EFFICACY OF LAUGHTER YOGA ON RESILIENCE, EMOTIONS AND PERCEIVED STRESS AMONG DISADVANTAGED FEMALES

A Thesis

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DECLARATION

I the undersigned solemnly state that the thesis entitled "Efficacy of Laughter Yoga on Resilience, Emotions and Perceived Stress among Disadvantaged Females" has been prepared and compiled by me under the guidance of Dr. Komal Rai, Assistant Professor, Psychology, Lovely Professional University. I would also like to assure that no part of this thesis has ever been submitted for basis of the award of any degree/diploma/fellowship. The work and the study contained is original and has been carried out by me with general guidance of my supervisors.

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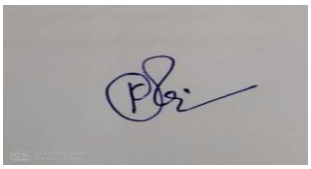
I certify that Harshita Ahuja has prepared her thesis, under my guidance, entitled "Efficacy of Laughter Yoga on Resilience, Emotions and Perceived Stress among Disadvantaged Females" for the award of PhD degree from Lovely Professional University. She has carried out the work at the Department of Psychology, Lovely Professional University.



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ABSTRACT

Unless we live a truly charmed life stress is inevitable and so are emotions. Every one of us feels emotions both positive and negative and each one of has felt stress more often than not. Similarly, we all wish to reduce stress and negative emotions to the maximum and increase positive emotions. Life can be a roller coaster ride and being resilient means being able to bounce back after adversities. A lot of ways and means and interventions are explored for the same. One of the most economical interventions can be laughter yoga.

Laughter Yoga is a unique form of exercise program that involves the use of simulated laughter, childlike playfulness and breathing exercises (Laughter Yoga International, 2017). It includes standard steps and procedure that starts with warming up, clapping, chanting and laughter exercises (foundation exercises were used). This followed by second step of laughter meditation and finally guided relaxation. Thus, making use of laughter which is rather natural and ubiquitous to human beings makes it an economical intervention. Its success can make it a really good tool specially for those who cannot afford expensive therapies.

Much research is done in the field of laughter yoga. However, most of it is limited to hospital setting measuring biological and physiological markers of psychological phenomenon like stress and depression or are carried out with elderly or in organizations. There has been no research with disadvantaged females (socially and economically disadvantaged). Neither has there been an attempt to investigate its impact on resilience (apart from few odd studies like one with military graduates). Most surprisingly, there is a dearth of systematic attempt to study laughter yoga in India which is ironic a condition to happen in the very land where laughter yoga was born. Laughter Yoga is more popularly accepted than popularly researched and popular acceptance is different from its genuine efficacy until and unless supported empirically. Thus, before its widespread canvassing research becomes imperative.

It is well known that how stress is related to factors like gender and economic status in India. In India, studies have reflected that woman are twice more prone than men to go

through depression (Patel, 1999 as cited in Rao, Vanguri & Premchander, 2011). And variables like poverty, deprivation, social class, are responsible for this augmented gender susceptibility (Patel, et al., 1999). In studies across India, Haiti, Ghana, Tanzania and Philippines it was seen that stress was mainly contributed by poor levels of natural, material, and infrastructure resources. (Bull and Kanyeka, 2013). Thus, this reflects a need for measures and attempt to redress this issue in the most effective way possible.

The aim of this study was to investigate the influence of laughter yoga intervention on stress, emotions and resilience among disadvantaged women. Using a mixed-methods approach the study's objective was to gauge the efficacy of laughter yoga on perceived stress, negative and positive emotions, resilience, laughter quotient and self- reported state of mind and body. Thus, for qualitative method, semi-structured interview was used along with conducting a field experiment using before and after within group design. Thus, the sample was randomly divided into experimental or control group. The experimental group engaged in standard laughter yoga sessions for one month (twice a week for 30 minutes each) carried out by a trained and certified laughter yoga leader while the control group carried out their regular schedule wherein care was taken that they did not engage in any other exercise or psycho-social intervention that could act as a confounding variable. Before the intervention a baseline measure of their perceived stress was recorded (PSS Perceived Stress Scale) as originally developed (Cohen, Kamarck, & Mermelstein, 1983). However its Hindi version has been used for population in this study (Pangtey, Basu, Meena, & Banerjee, 2020) Similarly, a baseline measurement of their level of positive and negative emotions was measured using Positive and Negative Affects Schedule Hindi PANAS H (Pandey & Srivastava, 2008) which was originally developed by David Watson, Anna Clark, & Tellegen and resilience using Connor-Davidson Resilience Scale Hindi Version CD RISC (Connor & Davidson, 2003) and Laughter Quotient using laughter quotient form and perceived state of mind and body using How Do You Feel Form (Laughter Yoga International, 2017). These were then again measured after the intervention to see the difference before and after. Also, using semi- structured interview before and after the intervention helped get a deeper and richer understanding of the participants.

Due to the non-normality of the data non-parametric tests were used to measure whether the differences were real or occurred by chance. Therefore, difference between before and after the intervention was measured using Wilcoxon-Signed rank test (equivalent of paired t-test) and to gauge the significance of difference between experimental and control group both before and after the intervention Mann Whitney U test was used (equivalent of independent t-test). A non-significant difference between control group and experimental group before the intervention implied both being equal at baseline measure that is on an average having similar perceived stress, emotions and resilience and significant difference after the intervention was a clear indication of the difference being attributed to the intervention.

A significant difference was found between experimental and control group on perceived stress, positive affect, negative affect, resilience and laughter quotient after the intervention ($p<.001$). Similarly, a significant difference was found before and after the intervention on positive affect, negative affect perceived stress and laughter quotient ($p<.001$) and resilience ($p= .013$). Interestingly, a significant increase in positive emotions and decrease in negative emotions ($P<.001$ respectively, using Wilcoxon sign rank test) was seen in both who showed high level of perceived stress at baseline and who showed average to below average level of perceived stress. This implied the success of laughter yoga in upliftment of emotional state among both stressed and less/non-stressed pointing out its utility for all. Thus, these results support the hypothesis and proves the positive impact laughter yoga can have on one's perceived stress, emotions, laughter quotient and resilience. The qualitative data from the interview responses align with the same and support the positive impact of laughter yoga. It is clear from the responses that there was a positive change in their emotionality and coping. Although, their problems did not reduce (with exception of one participant who believed that this helped her reduce her actual problem too) but their coping became more adaptive (perhaps, making them more resilient). All four participants reported how they hardly laughed before the intervention, how they doubted this program (even terming it 'stupid') and then how ultimately, they did laugh that to unstoppably. This clearly indicates that laughter yoga can increase a person's ability to laugh. It can improve one's coping if not resolve the issue and, in that sense, build resilient individuals. Another bone of contention may be someone's argument on this being a

mere placebo effect, which is where the findings from quantitative data from experimental design (using control group and baseline measurements) defend and solidify the qualitative findings. In a nutshell, the efficacy of laughter yoga is well established in terms of its effectiveness in reducing perceived stress and negative emotions and increasing positive emotions, resilience, ability to laugh and overall coping.

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Accomplishment of my present work entitled “Efficacy of Laughter Yoga on Resilience, Emotions and Perceived Stress among Disadvantaged Females” would have been impossible without the unending support of so many. First and foremost, I will like to express my sincerest and heartfelt gratitude to my guide Dr Komal Rai. She not only guided me with the research work as would be her role but also ensures her students emotional well-being and is a source of motivation. This has helped me finish my work successfully.

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Harshita Ahuja

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CHAPTER 1 INTRODUCTION

1.1 Laughter

“Let’s Ho Ho, Ha Ha, for laughter can heal! Surreal or is that for real? What can be better or more economical than to tap this laughter to heal broken hearts and envisage a new start? Thus, through Laughter Yoga intervention this research holds much potential to impart, to heal hurt and avert the adverse influences of stress and strain among those who are unheard.

Laughter is ubiquitous in human species and the scope of this research extends to facilitate the flow of this ubiquitous laughter through laughter yoga with the aim to investigate the resultant increase in resilience, perceived stress and negative emotions and increase in positive emotions towards the goal of positive experience, positive individual traits and positive institution (3 pillars of Positive psychology)

Definitive description of laughter has never been easy owning to it’s chameleon and multifaceted explanation. It may be seen as a response to environmental occurrences or reflection of state of internal activation. It is both reflex and psychosomatic in nature. But the picture is not so simple because laughter can also be a voluntary reaction to a situation or a manifestation of psychopathology.

The idea of Laughter as release of surplus energy followed by release of tension is an old one, further supported by Spencer. (Spencer, 1860) Sigmund Freud has mentioned laughter as an outlet for discharging psychic energy. According to him the inhibited tendencies cause tension which is released in the form of jokes (morally acceptable and innocent form of release) and he linked laughter with gain of lust in this process of release of tension in the garb of jokes (Freud, 1960). This adds to the explanation of laughter but not all laughter can be explained psycho dynamically neither can all have sexual content.

Our feelings trigger discharge of nervous energy to muscular system and it triggers the articulatory and vocal systems along with system that expel air from lungs. (Spencer, 1860) In general it is triggered by all kinds of intense mental and physical feelings. According to Spencer laughter is manifestation of muscular excitement which is different from other muscular action in terms of its purposelessness. Children express by claps while adults may slap their knee, rub hand and sway body back and forth (Spencer, 1860).

The word "laugh" originated from old English hliehhan. Keeping aside its variation, laughter is a series of short, repetitive, syllables that boil down to "ha- ha" "ho- ho" or "he- he" in English. This laughter is universal and genetic and thus common to all creatures (Provine, 2000).

Use of laughter to induce more laughter is common and became evident in use of laughter tapes or laughter tracks in comedy shows. Interest is laughter is not novel. It is documented in ancient philosophical writings. One such theory comes from Plato who rather was a critic of laughter. He emphasized on the negative influence of laughter. According to him laughter was a vice (Plato, 4 B.C).

Aristotle and Hobbe had a similar line of thought wherein they associated laughter with superiority over others (Provine, 2000).

History of empirically understanding laughter is relatively new, about 100 years old. Such studies began with the advent of experimental psychology. Such studies include study of trickle down by G. Stanley Hall in 1897, memory for funny material laugh provoking stimuli, laughter development, introspection of the humorous (Heim, 1936; Kamboropoulou, 1930; Washburn, 1924; Wilson, 1931 and Martin, 1904 as cited in Provine, 2000)

Humans are not the only one known for laughter. Laughter is also studied in chimpanzees. Although their laughter responses include more of panting than human "ho-ho" or "ha-ha" but have sonic bursts at regular intervals making them alike (Provine, 2000).

Contagious Laughter

One peculiar nature of laughter is its contagiousness. Laughter spreads. And History is replete with incidents that support the claim. Laughter epidemic have affected various communities in the past. One such incident occurred in Tanganyika (now Tanzania) in 1962. It began with laughter of 3 girls which swiftly spread to 95 of 159 students in a Mission run girl's boarding school. This led to a temporary closure of the school. It was not late before the girls who went home spread it further in Nshamba area. A similar outbreak happened in Ramashenye Girls's middle school in Bukoba area. It all boiled down to affecting 14 schools and 1000 people of various tribes. It was concluded with a psychogenic origin rather than possibility of toxicity or encephalitis. The behavioral chain response reflects the role of neural mechanism in laugh epidemics, which is similar to ones involved in yawning, probably cry and coughing (Provine, 2000).

Such contagious laughter was not confined to African schools, but was also seen in forms of 'holy laughter' in churches. Times Magazine's, 1994 article titled 'Laughter for Lord' is evidence of the famed laughing revivals among groups including Anglicans (Time Magazine, 1994 as cited in Provine, 2000). This perhaps enhanced their bonding and physiological changes were attributed to the divine.

The contagious nature of laughter is not just evident from such mass behavior but also evident in the laughing tracks used to augment audience laughter. Could their potency be equated to what the subliminal messages do? Perhaps.

A German Tavern keeper and his wife featured in a laugh record called "The Okeh Laughing Record". Their contagious laughter interrupts a solo trumpet. Its sweeping success worldwide is an assertion of the pervading universality of laughter. Movie like Mary Poppins also featured laugh songs 'I live to laugh' which hints at the contagious nature of laughter (Provine, 2000).

The contagion and universality of laughter can be demonstrated by use of laugh boxes. These boxes meant laughter at a press of a button and not having to rely on jokes or humour for eliciting laughter. This points to a very important characteristic of human laughter; i.e. laughter produces/ can produce laughter (Provine, 2000). This very

principle is used as the basis of laughter yoga philosophy which will be explored at length shortly.

Laugh boxes came in various forms. The huge success of Elmo Doll ($30) highlights the appeal and demand of laughter stimulus (Provine, 2000)

Development Of Laughter

Laughter is considered to begin between sixth and eighth week when child is born (Gewirtz, 1965; Washburn, 1929 as cited in Askensey, 1987). Whereas, other authors regard its beginning after five weeks (Izard, 1997).

The Physical Nature Of Laughter

Laughter manifests in form of some physical markers of which location in face is central. Smiling and laughter overlap with respect to these patterns which differ only in intensity and degree (Lorenz, 1963; Young, 1973). According to Spencer (1860) smile is elicited by weaker stimulation whereas stronger excitation or stimulation uses other muscles and results in laughter. Relief theorists emphasize on physiological nature of laughter, seeing laughter as release of excess nervous energy. One of the pioneers of this school of thought was Sigmund Freud who believed that laughter is synonymous with release of tension thus it saves psychic energy. (Freud, 1960)

Acoustic Analysis Of Laughter: -

The research to understand acoustic of laughter involves studying laughter recordings. Robert Provine and Yvonne Young, (1991) analyzed laugh samples of 51 respondents using a sound analyzer/ sound spectrograph, wherein laughter could be seen as composed of vowels like syllables “ha”, “ho” and “he” with a $1/15^{th}$ second duration, with spacing of ½ seconds.

Also, what they learned was homogeneous relativity trend of the syllabus being either “ha-ha- ha- ha” or “ho-ho-ho-ho” they are not “ha-ho ha- ho” due to biological constraints. Also, they are gender variations in frequency just like they are in gender

pitch. Women's laughter has higher frequency than men's laughter. Laughter manifests itself as recurrent contractions of diaphragm and facial muscles along with risen corner of eyebrows (Dearburn, 1900 as cited in Askenasy, 1987).

