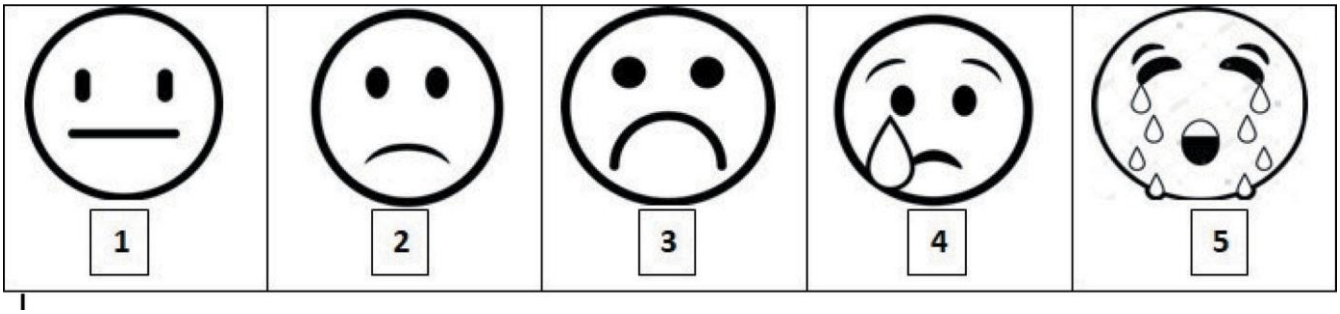
You need to assess each stressful situation on a 5 point scale. Supposing death of a parent is the most stressful situation, getting a rate of 5, what will be the rating for each of the items listed below? After you finish giving your rating, go to second column, and tick those ratings which you have experienced in your life.

Participant's details

Gender: **Class:**

ID No.
(to be filled by investigator)

Age: **School/College/University:**



S. No.	Stressors	Your Rating	Have You Experienced It in Your Life? Yes or No
1	Alcoholic parent (drinking problem)		
2	Beating by teacher		
3	Quarrel between parents		
4	Quarrel with friends		
5	Quarrel with parents		
6	Quarrel with brother or sister		
7	Quarrels in family		
8	Death of a family member		
9	Death of friend		
10	Death of grandparent		
11	Death of parent		
12	Failure in exams		
13	Fear of animals		
14	Fear of dark places		
15	Fear of hospitals		
16	Forced to do disliked task		
17	Forced to participate in an activity		
18	Being punished		
19	High academic pressure		
20	Ill health of self		
21	Injury to self		
22	Lack of sleep		
23	Meeting with an accident		
24	Not meeting academic expectations (self or others)		
25	Not meeting expectations in other activities (self or others)		
26	Problems with girlfriend or boyfriend		
27	Separation from loved ones (grandparents/cousins/friends)		
28	Separation from parent		
29	Someone touching me wrongly		
30	Fear of ghosts, etc.		
31	Not getting what you had asked for		

Factor 1: Major loss Induced Stress (items 8, 9, 10, 11, 12, and 23)
Factor 2: Enforcement or Conflict induced stress (items 19, 22, 26, and 31)
Factor 3: Phobic stress (items 13, 14, 15, and 30)
Factor 4: Interpersonal conflict induced stress (items 3, 4, 5, 6, and 7)
Factor 5: Punishment induced stress (items 2 and 18)
Factor 6: Illness & Injury induced stress (items 20 and 21)
Factor 7: Performance stress (items 24 and 25)
Factor 8: Imposition induced stress (items 16 and 17)
Factor 9: Insecurity induced stress (items 27, 28, and 29)
Factor 10: Unhealthy environment induced stress (item 1)

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Development and Standardization of Adolescence Stress Scale and Identification of Psychosocial Factors Contributing to Adolescence Stress

by Nakka Laxmi Priyanka

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