1.1.1 Biological Underpinnings Of Laughter

The domino effect of laughter can be elucidated by the relatively new understanding of "mirror neurons" (Rizzolatti & Craighero, 2004). The term mirror neuron is suggestive of its role. Mirror neurons mirrors the behaviour of another. In a study with macaques Rizzolatti and Sinigaglia (2008) reported activity in the frontal cortex of macaques when the macaques observed the researchers grab peanuts. This was found out to be the same area that gets triggered when macaques grab peanuts themselves. (This area is responsible to conduct the task of planning of bodily movement). Similar results were found with humans thus mirror neurons could possibly be the biological premise to account for the infectious character of laughter. Laughter is contagious is well established by the discussion so far. The laughter epidemics, holy laughter, laughter tracks and laughter boxes have all shown the evidence in favour. What is intriguing enough for human curiosity is the possible neural link to explain the phenomena. Although, laughter as a social phenomenon had been widely researched area, wherein the role of the presence of other individuals and its effect on individual laughter has been studied. However, role of laughter, just blank laughter to produce laughter was never researched until recently (Provine, 2000).

1.1.2 The Social Nature Of Laughter

The saying that "Laugh and the world laughs with you" (Ella Wilcox, 1850-1919) resonates with the social underpinning of the act of laughter. Laughter is essentially social. It is rooted in social context and presence of people. According to Bergson laughter has no meaning without a group (Bergson, 1911) and laughter is a mode of communication understood by all humans across cultures without barriers of language. 94% of laughter in preschoolers occurs in group (Kennerdie, 1931).

The ‘sociality’ of laughter is a reflection of this (Sociality here means ratio of social to solitary behavior). Robert Provine (2000) found that there is 30 times more laughter when surrounded by people! He also found that people smiled six times more and talked four times more in social situations. It was noticed that bowlers smile during conversations or interactions while playing rather than on receiving a score. Furthermore, smile in babies is elicited not when they simply look around but when they make eye contact with their mothers (Jones, 1989).

According to Robert Provine (2000) eye contact is an important element of laughter.

Laughter bonds friendship and friends are the people we laugh with.

There is also a downside to this bonding and seemingly positive influence of laughter and this can be seen in laughing at someone; that is jeering rather than laughing with someone. Also, this is evident from reports of mob violence in Indonesia, Kosovo and Colorado that laughter sometimes accompanies such dark crimes (Denver Rocky Mountain News, 1999 as cited in Provine, 2000). Such nasty laughter is commonly witnessed in various theatrical performances including cinema. Laughter can be explained from various angles, evolutionary, physiology, inter psychic, literary analysis but most of it is about material which stimulates laughter and not laughter itself (Provine, 2000).

1.1.3 All Laughter Is Not Good Laughter

Laughter is not always an indication of happy and healthy individuals. Bursts of laughter at inappropriate times or bouts of pathological laughter fall outside the domain of what is considered normal and salutary. A coin has two sides just like any behavior. A healthy, hearty and adaptive behavior can be detrimental and nonadaptive in its excesses. For instance, the inappropriate laughter response by schizophrenics or the euphoric laughter by a maniac could not only qualify for normal (Baron, 2000). Schizophrenics would exhibit laughter for no reason, they feel compelled to laugh, denying any happiness or joy (Bleuler, 1950). The Contagious laughter among schizophrenic is pointed by Izard, 1977; wherein entire ward would get infected by an out roar of laughter.

Another account of abnormal laughter is evident in what is known as Puppet like syndrome (Angleman, 1965) which consists of multitudinous symptoms along with recurrent outburst of laughter.

Another absurd form of laughter includes the one included by a gas; that is Nitrous Oxide, famously known as the laughing gas. It was discovered by Priestly in 1772laughter induced cataplexy is another dysfunction with laughter (Askenasy, 1987).

Another abnormal condition associated with laughter is giggle micturition, a term coined by Mackeith, 1959 which refers to laughing and resultant uncontrolled urination. Abnormal laughter is also associated with kuru (disease among people of new Gninea); manganese poisoning and epilepsy induced seizure (Provine, 2000).

1.1.4 Laughter And Health

Interest in studying laughter and its link with health increased after the classic case of Norman Cousins. Cousins (1976) highlighted in his account the contribution of laughter in curing him of his illness (ankylosing spondylitis, a painful degenerative disease of the joint). He experimented to verify this by laughing for 10 minutes. This resulted in at least two hours of pain free sleep in him. The relatively new understanding of Psychoneuroendocrinoimmunology (PNEI) is relatively new branch of understanding. It can explain the role of laugher on mind and body. Laughter is known to reverse the effect of stress by essentially reversing the neuro-endocrine stress response. Simply put, Stress response actively involves the psychological, endocrine system and neural systems. This involves the sympathetic and parasympathetic nervous system, the hypothalamus-pituitary-adrenal axis (HPA axis) and resultant increase in cortisols, corticotropin (ACTH) catecholamines, beta- endorphin, prolactin and growth hormone which essentially make up the stress hormones. What laughter exactly does is reverses this and thus undo stress and any resultant ill impact on health. (Since stress hormones are widely and undoubtedly known to impact health). Many studies support this claim. One such study measured impact of mirthful laughter by exposing the experimental group to humor video for 60 minutes unlike the control group. When blood samples were measured for various hormones a reduction in serum levels of cortisol, dopac and epinephrine was reported. This lends support to role of laughter in reversing the classic

stress response (Berk et al., 1989).

William Fry is the famed and named pioneer researcher in the field of laughter. He found out that one minute of hearty laughter was equal to 10 minutes that he would row on exercise machine at home (Miller & Fry, 2009). Also most important is that for laughter to provide same effects as exercise it should be sustained (Provine, 2000), which laughter will produce such exercise effect? Comedy? Contagion? or what? Perhaps these questions have answers in the following sections.

1.2 Laughter Yoga

Laughter Yoga is not something to laugh off rather a serious exercise program. It is a rather unique form of exercise that integrates simulated laughter with Yogi breathing, hence the name laughter yoga. Most interesting to note is that laughter is unconditional, that is it does not rely on any outside factors like jokes, comedy or humour (Laughter Yoga International, 2019).

Humour and laughter have been confused for long and even now. Laughter usually accompanies or is rather a consequence or reflection of humour. It is a physical manifestation as a result of humour. However, humour is not the only way to induce laughter. Laughter Yoga incorporates simulated laughter in group setting wherein eye contact and childlike playful activities form an important aspect. Often simulated and forced laughter turns into genuine and contagious laughter.

1.2.1 The Link Between Yoga And Laughter

The word yoga comes from the Sanskrit ‘Yuj’ which essentially means union. Thus, it refers to uniting or integrating all aspects of one’s life. It occupies a major part of the Hindu philosophy and is now a much-cherished exercise form for the West. The Ho Ho Ha Ha of the laughter yoga were found to be so much like the “Kapalbhati” from yoga. Both laughter yoga and Kapalbhati share the similar rhythmic movements that involve the diaphragm and muscles of the abdomen. Thus, the perfect blend of the two resulted in combining deep yogic breathing with laughter exercises and hence the name laughter yoga or hasya yoga. (Kataria, 2018). Laughing alone is tiring hence it was interspersed

with yogic breathing. Breath is given utmost emphasis in yoga. It is termed as prana-the life force

Deep breathing increases the amount of Oxygen that reaches cells. This is one of the most important aspects for diseased free life. (Warburg, 2010).

1.2.2 Exhale The Stale Air - Breathing And Laughter Yoga.

1.2.2.1 *Breathing capacity.*

The benchmark of yogic breathing lies in longer exhalations than inhalations. This helps in getting rid of state residual air to make way for fresh air. This is exactly what happens during laughter yoga. One can exhale much more while laughing rather than normal breathing. The lungs consist of 1500 ml of residual air with much carbon dioxide and while breathing, we essentially inhale and exhale only 500 ml of air (Kataria, 2018).

The stale air can be forced exhaled through laughter exercises. Breathing capacity of the lungs is not used effectively for various reasons, sedentary lifestyle being one them. Stress makes our breath shallow and hence reduction in amount of oxygen reaching our brains and consequent decline in health and well-being. Thus, lung cells do not fully participate in exchange of Oxygen & Carbon Dioxide. By doing laughter yoga one is able to facilitate effective utilization of lung's capacity. The result is increased breathing capacity or Vital Capacity (Kataria, 2018).

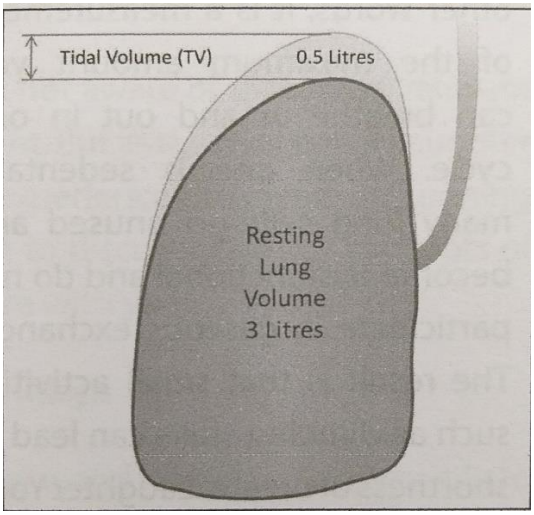

Figure 1.1 Showing breathing capacity of Lungs (Kataria, 2018)

Exhalation.

Our lungs consist of about 3 litres of air when in a resting state, and about 0.5 litre (500ml) is what we usually inhale and exhale while breathing. This average is known as Tidal Volume (Kataria, 2018).

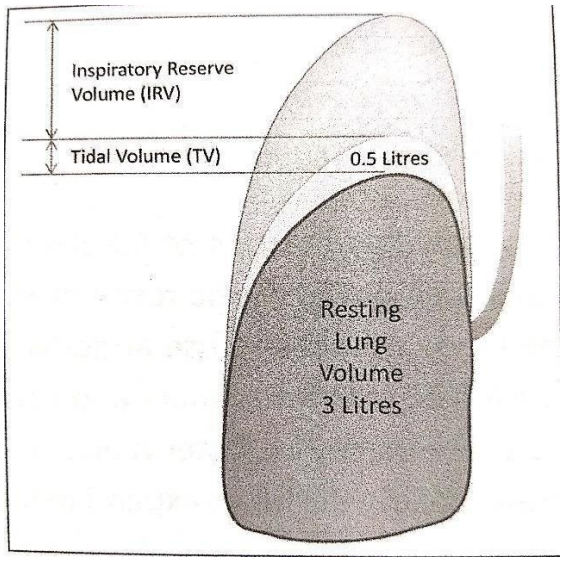

Figure 1.2 Showing tidal volume and inspiratory Reserve Volume of lungs (Kataria, 2018)

Since our lungs are elastic, they expand to let in more oxygen (In times like physical activity). It can get up to 2.5 litre of air. This is known Inspiratory reserve volume in medical terminology (Kataria, 2018). As mentioned earlier, lung consist of about 3 Ltr. of air. We can force exhale about 1.5 Ltr. of this residual air which is always present in the lungs. This is known as 'expiratory reserve volume,' and it is this residual air that consists of more carbon dioxide than oxygen (Kataria, 2018).

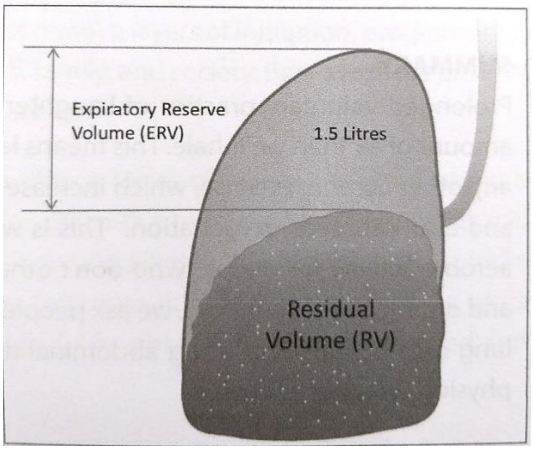

Figure 1.3 Showing Expiratory Reserve Volume (Kataria, 2018)

The prolonged exhalation of voluntary laughter helps to force exhale this stale air and replace it with fresher air (Kataria, 2018).

The sum of respiratory reserve volume, expiratory reserve volume and tidal volumes is known as vital capacity. Essentially it is an estimate of the maximum amount of air one can breathe in and out in a cycle (Laughter Yoga International, 2019).

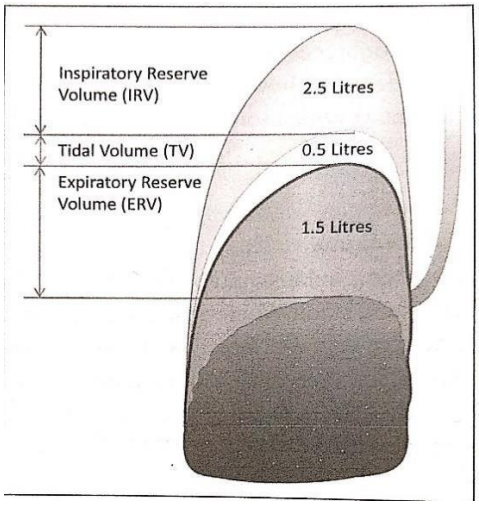

Figure 1.4 Sowing Inspiratory Reserve Volume, Tidal Volume and Expiratory Reserve Volume (Kataria, 2018)

A sedentary lifestyle causes lung cells to dysfunction due to underuse or no use. This results in shortness of breath even in simple and light physical activities like climbing stairs. Here laughter yoga can help undo this effect, specially being useful for elders or one's who have diabetes or otherwise sedentary lives. (Kataria, 2018).

The maximum inhalation followed by laughter until out of breath, is the vital capacity laughter which exercise the lungs by expanding to their capacity. Since laughter yoga has been known to facilitate double the exhalation than inhalation it can be equated to any other form of aerobic exercise and it is especially relevant for elders or those with disabilities who cannot otherwise engage in more active aerobic exercises. (Kataria, 2018).

1.2.2.2 *Diaphragmatic breathing and parasympathetic nervous system.*

As mentioned before, stress makes our breathing shallow since it does not incorporate diaphragmatic breathing rather uses chest for breathing. Diaphragm is a muscle which separates the abdominal cavity from the thoracic. It is because of the movement of the diaphragm that two third of breathing procedure occurs, white remaining one third is co-ordinate by rebadged expansion (Kataria, 2018).

Yogic breathing and laughter yoga facilitate stimulation of movement of abdominal muscles and diaphragm. This diaphragmatic breathing has its positive impact since the diaphragm is connected to the parasympathetic nervous system, a branch of autonomic nervous system which calms down the sympathetic nervous system and thus calms down stress. Thus, if one can simply turn off stress of one learns to move the diaphragm. The ho ho ha ha chant of laughter yoga is one such way to be able to affect diaphragm. This helps one to train the diaphragm to help one to laugh from belly (Kataria, 2018).

1.2.2.3 *Change in breathing changes one mind.*

These exists a link between one's state of mind and one's breathing pattern. A stressed state of mind makes one's breathing short and shallow. However, when one is at peace the breathing becomes deep and regular. In the same vein when aroused and stressed one can change thoughts and mental state by changing one's breathing. In a disturbed or anxious state of mind deep breathing helps immensely. Laughter yoga allows one to breathe deeply and thus relaxing an anxious mind (Laughter Yoga International, 2017).

Steps Of Laughter Yoga

Laughter Yoga consists of standard steps however changes accrue from setting to setting e.g., hospitals, schools. old age homes depending on the audience and their capacity. However, there are standard steps that are followed among otherwise physically normal population. (Laughter Yoga International 2019).

(A) The Four-Fold Steps of Laughter Yoga.

Step-1: This includes clapping, chanting and moving. It begins with clapping to invigorate energy and enthusiasm. A rhythm and sequence is added to clapping which makes group activity more synchronous, clapping activates acupressure points. Ho Ho, Ha Ha chants are added to this rhythmic clapping which also facilitates diaphragmatic breathing. All of this is done by moving around randomly and constantly keeping eye contact with other participates. (Role of eye contact is important in its own way and will be discussed further).

Step-2: Breathing Exercises: These are strewn between laughter exercises. Exhalation

and Inhalation along with stretching front and backwards is incorporated. Variably burst of laughter followed by inhalation is also incorporated.

Step-3: Childlike playfulness - this involves incorporating a childlike attitude and manifest the playfulness children exhibit. A special cheer 'Very Good Very Good' 'Yay!' is recited after almost every laughter exercise. Participants clap while saying very good-very good and swirl their arms often in shape of Y while saying staying yay. One can do this with as much energy as possible by jumping or simply doing the action.

Step-4: This incorporates the various laughter exercises. It consists of 40 foundation exercise along with innumerable more exercise across the globe. Some of the foundation exercises are greeting laughter, phone laughter, milkshake laughter and many more.

(B) Laughter Meditation

These four steps procedure is followed by what is termed as laughter meditation. Usually, people sit in a circle either on floor or chairs. Then gradient laughter is carried out, i.e., slow and soft laughter followed by intense and strong laughter. Soon laughter becomes contagious and difficult to stop. Short breaks of silence and breathing are incorporated too. Meditation can be both still and dynamic and laughter falls latter.

(C) Relaxation and Grounding technique - Since the group is charged up with much energy, the group has to be calmed down. Some grounding techniques are essential. One such grounding technique is humming. This incorporates closing eyes and taking a long deep breath and humming while exhaling. Thus, vibrations are created when sound of hum is uttered by lower and upper lips just touching each other. Guided humming has good results. Yoga Nidra is another alternative technique to relax.

This section incorporated steps or procedure of laughter yoga. To better understand why such procedure is followed, models and philosophy of laughter yoga will be discussed.

1.2.3 Philosophy/ Tenets of Laughter Yoga

The overarching philosophy of laughter yoga is its major component of laughter without reason. Thus, it incorporates unconditional and simulated laughter. Such laughter does not incorporate or depend on humour. Usually, humour is mistaken to be equal to

laughter which is not exactly the case Laughter can be explained is two ways.

Humour model

It is mind to body model. This incorporates humour dependent laughter. Mostly adults cognitively engage with what is humorous and this may then follow laughter depending on whether the content was perceived as humorous or not. Thus, laughter is conditional and comes without guarantee.

Body to mind model

The direction of laughter is manifested in reverse order here that is from body to mind. It does not rely on humour or its comprehension by the mind. Such laughter is usually seen in children. Adults too incorporate by simulating laughter (Laughter Yoga International, 2019). To understand the above, one must understand the two-way link between mind and body. It is known that emotions follow physiological changes in body. Thus, when physiological changes occur, we acknowledge that and this leads to the emotional label we apply (James, 1922). Thus, one feels the emotions according to the way he acts.

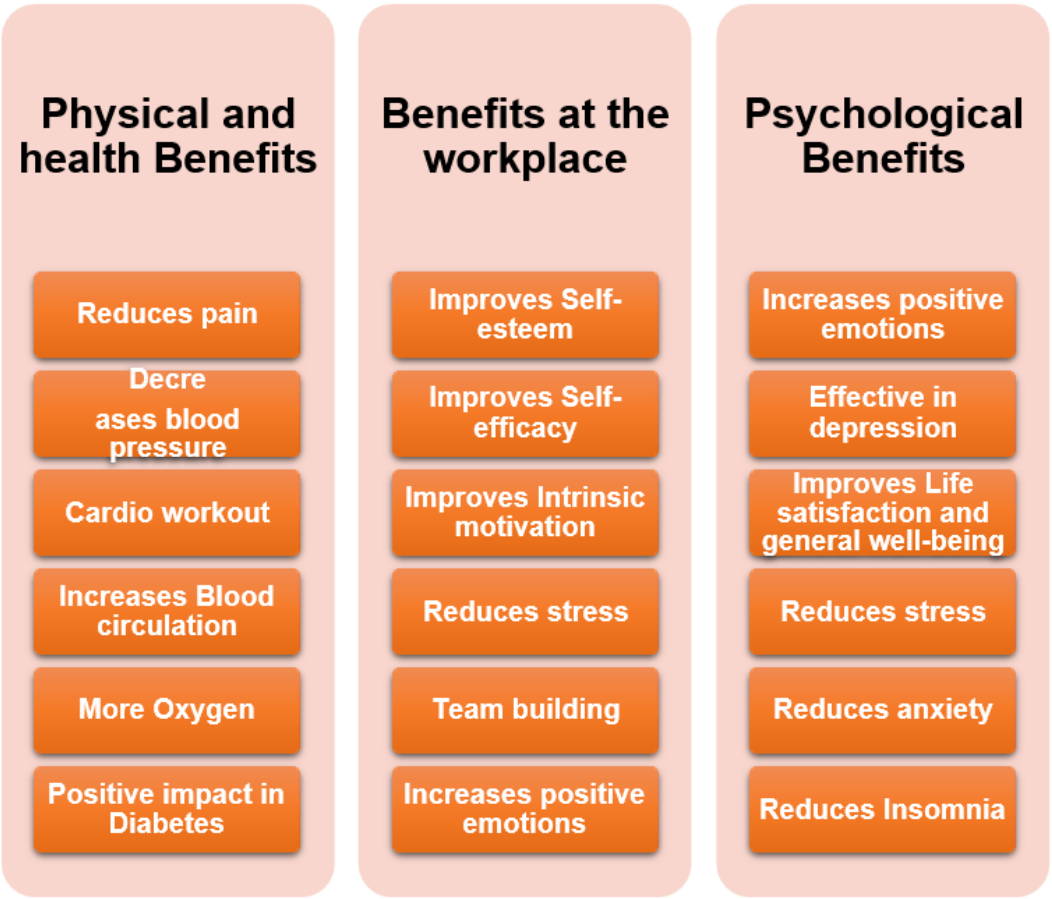

Figure 1.5 Benefits of Laughter Yoga

1.3 Resilience

Resilience is a concept has gained much the attention recently in positive psychology. It has been defined and explained differently by different researchers but essentially it consists of triumphantly coming out of stressful situation to understand the nature of resilience it will be looked at from various angles.

1.3.1 Psychological Resilience

Resilience has been defined in many ways by different psychologists. Some see resilience as an outcome, while some see as a trait and some others see it as a rather dynamic process. Resilience is a trait according to Connor and Davidson, 2003. They explain resilience as a group of abilities that make an individual face adversity and flourish through the same. They also believe in the ability of resilience to change over time, or show improvement.

Some researchers like Masten (2001) describe resilience as a result or outcome rather than a characteristic trait. Thus, resilience is the result of facing an adversity. It was seen as a common phenomenon or result of adversity.

Resilience is rather seen as a dynamic process by some other researchers. Luther, Cicchetti and Becker (2000) have described resilience as a dynamic process. The process that essentially consists of:

a) Severe adversity or threat in the first place

b) The positive result or outcome in spite of adverse conditions and its detrimental impact. In spite of different operationalizations of resilience, the commonality between them lies in two major aspects – the element of adversity and the element of post-adversity positive outcome or coping.

Also, many more attempts have been made to understand resilience. It has been often interchanged with emotional stamina that keeps people fearless amidst trauma (Wagnild & Young, 1990).

1.3.2 Factors Associated with Resilience

Following is some of the protective factors associated with resilience. Here protective factors refer to factors or resources that help cope and are associated with resilience.

1.3.2.1 *Locus Of Control*

Locus of control is how a person controls his/her life. Thus, it refers to location of control as in whether this is located inside or outside. Internal locus of control refers to

attribution to internal causes whereas person who have external locus of control attribute events to chance, luck or factors outside one's control. Internal locus assists a person to be more resilient and take charge. According to Seligman (1975) people end up giving up when they believe events/situations are not under their control. However, they cope more efficiently when they seem to believe that they have a grip on life. Children with greater locus of control show lesser resilience than children with internal locus of control.

Resilience is positively correlated with internal locus of control Luthar (1991) among underprivileged children. Resilient adolescents are known to show higher internal locus of control (Werner, 1989).

1.3.2.2 *Sociability*

Social actions and social support are related with resilience. Actions such as supportive advice, words of reassurance augment coping (Lakey & Cohen, 2000). Rutter has laid stress on social relationships and its role in resilience. Factors like sibling and maternal warmth and a positive home milieu as protective factors.

Resilient girls are seen to be more affectionate whereas resilient boys are found to be good natured. Furthermore, as toddlers they exhibit autonomy, positive social orientation, advanced communication, and when such children entered elementary school, they exhibited better relationship with classmates, multiple results, nurturant. As teens they sowed positive self- concept more of close friends (Werner, 1989).

1.3.2.3 *Optimism*

Optimism and positive outlook are associated with resilience. Lower levels of optimism is associated with maladjustment. In KOSOVO refugees, Albanians helping refugees in Albania and Albanian refugees in US. It was seen that in people with better adjustment showed higher optimism, low neuroticism, openness to experience, extraversion and high conscientiousness (Riolli, Savicki & Cepani, 2002).

Furthermore, dispositional optimism is known to have a major contribution in maintaining psychological resilience and subjective wellbeing. This was examined among patients with severe burn wounds (Tle, et al., 2013).

1.3.2.4 *Laughter, Humour And Resilience.*

For long humour and laughter have been studied together although the two differ. It is known that highly resilient people are humorous. Humour is one of the defining characteristics of resilient people (Werner & Smith, 1992).

1.3.2.5 *Mental Features/ Operations.*

Rutter (1979) emphasizes on mental operations as of the protective factors. Factors such as planning, self-reflection, self-confidence, self-control are some of the mental features as mentioned by Rutter. According to him the person who possesses these characteristics are more successful at changing and controlling events. Consequently, it may be a person's mental factor rather than any environmental protective factors.

High intelligence which generally is known to share a positive correlation with resilience is however known to affect resilience in the opposite direction in Luthar's studies. She pointed out that high intelligent adolescents are more at risk, perhaps by being more sensitive to environmental issues (Luthar, 1991).

1.3.2.6 *Other Factors.*

Garmezy et al., (1984) gave the following protective factors:

a) Individual factors which included factors that are personal and dispositional in nature. Such as temperament, cognitive skills or how one responds to others.
b) Familial factors which included factors related to family cohesion, warmth, dispute, poverty or any type of adversity, caring adult presence in spite of parental deprivation, concerned parents.
c) Support factors (external) which included factors outside family, like supportive teacher, church, social workers.

1.3.3 Neuro Psychological Underpinnings

Attempts have been made to understand the neural circuits if any associated with resilience. If brain consists of centres for various behaviours owning localization or at

least relative localization of function then there must be a centre for resilience too. It was the ventral- medial prefrontal cortex (VmPFC) where high levels of neural activity have been observed in subjects while trying to cope and combat stress. Subjects with no or lower flexibility in VmPFC were found to resort to maladaptive coping like substance abuse and other behavioural issues, whereas the ones who exhibited dynamic changes also exhibited active and adaptive stress resilience coping (Sihna et al., 2016). Furthermore, medial prefrontal cortex (mFC) dysfunction is associated with maladaptive responses to stress. Enhanced activity in these areas neurons perhaps underpin the already reported hyperactivity in depressed brain (Wang et al., 2014).

Strengthening of excitatory synapses on MPFC neurons are shown by mice exhibiting learned helplessness, whereas weakened excitatory synapse on MPFC neurons are exhibited by mice that were resilient to helplessness. (Wang et al., 2014). These findings are in line with the findings that techniques of deep brain stimulation (DBS) which inhibits neuronal activity in MPFC effectively alleviates depression symptoms in humans and rodents (Covington et al., 2010; Hamani et al., 2010; Warden et al., 2012).

However, the picture is not very clear and simple. It never really is when it comes to brain and behaviour. Different prefrontal cortex (PFC) areas exhibit different functions and consequently may have different roles. Studies have shown how the activation of MPFC induces depression like symptoms (Yizhar et al., 2011; Warden et al., 2012). Some other studies have also reported a discrepant result in terms of anti-depressant effects (Covington et al., 2010). This discrepancy implies the role of several circuits in MPFC induced depression like or resilience like behaviours in rodent. The selective stimulation of dorsal raphe pathway of MPFC leads to resilience (Warden et al., 2012).

It is well known that stress leads to longstanding detrimental consequences but stress inoculation or mild explosive during early age might augment resilience (Machenbaum and Cameron, 1989 as cited in liu et al., 2018). Decreased spatial memory and basolateral amygdale- ventral hippo campus CA1 connection was found in learned helplessness mice who were subject to inescapable foot shocks whereas enhanced spatial memory and neural activity was witnessed under same conditions learned hopefulness mice (Yang et al., 2016).

Many neuro chemicals are also known to change resilience. A neuropeptide NPY, which is a 36 amino acid peptide is found to reduces and limit negative and adverse consequences of stress (Cohen et al., 2012). The stress induced Hypothalamus-Pituitary- adrenal axis (HPA- axis) dysregulation can be prevented by NPY, given intranasally (Laukova et al., 2014 and Serova et al., 2014). Rats who were administered NPY intranasally immediately before single prolonged stressful event showed less anxiety like and depression- like symptoms (Serova et al., 2013). 5-HT is another neurotransmitter which is significant enough in resilience. Reduced amounts of 5-HT in brain increases susceptibility to stress (Sachs et al., 2015). The gut brain is closely associated with 5-HT and resilience (Foster & Neufeld, 2013).

1.3.4 CORE DIMESIONS OF RESILIENCE: ADVERSITY AND POSITIVE ADAPTATION.

Resilience, essentially has been referred to as a phenomenon that incorporates positive adaptation in the face of adversity or trauma in the previous discussion. Thus, it is an umbrella term that incorporates two distinct constructs or dimensions.

1.3.4.1 *Adversity*

Adversity refers to risks. A high-risk condition would be the one that induces high chances for maladjustment (Luthar, 2006 as cited in Luthar, 2014; Masten 2001). Community violence, and maternal depression are one of some examples that expose children to high risk. Parental low-income or poverty, poor education, history of mental illness, and disorganized neighbourhood are other factors as acknowledged by researchers. In real life such factors usually co-exist and they affect in synergy. Consequently, the outcome for child would and is even more detrimental than it would be, had the risks occurred independently (Rutter, 1979).

1.3.4.2 *Positive Adaption*

The second dimension incorporates positive adjustment or adaptation. This essentially includes better outcomes than one would expect, given the adverse circumstances. This concept has been described in terms of social competence or successful completion or

catching up with developmental tasks (Luthar, Cicchetti & Becker, 2000). In younger children it would be different from how it is manifested in older children.

Apart from simply being appropriate from developmental tasks point of view, positive adaptation is also explained in terms of domains of criteria used (Luthar, 2006; as cited in Luthar, 2014). An example of this could translate to presence of socially conforming and appropriate behaviours by children exposed to a community that serves as high risk factor for anti-social problems (Jain et al., 2012). Equivalent to this would be lack of psychopathology symptoms among children of depressed parents (Beardslee, Gladstone & O'Connor, 2012).

Labels of resilience can also be appropriate at community level. For instance, some poor, low-income neighborhoods' manifest higher cohesiveness and affiliation among with social efficacy as compared to other neighborhoods. This is a potential buffer against negative influences (Jain et al., 2012).

These positive adaptations may not necessarily occur as a part of smooth, predictable continuous trajectory. There are reported instances of bouncing back from earlier dysfunctions (Masten, 2001; Rutter, 2012).

Resilience is usually and mistakenly equated with competence and ego resilience. Although, they are overlapping constructs yet resilience differs from competence in many ways, (Luthar, 2006; Yates and Matsen, 2004 as cited in Luthar, 2014). Firstly, competence does not necessitate risk. Whereas resilience does. Secondly, both positive and negative dimensions of adjustment are incorporated in resilience (for instance absence of disorder and presence of health). Whereas competence mainly emphasizes on positive. Thirdly, competence exhibits mainly in terms of observable behaviours whereas resilience encompasses both emotional and behaviour factors. Finally, resilience is more like an umbrella term, a super ordinate construct that absorbs aspects of competence.

1.3.5 Factors that Attenuate or Advance Resilience

1.3.5.1 *Family*

Maltreatment by primary caretakers is known to be one of the most fundamental and strong factors that affects and acts as high risk. This is comorbid with parental mental illness, poverty or community violence (Mersky et al., 2009). Such children exhibit multiple issues or failure to meet developmental tasks. Deficits ranging from poor relationships cognitive processing to emotional regulation (Cicchetti, 2002).

However, some positive protective factors like relationship with peers and school engagement can attenuate the influence of maltreatment (Afifi & MacMillan, 2011).

The significance of family relationships as a protective factor has been persistently reiterated throughout Literature. Such unanimous support to the claim points out to the relevance of family related factors in building resilience (Garmezy, 1974; Rutter 1979; Werner & Smith, 1982 as cited in Luthar, 2014). And not only is the positive consequence of such positive parenting visible during childhood but also through adolescence (Burt & Paysinck, 2012 as cited in Luthar, 2014).

Another important family related factor is culture. Second generation children of immigrant families who revoke traditional family values are known to be linked with more adjustment problems (Garcia Coll & Marks, 2009) as cited in Luthar, 2014).

1.3.5.2 *Community Processes*

Just like family factors can be both protective and risk inducing. Similarly, many factors at community level can also affect resilience. In such situations parental support and family factors can buffer the detrimental impact of community violence. However, that may not occur realistically since parents too are exposed to stresses brought forward by community violence (Jain et al., 2011). This impact can be moderated given the exposure of children is not continuous or chronic, and does not involve witnessing personally violent experiences (Gormon- Smith & Tolan 2003 as cited in Luthar, 2014).

Positive peer relationship is another factor at community level that advances resilience (Neal et al., 2010). Friendship with peers who exhibit responsible behaviour can reduce

the deleterious effects of community violence (Jain et al., 2011). However, this same affiliation and close friendship can make one even more vulnerable, when peers model deviant behaviours (Dishion et al., 1999).

This could lead to poor outcomes across domains. Furthermore, social organization processes, which constitute features like high cohesion, sense of belonging ness, high participation are important factors that enhance resilience (Rios, Aiken & Zautra, 2012).

1.3.5.3 *Individual Attributes*

Individual characteristics and attributes are another set of factors that either mitigate or enhance resilience. Intelligence is one such factor. Individuals with high IQ's do well in various domains, such as those enacting problem-solving (Luthar 2006 as cited in Luthar 2014; Masten 2001).

However, the other side of the coin is that those children who are constantly exposed to chronic risk show relatively low IQ scores (Koenen et al., 2003; Rutter 1998).

1.4 Positive And Negative Emotions

Emotions are our reactions that consist of physiological changes, subjective cognitive states that we label as emotions and expressive behaviors (Baron, 2002). These have recently formed an important area of Psychology. Unfortunately for many years concern and focus has been on psychological problems and their solutions. Negative emotions and their prolonged occurrence contribute to various disorders like anxiety disorders, mood disorders, eating disorders, stress induced physical disorders and many more hence negative emotions have always outrun positive emotions in terms of research interest (Seligman and Csikzentmihalyi, 2000 as cited in Fredrickson, 2004).

1.4.1 Positive Emotions

These emotions refer to short and brief experiences that feel good at present. These have always taken a backseat until 1980's when groundbreaking research emphasizing implications of positive emotions emerged. Human beings are drowning more towards negative than positive situations be it emotions or events. This possibly explains why research is biased more towards negative emotions than positive. Perhaps it has

evolutionary links too. Human beings would be requested to pay more heed to negative events that may lead to or danger than positive outcome that may not be as detrimental (survival instinct). The rationale behind emphasis on negative emotions seems to be the intensive impact of negative emotions over positive emotions. A bad day's relative impact on next day as compared to no impact of good day on next day, impact of trauma on a long-term basis and the like. Compare the impact of sexual pleasure/bliss to sexual abuse. Thus, it seemed that negative has a more lasting impact hence occupies human beings more than positive emotions. Fortunately, research on the other side of the coin was accumulating to draw our attention to equally lasting influence of positive emotions (a detailed understanding of which will follow). Wherein positive emotions have been known to show lasting impact too (Lopez, 2009).

According to Fredrickson, 1988, positive emotions have received less attention owing to smaller number of positive emotions as compared to number of negative emotions, as more words describing negative emotions exists.

Positivity is not only an indicator of success in life but also a producer of success. This is backed by evidence (Fredrickson, 2009). Fredrickson, 2009 went ahead with even suggesting a ratio of 3:1 for flourishing. Thus 3 positive emotions' inducing events for one negative emotions' event should be enough for one to flourish. It's interesting to note that the ratio is not 3:0, thus significance of negative emotions is not discounted for.

Thus, augmenting positivity seems rather easy. One could simply use upbeat words or pull off with that charming smile. Unfortunately, if one does not feel positivity when expressing in words or smile, one is doing more harm. If anger is known to kill (Williams, 1998) so is insincere and ingenuine positivity possibly known to (Rosenberg & Ekman, 2001 as cited in Fredrickson, 2009).

Usually bodily pleasures like sexual stimulation, bodily warmth on a cold day or mouthwatering food are confused for positivity. According to Barbara Fredrickson, 2009 they may be related and hence become difficult to differentiate but they are not same. Sensations are different from emotions.

1.4.2 Ten Forms of Positivity

Barbara Fredrickson has given a list of ten positive emotions or forms of positivity. These ten have been emphasized owing to they being a popular subject of scientific research and being an integral part of hundreds of people in their daily lives (Fredrickson, 2009).

Joy

Joy is one such emotion that us expressed by many people in high frequency. It feels light and bright bringing ‘inner glow’ making one ‘playful’.

Gratitude

This involves appreciation and being thankful for gifts of life, e.g., being thankful to our parents for their efforts, being thankful for the clear air we breathe. It involves the beautiful urge to give back. However, this should not be confused with indebtedness- where one may feel the urge to pay back but is devoid the feeling of being grateful or thankful. Also, neither is gratitude simply conditioned manners or habitual etiquette. It is beyond that, something that cannot be forced taught. It is heartfelt and not scripted.

Serenity

This involves a kind of mindful state wherein one savors current situation it may usually accompany other forms of positivity, most commonly overlapping ones being Joy.

Interest

This includes that sense of possibility, the sense of fascination when you are attracted and driven to explore and discover the new path. It makes you alive.

Hope

It is a slightly different situation in which hope arises unlike other forms of positivity.

It arises in times when everything is not going our way circumstances that are dire and uncertain. It includes the belief that there would be change.

Pride

It can be considered as opposite of shame/ guilt. Pride as an emotion is very fascinating to know about. This emotion if not reigned can play havoc, whereas if tempered it is a positive emotion. Pride is known to facilitate persistence on difficult tasks.

Amusement

Amusement is an emotion that consists of two elements. One of them being social, like laughter which occurs with others. Even independent laughter ultimately is because of some other or social factors (media, memory of events with others/ friends). The second element is the safety in surprising components of amusing events. A joke that hurts, threatens or jeers is not amusing.

Inspiration

This is another set of emotions in the comprehensive list given by Fredrickson. According to her, this is another emotion that is self -conscious and self- transcendent apart from gratitude and awe. It is one that makes one tread beyond self-absorption.

Awe

Another one in her list is awe. This too is a self-transcendent emotion. It involves the overwhelming experience of being humbled by greatness. It could lead to disappearing of boundaries and becoming one with something bigger. It makes it all more holistic.

Love

Love is an emotion that encompassed all the above emotions. According to Barbara Fredrickson, in infant stage of relationship one shows deep ‘interest’ for each other’s and everything, share ‘amusement’ followed by ‘joy’ one starts sharing dreams and hopes of a shared future. Cozy ‘serenity’ follows once you settle in relationship one feels ‘grateful’ for the best one gets from each other, the ‘pride’ of the same, ‘inspired’ by this all one falls in awe of how it all works, how universe plans and executes it all.

Love is known to affect our body chemistry, in terms of oxytocin and progesterone which is known to enhance empathy and body (Fredrickson, 2004).

1.4.3 Broaden And Build Theory

Broaden and build theory is a theory about positive emotions. This theory as the term suggests included broadening one's horizons. Positive emotions are known to broaden one's thought, actions repertories and also, they are known to build one's resources thus the term Broaden and Build. Where negative emotions narrow down one's focus, positive emotions are known to widen it. The narrowing of focus as a result of negative emotions is adaptive in its own way since a quick decisive action is required in threatening situations. On the other hand, positive emotions broaden one's momentary and transient thoughts and action. This broadening of thoughts and action are not only reflected in social but also intellectual and artistic behavior.

For example, a positive emotion such as joy creates an urge to play (Fredrickson, 2004).

Barbara Fredrickson and Christine Branigan, 2005 conducted an experiment to support the above-mentioned claim. A sample of 104 people were randomly assigned to either group to experience negative emotions like fear or anger, and others to control group (neutral emotions). This was followed by a question that asked them to make a list of all that they wanted to do right then, given that feeling. The result was, the longest list for group exposed to feel positive emotions this was both longer than neutral group and negative emotion group.

The result of positivity is enhanced creativity. Thus, more and more ideas come to one's mind as a result of positive emotions. When more free-flowing ideas enter one's mind, more actions are possible. This affects one's interaction with the world. An imagines state of joyful memory can also ease the creative thinking process thus enhancing optimum solutions to various problems (Fredrickson, 2009). Also, studies in more naturalistic contexts show that people who exhibit more positivity in their lives were better able to cope with adversities. They used more open-minded approach and saw many more solutions. This openness allows them to resolve their problems with greater

ease since they found many more solutions. This further adds positivity which in turn increases open mindedness. Thus, it involves the affect that is cyclic and continuously beneficial. This was termed as “upward spirals” (Frederickson, 2009).

1.4.4 Positive Emotions and Human Relationships

Positive emotions very swiftly blur and melt the boundary between I and you and bring people closer. By injecting positivity temporarily, one could augment other person’s sense of belonging and overlap between them and the other. It incorporated a simple shift in thinking and perception rather than actual act of being close in some enjoyable activity and simply the act of thinking/feeling/imagining worked wonders. This effect of turning me to us and erasing the sharp boundaries is seen cross-culturally hence making it more or less global (Frederickson, 2009).

Such overlaps between themselves and friends were reported in independent studies in India and Japan too (Frederickson, 2009). India and Japan being collectivistic societies already exhibit overlap between us and them to be a norm, yet positivity is known to increase this further!

It is very interesting to note that something like racial differences that tend to divide people, seems to decrease when one is brimming over with positivity. Thus, it not only broadens view of “I” to include “us” but further broaden view of “us” to include all of us in “us”. One not only sees people of different race as being same, but people of one’s race being same too. (Johnson & Frederickson, 2005).

1.4.5 Positive Emotions and Building Resources

Positive emotions both broaden and build and much has been discussed about this broaden effect. Positivity is known to build a person. People who experience this positivity build on psychological resources. They grow psychologically. They become optimistic and resilient (Frederickson Thgade, Waugh &Gregrory, 2003). Positivity builds good mental habits. The changes are long lasting and not momentary. Also, positivity builds social connections and relationships. The interpersonal implications of positive emotions are wide ranging. The more openly one shares one’s positivity with

others, the stronger one's social connections and bond gets (Gable & Reis, Impett & Asher, 2004). A good example would be of the emotion of gratitude wherein one wants to do back for the other. This in turn germinates the seeds of a fruitful relationship ((Frederickson, 2009).

Positive emotions in the form of joviality and laughter strengthen intimate relationship of partners (Aron, Norman Mckenna & Heyman, 2000). Also, studies show and support that couples who exhibit and experience positivity build resources as a reserve for further hardship. Furthermore, they are statistically less likely to be divorced (Gottman, 1994, as cited in Frederickson, 2009).

There are rich connections seen and proven scientifically to exist between positive emotions and health (Pressman & Cohen, 2005). Increased positivity is associated with health- related consequences such as decreased sore throat, nausea and acne (Frederickson, 2009). Thus, positivity is closely associated with biological markers of health. Positivity is linked with lower stress hormones and higher growth hormones (Berk, Tan, Fry, Napier, Lee, Hubbard & Eby, 1989). Also, positivity is known to enhance bond related hormones (Light, Grewen & Amico, 2005).

Increase in positivity is also known to augment levels of dopamine (Ashby, Isen & Turken, 1999). Not only this it is also closely associated with immune system. It is known to improve immune system functioning (Davidson, et al, 2003). Thus, positivity brings about an array of positive biochemical changes. This makes it less surprising to understand how positivity is associated with pain reduction (Gill et al, 2004), lesser colds (Cohen et al, 2003) and sleep betterment (Bardwell et al., as cited in Frederickson, 2009).

People who are high on positivity are lower on their risk of diabetes, hypertension and stroke (Richmen et al., 2005; Ostir et al., 2001 as cited in Frederickson, 2009).

Studies on animals show too that love strokes on animals over a couple of days reported higher oxytocin and lower blood pressure in comparison to control group animals (Lund, et al 2002). Similar results have been reported within humans' beings (Holt-Lunstad, Brimingham& Light, 2008). Thus, love as a positive emotion has an important influence

as far as bonding, lowering blood pressure or loving affection is concerned. Thus, positivity is known to build mental habits, physical health, social connectivity and resilience. In the next session positive emotions and resilience are discussed at length.

1.5 Positive Emotions and Resilience

1.5.1 Resilience And Positive Psychology

Resilience as a construct often becomes a part of the positive psychology movement.

Resilience shares both similarities and differences with positive psychology.

One of the substantiate difference lies in terms of presence of adversity. Studies of resilience emphasize of the presence of some form of adversity to understand resilience. On the other hand, positive psychology incorporates all individuals and not just at-risk individuals. There is a shifting focus towards post stress growth and emphasis on adversity and risk in that sense in positive psychology (Park, 2010). However, that is not an essential condition as it is in resilience.

Furthermore, the difference lies in the emphasis of developmental task and age. Resilience research lays utmost importance on childhood and runs across adolescence and adults (Luthar 2006 as cited in Luthar, 2014; Masten, 2001). Whereas, positive psychology's focus has been on adults with a recent attempt to understand generalizing to children (Oshi & Kurtz, 2011 as cited in Luthar, 2014).

Also, resilience research gives importance to use of atypical or abnormal development to understand normal development and visa- versa (Luthar, 2003; Yates & Masten, 2004 as cited in Luthar, 2014). Whereas, positive psychology's emphasis is one sided, that is to refer to normal to as foundation or base to understand abnormal (Hames & Joiner, 2011 as cited in Luthar, 2014). Also, resilience differs from positive psychology in terms of its goals or outcomes. Resilience includes both positive and health adjustments as well as escape from psycho pathology (Luthar & Brown as cited in Luthar, 2014; Rutter, 2012). However, positive psychology (specially in early years) emphasized on only positive adjustments and promotions of health aspects. Although recent developments

have led to consideration of some negative aspects given these negative dimensions can be helpful too (Sheldon et. al., 2011 as cited in Luthar, 2014). Example could be sadness which is known to facilitate detail and focused thinking process, thus it is adaptive and helpful (Oshi & Kurtz, 2011 as cited in Luthar, 2014). However, much overlap exists between two constructs. This overlap can be seen in the relative importance placed on relationships. Both Resilience and positive psychology emphasize on quality of family relationships. This is made even more evident by Zatura's (2014) claim that resilience is social (Zatura, 2014 as cited in Luthar, 2014). This is in line with three words description of positive psychology, "other people matter" (Peterson, 2006 as cited in Luthar, 2014). Another shared similarity is in their struggle to pinpoint as to what is meant by doing well personal strength can even work against one (McCrae, 2011 as cited in Luthar, 2014) hence making it just difficult to conclude what defines doing well or life lived well.

1.5.2 Resilience And Positive Emotions

The link between resilience and positive emotions is much supported. One can improve one's psychological wellbeing and physical health by enhancing positive emotions that have an undo effect thus help cope with negative emotions (Fredrickson, 2000).

1.5.2.1 Resilient People and Positive Emotions

Resilient individuals show optimistic, energetic and full of zest approach to life. They are seen to be curious and quite open to new experiences. Also, they exhibit high positive emotionality (Block & Kremen, 1996; Klohnen, 1996).

Sometimes positive emotions are a result of resilience (Block & Kremen, 1996) but it is also seen that resilient people employ positive emotions for effective coping. Resilient people have been found to use humor (Werner & Smith, 1992), relaxation technique and optimistic thinking (Murphy & Moriarty, 1976) as ways of coping. Likewise resilient children who are under stress have known to score higher on humor generation as compared to less resilient ones under same amount of stress (Masten, Best & Garmezy, 1990)

Research evidence suggest that resilient personality type participants show faster

cardiovascular recovery following a negative emotion or anxiety. The participants who scored high on resilience scale were the ones who also showed least time towards cardiovascular recovery after laboratory induces stress (Tugade & Fredrickson, 2004).

Behaviours that are often repeated soon become automatic. Similarly, use of positive emotions by resilient people soon becomes automatic (Bargh & Chartand, 1999 as cited in Tugade & Fredrickson, 2006). Thus, it becomes a mastered technique which is swiftly and unconsciously employed by resilient people. Thus, activation of positive emotions in the midst of challenging situation would be effortless for resilient people (Isen & Diamond, 1989 as cited Tugade & Fredrickson, 2006).

Automatic activation of positive emotions is significant in coping mechanism. This could be considered useful as stress provoking situations can be draining. Having to deliberately bring to use the positive emotions would compromise on the limited resources. However more emphatical underpinning is required for the same.

Thus, resilient people are also affected and perturbed like all of us but are faster at recovery and positive emotions are the key to success. As some people, are more likely to generate this passivity than others it was the resilient type who exhibited most positivity during the 9/11 terrorist attacks. Resilient people worry much lesser and bounce back or rebound much quicker (Waugh et al., 2008). Thus, resilient people are nimble and agile, highly acclimatized to changes circumstances.

In a study by Christian Waugh (as cited in Fredrickson, 2009) aim was to assess resilience before and after negative emotions using brain imaging (fMRI). Laboratory experiment involved exposing participant to cue (triangle/circle) followed by disturbing/ non disturbing image which acted as threatening cue for upcoming pictures for the participant. It was seen that resilient individuals recovered fastest from anticipated negativity in insula, an area in brain linked to conscious states of feelings. Also, such people showed less activity in orbitofrontal cortex (OFC) region linked with working. Thus, it is clear that resilient personality-styled people not only exhibit faster cardiovascular recovery from stress but also a faster recovery from stress and expected negativity in their insula region of brain and lowered activity in worry centre of brain (Orbito-frontal cortex, OFC)

1.5.2.2 *Positive Emotion Build Resilience.*

The link between positive emotions and resilience has been discussed. Thus, it is known resilient people employ positive emotions more readily and widely, but also there is evidence that positive emotions can build these individual differences in resilience. Thus, it does not simply reflect resilience but also build some overtime. Positive emotions are known for their undo effect, that is they undo or cut down the adverse impact of negative emotions. Such impacts with respect to positive emotions have been studies with respect to cardio vascular activity (Fredrickson & Levenson, 1998). Participants heart rate was measured as a base line. After which the participants were asked to prepare a speech (under time pressure). Furthermore, they were informed that the speech will be videotaped and evaluated by friends (this was to induce some sort of anxiety or pressure). The result was spike in blood pressure and heart rates and constrictions of veins and arteries. Once this was induced it was followed by exposure to videos that would either induce negative, positive or neutral emotions. Tracking of heart was carried out the moment film clip would start. The result was that the participants were exposed to positive emotion inducing film had fastest cardiovascular recovery rates. It is indeed very interesting to note that positive emotions did not bring about any change in heart rate during normal viewing conditions. Thus, they do not do anything particularly to the heart, but definitely it can an undoes the adverse effect of negativity. This whole important implications in building personal resources prolonged cardiovascular response to stress is known to tread towards heart disease and even death (McEwen, 1998). Thus, reversal of such reactivity is a contributor in building a reservoir of personal resources.

Therefore, one need not feel unlucky or hopeless if not born resilient for resilience can be built and developed. Resilience can be built by positive emotions. The participants of a study who showed higher scores on resilience scale had reported higher positive emotions too. However, no link was found with negative emotions. Furthermore, the more the positive emotions felt through the month, more the levels of resilience growth (Cohen et al., 2009).

Negative emotions simply narrow down one's view point, which no doubt is adaptive. However, the upward spirals of positive emotions widen horizon and opens social channels. And each of this connect in turn supplies its own set of positivity (Fredrickson, 2009).

One can build a reservoir of resilience by optimizing the benefits of positive emotions. Finding positive meaning amidst daily vicissitudes of life is one way to optimize one's wellbeing and augment resilience and build on personal resources.

People who exabits an experience of positive emotions during bereavement are more likely to make long term goals. Altogether these factors are known to facilitate psychological wellbeing (12 months post bereavement). Thus, positive emotions play a role in fueling psychological wellbeing (Stein et al., 1997 as cited in Fredrickson, 2009). Thus, a reservoir of resilience is created.

As it is seen that use of positive emotions to cope is considered as an essential coping skill (Folkman & Moskowitz, 2000) and broaden and build theory shows that a repetitive experience of positive emotions may build these coping skills and all people have the capacity to utilize these positive emotions to better cope (Fredrickson, 2000) and thus form resilience it's just that resilient people ace to use this skill much more readily and efficiently than non- resilient thus there is a need to research and find out what may be helpful for facilitating and inculcating the skill of using positive emotions and developing resilience.

1.6 Perceived Stress

1.6.1 Stress

Stress can be defined in many ways. It is essentially an internal state which may be triggered by physical, environmental or social situations which are evaluated as potentially harmful, or over riding our coping resources. And these physical, social and environmental factors that cause stress are known as stressors (Morgan et al., 2004).

The General Adaptation Syndrome and The HPA Axis (Hypothalamus – Pituitary-

Adrenal Axis) explains the impact of stress on mind and body. It covers three stages of coping with stress. The general adaptation syndrome, is a term (Selye, 1956, 1976 as cited in Morgan et al., 2004) to describe body's reply to stressors. It essentially consists of three stages.

Stage-I Alarm Stage:

As the term suggests it is the stage wherein stressors alarm one's body. This constitutes the prompt emergency response of the body. When faced a with stressful situation, humans being react quickly to the same. This is the stage where the flight or fight syndrome essentially occurs (Cannon, 1929). Thus, the body prepares for action either to fight the since of stress or to escape or fly away from the source of stress. Energy and activation are required for both, fighting the stressor and escaping the stressor. Thus, the body prepares for this in this stage. And this preparation is mediated by the sympathetic nervous system. As a result, body witnesses an increase in blood glucose to fuel the body to respond to the stressor.

Stage-II Resistance Stage:

As the stressor continues to affect an individual the body reaches the resistance stage. As the term suggests this refers to continued resistance of the body in the face of continued stressor. This continuous bodily response is accompanied by a number of hormonal and other physiological changes. This is what forms the hypothalamus pituitary adrenal (HPA) axis (Bateman et al., 1989). This axis involves a sequence of changes as follow (Morgan et al.,2004).

Perception of a stressor in the environment triggers the hypothalamus a structure in the brain, which in turn releases the cortisone releasing factor (CRF). This CRF triggers the pituitary gland (Master gland) to release Adriano corticotrophin hormone (ACTH). This circulates in the blood and triggers the adrenal glands. It stimulates the outer cortex of the adrenal glands to release corticoid hormones such as cortisol. This cortisol build ups the body's resources or energy to fight against stressors, rather continue the resistance.

This sustained flow of corticoid hormones is adaptive and help in body's fight against stress but continued flow of these hormones is rather detrimental to the body. Since they draw on fats and proteins to make glucose to fuel the body against stressors, this has negative impact in the long run. Proteins are needed to manufacture cells like the WBC's (White blood cells) which in turn are very essential for body's immunity and defense. They need to be replenished quickly since they have a short life span. And when protein is being used to fuel for resources fewer white blood cells can be manufactured. These decrease one's immunity and elevates chances of disease. Finally, it takes the body to the state of exhaustion.

Stage-III- Exhaustion:

The last stage of the GAS model is exhaustion. As the very term suggests it incorporates exhaustion and complete depletion of resources after continued and persistent resistance. Here a person may no longer be able to word off infections and become sick. This could lease to stress induced ulcers, skin disorders, diabetes, high blood pressure and susceptibility to cancer (Bammer & Newberry, 1983 as cited in Morgan et al., 2004).

1.6.2 Perceived Stress

Perceived stress as the term suggests refers to one's perception of stress that is the thoughts or feelings that an individual has about how much stress they are experiencing. It incorporates components of uncontrollability of one's life, amount of charge occurring in one's life, level of confidence to deal with problems or difficulties. Thus, rather than focusing on types or amount of stressful events in one's life it focuses on how individual feels about the stressfulness and their ability to face the same. Thus, it focusses more on appraisal by individual rather than actual stressors. It is a manifestation of an individual's appraisal of the environment that is threatening and its interaction with the environment. Thus, an even maybe negative but an interplay of environment, once personality and coping may have an influence on how an individual thinks of the impact or severity of a stressful event (Lazarus & Folkman, 1984).

1.6.3 Stress, Perceived Stress, Positive and Negative Emotions

Murberg and Bru (2004) provides evidence that stress is linked with emotional problems. Stress and emotions have an association. Negative affect is correlated with perceived stress. This can have various interpretations. The higher levels of stress cause increased negative affect. But correlations are not causations, hence one cannot simply accept the claim. A negative perception of events, i.e., increased perceived stress could cause increased negative affect. This could be due to the fact that when in negative mood one evaluates the environment for possible explanation to justify the negative mood. A student with a negative mood may interpret an exam more threatening than a student with positive mood. However, there may be no link between the two variables at all. May be both of these, negative effect and perceived stress are a manifestation of same distress response (Watson, 1988). The correlations could be a manifestation of the fact that individuals who show trait of negative affect usually exhibit negative view of world and are complaining about everything (Watson & Clark, 1984). Furthermore, negative life events, negative emotions and perceived stress are known to augment vulnerability to illness, since higher the scores on these variables more the risk of common cold (Cohn et al., 1993).

Furthermore, perceived stress is also negatively associated with emotional intelligence. Thus, people with greater emotional intelligence can deal more effectively with environment. Since they have better control over their emotions, they feel use stress. They also exist better social networks, social competence and effective copping which facilities in regulating stress (Forushani & Besharat 2011). People who show high negative emotions are more likely to witness discomfort and this happens for them even in the absence of stress (Watson & Clark, 1984).

Positive and negative emotions have an important role in perceived stress among students (Khodarahimi et al., 2012). Both positive and negative emotions are known to be positively correlated with perceived stress. Thus, both types of emotions seem to have their own relevance with regards to perceived stress (Khodarahimi et al., 2012).

1.6.4 Stress and Resilience

The variables of resilience and physiological stress are often studied together. It is seen that homeless youth who exhibit higher psychological distress also reported lower scores on resilience. It is seen that life stressors that occur early in life are linked with immune consequences. Childhood adversity is associated with health problems later (Figundes, 2013). Resistance is known to facilitate recovery from negative emotions and perceived stress. Evidence lies in the results of study with nursing home residents wherein a negative correlation was seen between ego resilience and perceived stress. This correlation was a significant one. Thus, increased level of resilience decreases perceived stress or perhaps decreased level of perceived stress builds resilience (Elzohary, 2017). Social support and social functioning are known to attenuate the detrimental impact of stress on homeless people by augmenting their resilience and mini missing stress (Durbin, 2019).

1.7 The Disadvantaged Female

1.7.1 Understanding The Term Disadvantaged

Disadvantaged can be understood and operationalized in many ways. It refers to deprivation of advantage as the word suggest. It suggests an absence of advantage or equality, something that puts someone in an unfavorable condition ("Disadvantaged", n.d). It refers to an unfavorable prejudicial and/or inferior condition. It may also refer to a *"circumstance that makes achievement difficult"* ("Disadvantaged", n.d).

1.7.2 Women And Disadvantage

One of the noteworthy demographic attributes of India is the declining female male sex ratio. During 1900s it ranged and changed from 972 in 1901 to 935 in 1981 (Padmanabha, 1981 as cited in Kynch & Sen, 1983). Similarly in 2000s a decline in trend is visible too. 2013-15 saw 900 females to 1000 males with 909 in 2013 (Niti Aayog, 2020). If wellbeing is judged by a criterion like such ratio of the capability to live long then women's wellbeing has declined in India. However, the position of both males and females has augmented with augmenting social and economic progress but the relative position of women has weakened (Kynch & Sen, 1983). India provides a rather sad case of female depreciation but similar trends are visible in other countries

too (Kynch & Sen, 1983). Furthermore, from a worldwide study an important departure from worldwide trends is seen in low-income countries, wherein women are not equal to men. On the other hand, overall women depicted higher score on wellbeing than men on worldwide data set. Furthermore, when trends are studies within countries, women have shown higher levels of wellbeing than men in more educated urban cohorts. Also, presence and prevalence of legal/ regulatory framework that supports gender rights assertively is correlated positively with wellbeing of women in lower socio-economic nations. Thus, process of accruing gender rights is associated with low wellbeing and paradoxically long-standing gender equality is associated with higher wellbeing (Graham and Chattopadhyay, 2013). Thus, India as a nation has been an and is still in process of change and towards gender equal nation especially for the lower socio-economic strata. Thus, parallel measures to improve wellbeing of this strata is required. In intensely poor area of Haiti, India, Ghana, Tanzania and Philippines it was found that poor levels of material, natural and infrastructure resources were major contributors of stress as reported. However, skills, wisdom, marriage, relationship quality, motherhood, non-valance in family, supportive neighbor and empowering group membership represented as assets in women that facilitated coping (Bull and Kanyeka, 2013).

Women are way behind men when it comes to land ownership, educational achievement and access to finance. There exists gender-based constraints that limits a women's role in value chain. Some of these are inadequate legal protection, traditional gender norms and roles, gender related violence, risk of sexual and physical abuse, lack of control of resources (UNICEF, 2000). Thus, women are a disadvantaged gender, with respect to social and economic aspects and in totality this seems to have a toll on her emotional and psychological wellbeing.

1.7.2.1 *Women And Mental Health.*

Relevance of mental health problems is higher in people with lower incomes (Willims & Collins, 1995). Increased risk of depression is closely related with lower socio-economic status of women (Murray & Lopez, 1996). Furthermore, it is a widely accepted assertion that older women are more susceptible to health, economic and social disadvantage than men (United nation, 2005; World health organization, 1995). In India, older women show poor self- rated health and much higher rates of disabilities than men

of same age. Furthermore, education and economic empowerment as variables when controlled are known to narrow down the gender gap, however, gender differences that are statistically significant still persists. Thus, it is seen that economically empowered older women manifests either better or at least equal health than similar men. Female disadvantage in subjective health was known to narrow down after controlling for ownership of property and this even disappeared when controlled for economic empowerment (Roy and Chaudhari, 2008).

Emotional distress is strongly linked with poverty mostly in developing countries (Mohindra, Haddad and Narayana, 2008). In India clinical and community studies highlight the point that women are twice more likely than men to suffer from depression (Patel, 1999 as cited in Rao, Vanguri & Premchander, 2011). Many factors like poverty, social class, deprivation education account for this heightened gender susceptibility (Patel et al., 1999).

The data from five data sets constituting four low to middle income countries was used. Mental disorders were found to be associated strongly with low education, poverty and female gender (Patel et al., 1990; Saraseno & Barbui, 1997). It is also known that strategies like breathing exercises and counseling are of great help in the community setting (Grover et al., 1996). However, intervention might be very intensive both in terms of financial and human resources. Economic disadvantage is considered a major risk factor in post-natal depression. Thus, gender and economic strata play a vital role in mental health and poorer women are more susceptible (Patel, et al., 2002). Women residing in economically backward areas of India experience infant loss, health problems, unwanted pregnancy and socio-economic disadvantage. These women are at more risk of mental disorder and distress (Prost et al., 2012). As far as disadvantaged women are concerned, interventions that are psychological in nature would be of great help apart from economical intervention. Evidence of same is provided by Rao, Vanguri & Premchand, (2011). A positive change was seen by supplementing an ongoing an economic intervention with mental health intervention. Rural poor women's life both economic and social can be augmented by looking at mental health concerns along with economic and livelihood issues. A reduction in psychological distress and body aches was reported by women in experimental groups and relaxation techniques improved the

quality of sleep. Thus, facilitating such interventions in self-help groups/ NGOs/ rural poor women has a promising future.

Emotional wellbeing is an important determinant of success of psychological empowerment wherein negative emotions can rather mitigate or stop the process of psychological empowerment (Diener & Biswas, 2005). It is very few studies that take into account wellbeing as an indicator of development and lot of emphasis is laid on micro credit to women as a tool to empowerment.

1.7.2.2 *The Battered Woman*

Abuse of women in the form of battering is astonishing. Battering referrers to repeated and intentional sexual and/or physical aggression on a woman by spouse (Campell, 1989). Battering though as a term should be gender neutral but mostly has reference to females since it is known that 95 % - 99 % of battering is on females by males (Campell & Fishwick 1993 as cited in Humphreys, 2003).

The associated physical and psychological pain and distress is substantiated by a body of literature. Depending on the intensity, duration and type of abuse stress may reflect in many possible patterns. Various terms are used to understand various conditions that manifests in women. Usually reported as battered women syndrome (Walker, 1984 as cited in Humphreys, 2003) and post traumatic disorder (Astin et al., 1993). However, this is not the entire picture since all women exposed to battering do not manifest mental health conditions rather come out victorious. What could that be like?

The puzzle is completed by understanding the construct of resilience in the phase of adversity with reference to battering experience. Humphreys, 2003 reported in her study the significant psychological distress suffered by battered women. Also, this was associated with the severity and frequency experience. Also, an important finding was regarding the measurement of resilience in this sample of battered women. The battered women were known to show higher level of resilience as compared to the other samples like caregivers, Alzheimer's patients, public housing residence, female students and post-partum mother.

CHAPTER 2 LITERATURE REVIEW

2.1 Laughter

Literature includes studies that emphasizes, the role of laughter on both physical and psychological spheres, cardiovascular and neuroendocrine system. Pioneering names in the literature of Gelotology includes Lac Berk, William Fry, Norman Cousins, Patch Adams and many more.

2.1.1 Laughter And Neuroendocrine Responses

The classic stress response includes the HPA axis and the involvement of neuroendocrine system is well known. It is also known that positive emotional status plays a role in undoing the negative stress response by positively affecting the neuro-endocrine system. Hence in a study done in 1989, an attempt was made to understand how mirthful laughter could affect the biochemistry. An experimental study was conducted with ten participants, who were all healthy males. Five of them were a part of experimental group who viewed 60 minutes humour video and the other five formed the control group. It was seen that dopac and cortisol levels in experimental group decreased much more rapidly than control group (P=.011).

Also, the levels of epinephrine were lower in experimental group at all times compared to control group (P=.017). Similarly, a decline in growth hormone was also seen with the laughter intervention (P<0.0005) unlike the control group. Thus, one can infer that laughter brings about a lowering of serum cortisol, dopac, norepinephrine and growth hormone. And these are the so-called stress hormones which have a major role to pray in reversing the neuroendocrine stress response, hence laughter has a positive role to play in stress reduction (Berk et al, 1989). Thus, it is crystal clear from a very long time that laughter plays a positive role in stress reduction by directly impacting the neuro endocrine responses that are associated with stress. However, it is important to note the relatively small sample size before drawing any firm conclusions. Also, the sample was all males. Although the study being experimental in nature is likely more reliable with

even smaller sample. Furthermore, 1989 study can be seen as a precursor and a bed rock to future approaches to stronger consolidation. Having said that, another study was carried out in 2001 to understand the role of mirthful laughter in neuro immune responses. Have a larger sample, consisting of 52 men participated. Subjects were exposed to humorous videos for 60 minutes. And blood samples were taken in before during, after intervention manner. Thus 10 minutes before the intervention formed the baseline measure. Then again it was taken 30 minutes through the intervention, 30 minutes and 12 hours after the intervention. As a result, it was seen that there were increases in natural killer cells activity (P <.01); immunoglobins G (P <.02), active cytotoxic T Cells (P<.01), B cells (P <.01); helper T cells (P <.02); natural rules cells (P <.09); functional phenotypic markers for leukocyte subsets like activated T cells (P <.01); uncommitted T cells with helper and suppresser markers (P <.02). Thus, laughter intervention proved to be an effective healing and complementary therapy (Berk et al., 2001) Thus from these classic studies the role of laughter in stress and immune system is quite clear.

2.1.2 Laughter And Cardiovascular Changes

Attempts have also been made to understand how laughter affects cardiovascular changes. In a pilot study with eight college going students, it was found that laughter is linked to various cardio- vascular changes. The subjects were exposed to five minutes videotape of comedians in comfortable settling position. Decrease in peripheral resistance and arteriovenous oxygen difference and increase a cardiac output and stroke volume was witnessed during laughter condition. (Boone, Hansen & Erlandson).

2.1.3 Laughter And Hypertension

It has been seen in classic studies that mirthful laughter is accompanied by increased blood pressure but followed by decreased blood pressure. Thus, fifteen subjects were a part of the study wherein changes in blood pressure were seen as a result of laughter. These subjects were heterogeneous from point of view of cardiovascular health ranging from no cardiovascular condition to recent heart attacks. The age range was 51 to 67 years. Also, if they were under any medication that was halted for 24 hours before the study. The design consisted of 15 experimental runs, of which 14 experimental runs

included exposure to auditory stimulus that provoked laughter. It was a 15 minutes long pre-recorded skit performance of comedians. As a control care was taken to include an assortment of humorous content, this humour is subject specific and intention was to get maximum sample to respond. Also, primacy was given to spontaneous laughter over forced laughter, thus participants were told to laugh nicely on what they could or would. These were played individually for the subjects. Their blood pressure was measured before and after their mirthful responses. Furthermore, the mirthful responses were divided into two, chuckle and laughter. In the 15^{th} experimental run, video of Laurel and Hardy was the stimulus. It was seen that both systolic and diastolic pressures significantly increased during the mirthful laughter session as compared to when at rest ($P < 0.001$). Furthermore, longer the duration of mirthful laughter, longer the duration of blood pressure change. Also, a trend was noted that blood pressure decreased and became lower than pre- laughter condition after end of mirthful laughter experience. The most interesting aspect of the study lies in the measurement of blood pressure in mirth-less laughter condition, that is forced laughter wherein these subjects were asked to laugh and consequently they reported feeling no sense of mirth. The fascinating part is that there was found no difference between blood pressure changes in either mirthful laughter or simulated laughter. Hence the body could not differentiate. Further to this, such changes were measured with coughing too and it was seen that blood pressure increases were much more intense than the ones that occurred with laughter. Also, there was no significant decrease in blood pressure even after coughing stopped (Fry & Savin, 1988).

In 2008, in another study an attempt was made to understand if and how laughter intervention impacted blood pressure. The participants were 40 patients of hypertension. The participants engaged in laughter classes which happened twice a week for two months. Here the participants were exposed to popular comedy films. The classes lasted for around 1 to 1.5 hours. Systolic and diastolic pressure was measured. Before and after every session and before and after the entire study. Also, participants were encouraged to increase time of engagement with humour, by practicing humour with family at home, beyond the confined classroom experience. The results were optimistic. A significant decrease was found in systolic and diastolic blood pressure after every session. ($P<.05$)

so was it in 24 hour (P<.05). Thus, laughter intervention has both short term and long-term positive influence in decreasing blood pressure (Jalali, Kheirkhah, Ahmadi & Zarei, 2008).

2.1.4 Laughter And Pain Threshold

Studies have also been carried out to understand whether laughter has a role to play in pain threshold. The study that included six experimental runs including various conditions both in laboratory and field i.e., naturalistic setting. A within –group design was used to control against individual differences in pain threshold. Thus, pain threshold task was followed by either experimental task or control task followed by pain threshold test. Five of the six experimental conditions included watching comedy video (experimental) or documentary (control) and the 6^{th} experimental condition included live performances or naturalistic conditions. Various ways used to understand pain tolerance. Frozen vacuum wine cooler sleeve, inflated sphygmomanometer and ski exercise were the ways used in different experimental conditions. Various experimental conditions included the intervention either alone or in group, also to understand and control the factor of other's presence on laughter. In all, the results conclude that pain thresholds were much higher after laughter sessions. Also, this change in pain tolerance was proven to be a result of laughter and not positive affect. (Dunbar et al., 2012).

2.1.5 Laughter And the Elderly

Laughter has been studied quite a lot with the elderly. Many mental and physical conditions accompany old age and laughter is known to play a positive role. In a study an attempt was made to understand the role of laughter in form of humour therapy on quality of life of depressed elderly patient's elderly with Alzheimer's disease. A total of forty participants comprised the study, 20 of whom had depression and 20 of Alzheimer's. Ten of each group were subjected to Humour therapy along with standard therapy and remaining ten were subjected to only standard therapy. It was seen that scores on quality of life improved in both humour therapy group and standard therapy

group. Humour therapy was administered once in two weeks for one hour each. This study proclaims the importance of humour therapy in old age depression (Walter et al., 2007). However. it is important to note that humour therapy was given alongside standard pharmacotherapy and was not significantly different from standard therapy group. Thus, it could be inferred that the resultant influence of quality of life is due to standard therapy and not humour therapy. Furthermore, looking at the way humour therapy is operationalized will lend a better understanding of the study. Reading humorous stones and anecdotes, discussion of memories like spending first pocket money and many more that were assumed to being about a sense of humour in the group session.

In another study that was carried out in Japan. Impact of laughter and exercise was investigated. The rationale was to make exercise more encouraging and less boring by adding laughter to it. Thus 27 participants comprised the sample, who were randomly given the immediate treatment or delayed treatment group. It consisted of exercise and laughter in a 120 minutes session, which included general health related lecture followed by 50 minutes of watching comedy live or pre-recorded videos and 60 minutes of light, exercises. The result was increase in bone mineral density of experimental group so did self-rated health increase ($P<.001$ and $P=.012$ respectively). Thus, it was concluded the combined intervention of laughter and exercise has positive, physical and psychological effect (Hirosaki et al., 2012). This study pointed out at a combined effect of laughter and exercise, however, still there is a lack of clear- cut understanding of the independent effect of laughter. In both the above studies, impact of laughter is studied by incorporating laughter along with some other gown of intervention. Thus, there is a need to understand difference between laughter only and laughter with other intervention.

Thus, an attempt has also been made to study how laughter independently is associated with subjective health. This study is slightly different from the previous studies, since it used the survey method. Data of individuals who has participated in the Japan Gerent logical Elevation study (JAGES) was taken. Information was taken about laughter, subjective health, depression, socio economic and psychological aspects laughter was assessed from three angles- frequency interpersonal interactions and opportunities. Socio demographic factors and depression were adjusted to assess independent

association of laughter with subjective health. Higher amount of poor subjective health was reported by women who never or almost never laughed. Similar results were found for men (Hayashi et al., 2015).

Similarly, in another study it was seen that combining simulated laughter to exercise program has positive implications for elderly. Twenty-seven elderlies participated in the 'Large Active' program that combined laughing with daily exercise program. As a result, a significant improvement was seen in mental health, aerobic endurance and self-efficacy for exercise. Once again, a combination method, wherein independent impact of laughter was not assessed. However, it aimed to understand if adding laughter to their exercise would increase their motivation to exercise and it did (Greene, Morgan, Traywick & Rock, 2016).

2.1.6 Laughter Surveys

A few more studies incorporated surveys to understand laughter and it's benefits if any. In one such survey studies an attempt was made to understand as to what type of laughter people associated with health. For which the participants compressed both adults and elderly. For adults, health promoting laughter was the one that was active, strong, inhabited, including movement whereas, the older participants health laughter was the one that was appropriate socially. However, laughter was linked with positive emotions and lack of malice by both adults and older people (Mahony & Lippman, 2002). By this it is clear that there are generational different in perception of benefit of laughter, hence role of placebo and such individual differences should be considered in any study pertaining to laughter intervention.

In another study carried out in 2009, a cross cultural survey was conducted to understand both how laughter was beneficial or detrimental and how/or whether cultural differences exist in the same. Thus, a sample of 730 persons 366 from Aurangabad, India and 366 from Mississauga, Canada participated. The survey procured demographic information and information regarding lifestyle, laughter, life satisfaction emotional wellbeing, subjective wellbeing and health dimensions. As far as laughter was concerned it was divided into three levels- low, moderate and high. And for Aurangabad it was seen that

laughter had a beneficial influence which was mediated through moderate level laughter and levels 1 and 3- that is both low and high had no impact. On the other hand, for participants from Canada, Moderate level laughter was beneficial just like it was for Indian participants but high level of laughter at level three was associated with negative impact. (Hasan & Hasan, 2009). Thus, as universally acclaimed laughter is beneficial but the type and intensity of laughter and its benefit may or affected by cultural factors. Since laughter has a social element in it thus its Impact also differs from culture to culture.

2.1.7 Laughing Qigong Program (LQP)

Laughing Qigong refers to a program that combines laughter with Qigong. Qi (Pronounced as chee) refers to life force. And Qigong refers to various disciplines that are known to bring about improvement in Qi through body movements and involve attention to breathing. Wherein laughing Qigong combines laughing to it. It includes simulated laughter with focus on mind and body. Thus, in a study in Taiwan, Laughing Qigong Program was carried out with adolescents out of which 34 formed the experimental group who performed LPQ and 33 who were a part of the control group that simply did homework. A before and after design was incorporated wherein Self-esteem scales, Humour scale, face scales were used for psychological measures, for biological marker salivary cortisol levels were measured and blood pressure, heart rate and heart rate variability for physiological measures. It was seen that mood states and humour showed improvement in experimental group. Furthermore, a significant decrease in cortisol levels of experimental group was reported (P =.001). Thus, Laughing Qigong Program has a positive role in stress reduction (Chang, Tsai & Hsieh, 2013).

The same laughing Qigong Program was studied with elderly as well. This study comprised 66 elderlies from institutionalized setting. After the participants were matched for their general abilities, they were assigned to experimental or control group (23 in experimental and 33 in control). Participants of experimental group attended LQP for four weeks (twice a week). Using Mini Mental State examination, faces scale,

Geriatric Depression Scale and cortisol levels a comparison was drawn between experimental and control group. It was seen that scores on mini-mental state examination improved (P<.05) for experimental group. Similarly, there was an improved mood state (P <. 001) and decline in geriatric Depression Scale (P <. 001) in experimental group. However, there were no significant decrease in cortical levels in experimental group. This is rather unlike the previous study with adolescents using same LQP. Furthermore, for control group decreased mood states (P <. 011), enhanced generatic depression (P <. 001) and interestingly significantly higher control levels were reported (P <. 009.). Thus, it can be safely inferred that LQP has a positive impact on mental state, depression and mood of elderly in institutionalized care centres (Hsieh et al., 2014).

2.1.8 Forced Laughter

Studies have been done to find the impact of forced or simulated laughter. In one of the studies it was found that one minute of forced laughter had brought about a significant increase in positive affect. Seventeen college students formed the sample. Participants reported their mood before and after one minute of simulated laughter. They rated their mood by choosing one of the seven faces, that have rating from very sad (Score 1) to very happy (Score 7). The students reported positive affect even before forced laughter. However, they reported a significant increased positive affect after forced laughter (P<.01). Thus, a straight forward self-reported increase in positive mood is seen after self-induced, forced laughter for a period as small as one minute (Foley, Matheis & Schaefer, 2002). This clearly shows that one need not rely on sources of humor, comedy shows and the like for laughter. Even forced laughter has a significant positive impact.

Similarly, the aim of previous study was taken further and attempt was made not only to assess the impact of laughter on mood but also compare laughter's impact with smiling and howling. Thus 22 adult subjects participated in the study. They engaged in 60 seconds of Duchene smile on one occasion then in next treatment they engaged in forced laughter for 60 seconds. Similarly, on another independent occasion they engaged in 60 second of howling. They were free to decide the order of these activities. Similar procedure as was adopted in the proceeding study was used to measure their current emotional state. That is a rating on seven faces, wherein faces ranged from broad

smile to frown. Thus, they rated the face before and after each activity. The results showed that one minute's howling did not result in significant improvement in mood. However, 60 second of smiling did result in significantly higher mood ($P<.01$). Interestingly a greater mood increase was found after forced laughter ($P<.01$). Thus, it was clear that smiling and laughing elevates mood and can and should be used as a mood enhancing technique. However interesting to also note is the significantly stronger impact of laughter on mood as compared to smiling (Newhoff & Schaefer, 2002).

2.1.9 Laughter And Resilience

Laughter and humour have not been differentiated for a long time now. However, these two rather overlapping traits have been known to be protective factors with regards to resilience. Also, it is seen that highly resilient people have humour as one of them major traits (Werner & Smith, 1992).

Furthermore, clown without borders (CWB) have been providing psychological support to people in adversity, through laughter. Levine has mentioned the stories of those who were struck amidst crisis in disaster camps across the globe and have manifested resilience by laughing in the face of crisis (Technology, Entertainment, Design [TEDx], 2016).

Furthermore, Daniel Murray in TEDx, 2018, has talked about resilience and laughter. He has made a mention of company builders, United Kingdom's best-known leaders and royalty to show relation between stress management and laughter. He has further shared some personal experiences to back his claim.

Dave Berman (Daily laughers, 2018), emphasizes on the role of laughter coaching as a mechanism and tool to resilience. According to him resilience means the ability and capacity to laugh in the face of adversity.

2.2 Laughter Yoga

This section includes all the studies that incorporate laughter Yoga which is non humour based simulated laughter.

2.2.1 Laughter Yoga at Work Place

An attempt was made to understand the role of laughter yoga in improving self-efficacy at work place. Thus, 33 participants from a behavioral mental health facility staff were recruited for this study. They were administered laughter yoga for 15 minutes every day for 15 days. This was done using pre-test, post-test follow up design. Changes in self-efficacy were measured using capability awareness profile. A significant increase was found on self- regulation, optimism, positive emotions and self-regulation aspects of self-efficacy ($P < .001$; $P < .001$; $P < .001$; $P < .001$, respectively). A 90 day follow up was also carried out and a significant positive change persisted in all these four aspects after 90 day follow up as well. Furthermore, there were non-significant difference between self-efficacy scores between post and 90 day follow up (except for self-acceptance sub scale). Thus, it is clearly seen that laughter yoga played an all-important role in not just enhancing employee's self-efficacy at that point but also building it for quite some time (Beckman, Regier & Young, 2007). It can be said that laughter yoga has a lingering effect too and not just a transient sensation or a mere placebo.

In another study efficacy of laughter yoga was assessed in work place setting. In the same year as the previous study, impact of laughter yoga on employee's stress was carried out in Mumbai, India. Participants were 200 information technology professionals. The participants were randomly assigned into experimental or control group and the laughter yoga instructor was not involved in analysis and the experiment was blinded. Various psychological and physiological measurements were carried out. To measure emotions, positive and negative affects schedule (PANAS was used). To measure stress, Perceived Stress Scale (PSS) was used. Furthermore, four channel polygraph was used to measure respiration, skin conductance and electrocardiogram (ECG). Blood pressure was measured using ELKOMETER Sphygmomanometer. Also, levels of salivary cortisol were measured using Elesa kits. No significant changes were seen either within or between groups as far as heart rate, respiratory rate, heart rate

variability and breathing are concerned. However, there was a significant difference between laughter yoga and control group on systolic blood pressure measures (P <.04; laughter yoga group 120.78 mm/hg and control group 125.96 mm/hg). But there was no significant difference seen in diastolic blood pressure. Also, there was a significant difference within group before and after laughter yoga intervention. There was a 7.46 mm/hg reduction in systolic and 3.03 mm/hg reduction diastolic blood pressure in laughter yoga group. These results are consistent with Fry & Savin, 1988 and Ahmadi & Zarei, 2008, wherein, mirthful laughter was followed by decreased systolic and diastolic blood pressure. It is further verified that both mirthful stimulated laughter has the same effect on blood pressure. This had been tested by Fry & Savin in 1988 as well. Along with mirthful laughter they went ahead to see the impact of forced laughter on blood pressure.

Furthermore, significant difference in cortisol levels between pre and post test results of laughter yoga group were recorded (P< .001) (Nagendra et. al., 2007). Similar trend was seen with cortisol in mirthful laughter (Berk et. el., 1989). Hence it shows that both stimulated laughter and mirthful laughter have similar impact on cortisol and hence stress. With such results one may infer that the body and mind draws same benefits from mirthful and simulated laughter. It seems body cannot differentiate between the two.

As far as emotions and stress were concerned there was seen a difference (significant one) between total positive effect scores between experimental and control group (P< .001). Similarly, a significant difference on total negative emotions between groups was reported (P<.004). Furthermore, there was also a significant difference within laughter yoga group on both positive (P< .001) and negative emotions (P< .002). As far as stress was concerned there were significant differences between groups (P< .01) and within laughter yoga group (P< .02). Thus, laughter yoga has a positive impact on both emotions and stress and this is supported by psychological inventories and bio markers like blood pressure and cortisol (Nagendra et. al., as cited in American School of Laughter Yoga, 2007).

In 2015 another study was conducted in Singapore to understand the role of laughter yoga at workplace. Forty-three professional of multi-national engineering company

participated in the study. Using before and after design changes in intrinsic motivation and physiological responses (like heart rate and oxygen saturation). The intervention was carried out for two days. On day one itself significant pre post intervention differences were recorded in motivation (P = .038). Significant increase in heart rate was also seen. However, no changes in oxygen saturation were reported. On day two, too significant differences were noted before and after laughter yoga intervention on motivation (P = .001). Similarly significant difference reported with heartrate. On day two a significant difference was also noted in oxygen saturation level unlike day one. Day two there was more focus on breathing which would explain this change (Ram, 2015). One should be careful before drawing on any generalization based on the study since the study lasted just for two days which is rather a short duration to measure something like intrinsic motivation.

2.2.2 Laughter Yoga and Nursing Home Residents

Study has also been conducted with nursing home residents. This was in Turkey that the researchers wanted to understand how laughter therapy impacted quality of life among nursing home residents. Thirty-two nursing home residents comprised the experimental group and another 33 residents from other nursing home comprised the control group. This could have been major drawback since the assignment of subjects to experimental and control group did not ensure randomness although a mention is made of an attempt to ensure equality between two groups with regards to socio-demographic variables. Laughter yoga was administered for 21 sessions. Incorporating a pre-post design, short form health survey (SF-36) was used to measure quality of life. Significant difference was recorded in mean score on general quality of life (P< .01) between control group and experimental group. Also, a significant difference was found in mean score subscale between control group and experimental group (p< .05) (Kuru & Kublay, 2016). As far as quality of life is concerned, laughter yoga does seem to succeed.

In another study with nursing home residents, laughter yoga's impact on burnout, compassion satisfaction and compassion fatigue were carried out. Eight laughter yoga interventions spanned across 30 minutes lasted for two months for the laughter yoga

group. The Maslach Burnout Inventory (MBI) and the Professional Quality of Life Scale (ProQOL-IV) were used. These were administered before and after the intervention and also after eight weeks of intervention. As far as depersonalization, emotional exhaustion, and personal accomplishment sub scores were concerned there were no significant differences between control and experimental group. Neither were there any significant changes within experimental group. However, laughter yoga group showed increased compassion satisfaction in both post intervention measurements unlike the control group (Lynes, Kawar, & Valdez, R.M, 2019)

Another study was carried out among nursing home students to understand the impact of laughter yoga on stress in terms of salivary cortisol and subjective happiness. Using a pre- test post-test design with non-equivalent control group 48 student nurses made a part of the study. This was carried out right before their exams and job search (stressful time). Significant improvements were seen in terms of psychological stress ($p < .001$), salivary cortisol ($p< .001$) and subjective happiness ($p< .001$) as well (Lee & Lee, 2020).

Another study was carried out with nursing home residents to investigate the impact on mental symptoms and cortisol levels. For these 75 participants were recruited and randomly assigned to either experimental or control group. A significant decrease ($p <.05$) in the mean scores on Brief Symptoms Inventory was reported after eight sessions. Similarly, a significant decrease ($p <.05$) was noticed in cortisol levels in experimental group as compared to control group in three out of eight trials (Ozturk & Tezel, 2021)

2.2.3 Laughter Yoga, Wellbeing, Stress, Emotions and Quality of Life

Much research exists with regards to impact of laughter yoga on general well-being and quality of life. In a study done in Australia, it was seen that a single laughter yoga session affects well-being of those who join laughter yoga voluntarily. The exploratory pilot study consisted of 88 participants of which 44 were from seven different laughter yoga clubs in Melbourne and another 44 were randomly picked from '23rd longitudinal survey of Australian unity well-being index'. A single item was used to measure life satisfaction. Using the personal wellbeing index subjective well-being was measured (which has strong psychometric properties). The Depression Anxiety Stress Scale,

DASS. (Again, with strong psychometric properties) was used to measure stress, anxiety and depression. It was noted that those who volunteered had a low score on both life satisfaction and general well-being as compared to the other set of 44 participants before the intervention. This established the baseline difference between the two groups. The laughter Yoga (LY) group also recorded higher rates of negative emotions as compared to Australian sample. This could also hint out a trend such that people low on general well-being, life satisfaction and high on negative emotions are the ones who seek/volunteer for programs like laughter yoga. However, we are interested to understand how efficient these programs are. Significant improvement in the Life satisfaction and subjective well-being was witnessed among laughter yoga group after single laughter yoga session itself (P=.001, P<.001 respectively). Furthermore, there were significant changes in mood, stress, anxiety (P=.037, P=.024, P=.019 respectively) However there was no significant improvement in laughter yoga group as far as depression was concerned. Attempt was also made to understand whether laughter yoga was more beneficial to those who showed lower scores on well-being initially (i.e., baseline) for which the LY group was divided into two. Results were found out to be optimistic. The intensity of change was greater for those showing lower SWB score than participants within normative scores (P<.05) (Weinberg, Hammond &Cummins, 2014).

Another study (Cha & Hong, 2015) looked at the impact of laughter yoga on serotonin level, quality of life and depression among middle aged women. The intervention was carried out five times a week in a two-week program. They used a pre and post design wherein 14 women were a part of control group and 30 women formed the experimental group (which was further divided into three groups on the basis of level of their depression). Repeated measures ANOVA, ANCOVA and LISREL were used for statistical analysis. A significant increase in serotonin was recorded after the 10^{th} session (P= .006) the highest increase being in the severe level depression group (P=.001). Depression levels decreased the maximum in the severe depression group only after 5^{th} laughter yoga session (P=.007). Furthermore, path analysis showed that increase in serotonin mediated decrease in depression which in a way then was indirectly impacted by laughter yoga. It's rather interesting to take note of previous study mentioned before Weinberg et al., (2014) that no significant change was observed in depression scores

after a single laughter yoga session which makes us infer the significance of frequency of laughter yoga and the mediating role played by serotonin which was not addressed thereof. Also, in Cha and Hong (2015) research, the quality of life also showed significant improvement only after 10^{th} intervention (P=.049) and highest increase was again seen in severe depression group (P=.006) This further provides much strength to the known efficacy of laughter yoga with group that is already at lower functioning. Similar trend in results was seen in (Weinberg et al., 2014) wherein more improvement was seen with those who had lower initial/baseline subjective well-being scores. One may like to infer or rather predict the success of laughter yoga intervention to be more with a group at lower level of functioning, a more vulnerable group.

In a pilot study, the immediate impact of a single laughter yoga intervention was studied. The research was exploratory research using a voluntary/self-selected sample of 30 participants. How do you feel form was used to measure perceived state of mind and body. There was a stark difference between mean scores before and after the single laughter yoga session, from average 49.52 - 87.14 (Ahuja, Rai & Khullar, 2019) Another pilot study was carried out to investigate the impact of single laughter yoga session on positive and negative emotions and stress among school going adolescents. Standardized tool PANAS, Positive and Negative Affects schedule was used to measure emotions and stress was measured by a simple self-report ranking. Thirty-two participants were recruited and randomly assigned to either control or experimental group. Experimental group was administered laughter yoga while the control group carried out their daily activity/homework in the other classroom. Pre-test post-test design was used and hence Positive and negative emotions and stress was measured before and after the intervention for both the groups. A significant increase in positive emotions ($p < .001$) and significant decrease in negative emotions ($p = .002$) was seen after the intervention in experimental group. Similarly, a significant difference was seen between the control group and experimental group in post- test results with regards to positive and negative emotions ($p < .001$, $p = .003$) respectively (Ahuja, Rai & Khullar, 2020)

Similarly, another study was carried out to understand the immediate impact of laughter yoga on stress. This involved a single laughter yoga trial which lasted for thirty minutes

wherein 35 subjects were randomly allocated to either laughter yoga group, relaxation breathing or control group. The laughter yoga group showed lesser cortisol stress response in response to the Trier Social Stress Test as compared to both relaxations breathing group and control group (Meier, Wirz, Dickinson & Pruessner, 2021)

Qualitative study has been carried out to understand the impact of laughter yoga. One such study involved interview members of a laughter yoga club in a UK based laughter yoga club. Semi-structured interviews were used and analyzed using reflexive thematic approach. And it was found that participants reported laughter yoga as a tool to human connection and personal growth. They also saw it as a good coping tool against stressors of life. Another trend seen was the narrative of the beginning being *'skeptical'* to being and *'advocate'* by the end. Thus, it shows how laughter yoga may be seen through a critical lens at first, only to be well accepted later (Hatchard, & Worth, 2021) One should also keep in mind the limitations of qualitative approach. There is a high possibility of researcher bias.

2.2.4 Laughter Yoga Among Elderly

Laughter yoga intervention has not just been widely but also quite successfully applied with the elderly. In fact, the very term laughter yoga may conjure up a visual of the elderly bursting into a fit of laughter at a local park during their regular regime. This stereotypical presentation of laughter exercise bears testimony to its success or at least appeal with the elderly. Some of these multitudinous groups of elderly who engage in laughter yoga across the globe have been a part of many research studies which provide us valuable and critical account to find out how successful such interventions have actually been.

In one of the studies carried out (Ko and Youn, 2011), effect of laughter therapy on depression, quality of life, cognitive functions and sleep among elderly in community was explored. Hundred and nine subjects aged 65+ participated. They were assigned into one of the two groups- experimental and control. Geriatric depression scale GDS, mini-mental state examination MMSE, health related quality of life HRQOL by using short from health Survey 36 SF-36, Insomnia severity Index ISI and Pittsburg sleep quality Index PSQI were used as tools to measure various psychological variables.

These were used before and after four sessions of laughter yoga that lasted for one month for experimental group. Whereas, the control group did not do any laughter yoga. There was a significant decrease in mean GDS score after the intervention in laughter group (P=.027). There was no such reported change in control group. However, there were no significant changes in mini mental states (using MMSE) in both the experimental and control group. Also, significant changes were seen both in improvement in sleep quality and decrease in insomnia (P=.037) in the experimental group. Also, changes in bodily pain (BP) aspect of HRQOL were found to be statistically significant in laughter yoga group. Hence it can be summarized that laughter yoga has a noteworthy impact on depression, insomnia and sleep quality among elderly. This is one another study that supports the efficacy of laughter yoga with depression. Important to note again is that it is more than a single session of laughter yoga that resulted in any significant changes/improvement in relation to depression.

Another study that included an exploration with depression and life satisfaction was carried out in Tehran. This study too yielded results in line with literature. This study not only studied the impact of laughter yoga on depression and life satisfaction but also compared with impact of exercise program on life satisfaction and depression. It was found that laughter yoga proved to be as efficient as the exercise regime in betterment of depression and life satisfaction. Seventy elderly depressed women were participants of the study. They were randomly divided into exercise group, laughter yoga group and control group. The intervention of laughter yoga was administered by a trained instructor for ten days. Pre-test and post design was incorporated and depression (using Yesavage Geriatric Depression Scale) and life satisfaction (using Diener Life Satisfaction Scale) was measured. Results for all groups were compared. Significant decreases in depression in both laughter yoga group (P< .001) and exercise group (P< .01) were seen. Also, a significant increase in life satisfaction scores was recorded in laughter yoga group (P< .001). (Shahidi et al., 2011). Positive role of laughter yoga with regards to depression has been well established. Yet again, it is important to note that that the optimistic results with regards to depression included the intervention for more than a single session.

Another study with the elderly was conducted in Iran wherein impact of laughter yoga

on general health of elderly was the focus. General Health Questionnaire (which consisted of subscales measuring insomnia, somatic symptoms, anxiety and depression) was used to measure change if any in general health among seventy-two elderlies. A pre-test post-test method was used for the same. Subjects were randomly assigned into control or experimental group. A statistically significant difference was recorded in general health (P= .001) anxiety and insomnia (P= .03), somatic symptoms (P= .04) and depression (P=.07) between experimental and control group. The session was scheduled for six weeks (two sessions per week, 90 minutes each) (Ghodsbin, Ahmadi, Jahabin & Sharif, 2014). Once again optimistic results have been reported after two-week long laughter yoga with regards to depression along with general health, somatic symptoms, anxiety and insomnia.

Another study with elderly was conducted in the birth land of laughter yoga, India. It assessed stress reduction by laughter yoga among elderly residing in old age home. Sixty subjects were recruited using non-probability convenience sampling method and laughter yoga intervention was administered for four weeks. Levels of stress were measured using a structured questionnaire. Pre-test and post test scores on stress were compared. Significant reductions were found on stress after the intervention (P=.001). (Elamathi, 2015) This is in straightforward support of the positive role laughter yoga plays in stress reduction.

In the same year more studies of laughter Yoga were carried out with older people. It was in Australia that laughter yoga was carried out with twenty-eight participants, the sample being a convenience sample. Happiness (Using General Happiness Scale), blood pressure, pulse and positive and negative affect (using PANAS Positive and Negative Affect Scale) were measured using a pre-test post-test design. The session lasted for 30 minutes each (for six weeks) and post-test measures were recorded after 1st, 3rd and 6th week of the intervention sessions. Mean scores on positive mood were found to have increased significantly in the very 1st week itself (P= .001) whereas mean scores on general happiness increased significantly by 3rd and 6th week (P= .001 and P= .002 respectively). Also, between 1st and 6th session, blood pressure had decreased significantly (P= .027) unlike the difference in pulse rates which were found to be insignificant. Also, a significant decrease was seen in negative mood by the last session

(Ellis, Ben- Moshe & Teshuva, 2017). Thus, laughter yoga seems to affect positive mood more immediately than negative mood and general happiness.

Another study that suggests success of laughter therapy with older adults was carried out in Turkey in 2017. It measured whether there were any changes in loneliness and death anxiety using laughter therapy. De Jong Gierveld Loneliness scale (DJGLS) and Turkish death anxiety scale (TDAS) were used to measure loneliness and death anxiety respectively. A quasi experiment was conducted with a sample that comprised 50 adults (non-equivalent control group). Pre-test post-test design was used to measure results. Scores on DJGLS totals decreased significantly after laughter therapy intervention ($p< .001$). Also, scores on social and emotional loneliness subscales of loneliness scale (DJGLS) decreased significantly in the experimental group after the laughter yoga intervention ($p< .001$). However, significant decrease ($p< .05$) was only seen in exposure subscale of TDAS and not in overall TDAS or other subscales (Alici, Bahceli & Emiroglu, 2017).

2.2.5 Laughter Yoga for Cancer Patients

Although, the most swiftly accessible image of laughter yoga is that of elderly its successful applications have found way to improving lives of people with something as grave as terminal illnesses like cancer. The application of laughter yoga in hospital and community care centres with patients is remarkable and applause worthy. Critical accounts of its success, failure and scope follows.

A study using laughter yoga was successfully carried out with breast cancer survivors in Korea. Impact of Laughter yoga on depression, quality of life, resilience and immune responses among 37 breast cancer survivors was studied in the same. Experimental group comprised 16 participants and control group comprised 21 participants. Laughter yoga was conducted eight times in total. It was scheduled twice a week (sixty minutes per session). In order to measure depression, quality of life and resilience questionnaires were administered before and after laughter yoga session. Furthermore, blood tests were done to investigate the changes in T helper cells, T suppressors, Th/Ts ratios, total of the B cells, T cell in total, The ratio of T cell/B cell and the NK cell for immune

responses. A significant increase in variable of quality of life and resilience among breast cancer survivors was found among experimental group participants after laughter yoga session ($p < .001$). But difference in depression before and after the experimental intervention was not a significant one. Also, scores on immune responses before and after the session among breast cancer survivors was not significant (Cho & Oh, 2011). In this study laughter yoga intervention was carried out for a relatively longer duration but did not have much the positive effect on depression as was seen with the elderly in previous sections.

Farifteh et al., (2014) studied laughter yoga's influence on stress among cancer patients in Iran. Using randomized independent measures design they recruited thirty-seven cancer patients for the study. The participants were randomly put into control or experimental group. A pre-post-test measure of stress using QSC-R23 (Questionnaire on Stress in Cancer Patients) was employed. A significant decrease ($p<0.05$) in stress was found after laughter yoga in the experimental group. It is important to take note of the sampling method that is a convenience sample has been used. Nevertheless, this study underpins the positive impact of laughter yoga.

Another study was carried out with breast cancer patients in Korea. Role of laughter yoga in radiation dermatitis and pain reduction was studied. Nineteen participants were assigned to only radiation therapy condition (control group) and another eighteen of them to laughter yoga session during standard radiation therapy (experimental group). The sessions occurred twice a week until radiation therapy was complete. It was seen that both radiation dermatitis and pain had reduced in experimental group. Readings of dermatitis were taken by an oncologist who was made unaware to the patient's assignment to control or experimental group thus blinded of whether he/she was subject to laughter yoga or not. Thus, steps were taken to control bias which could have confounded the results. However, the difference in both pain and radiation dermatitis between the radiation therapy only group and laughter yoga with radiation therapy group was not significant. This has been attributed to smaller sample size (Kong, Shin, Lee & Yun, 2014).

Another study that was conducted with breast cancer patients studied the impact of

laughter yoga on depression, anxiety and stress among breast cancer patient. It was conducted in Korea. (The name used in this study for the intervention was Therapeutic Laughter Programme instead of laughter yoga but uses the same procedure/steps as in laughter yoga) A randomized control trial was used for the study. Thirty-one patients were a part of experimental and twenty-nine patients a part of control group. Four sessions of laughter yoga were carried out in total. Using a 11-point scale scores on depression, anxiety and stress were measured. Before and after design was used for the same thus measurements were made before and after the administration of laughter yoga and compared. As a result, a significant decline ($p<0.05$) in scores was seen after the very first laughter yoga session and after all the four sessions in experimental group. Such changes were not visible in the control group (Kim, Kim & Kim, 2015). The significant decrease in points on depression, stress and anxiety after the very first session shows the immediate efficacy of laughter yoga.

Another study that was carried out in Korea with cancer patients, investigated the role of laughter yoga in improving mood states and self-esteem among patients. Three sessions of laughter yoga were carried out (sixty minutes each). It included sixty-two patients in the sample. Thirty-three of them were randomly assigned to experimental and twenty-nine to control group. They were administered Profiles of Mood State to measure mood and Rosenberg Self-esteem scale to measure self-esteem. They were administered both the tests twice, once before and once after their laughter yoga session. Experimental group recorded significant reduction in mood disturbance after laughter yoga ($P<0.001$). Also, scores on self-esteem increased significantly for experimental group after laughter yoga sessions ($p<0.044$) (Kim, Kook, Kwon et al., 2015). Hence, laughter yoga has a promising impact on both mood and self-esteem.

Similarly, another study was carried out with gynecological cancer patients to understand the role of laughter yoga with entertainment music activity. Attempt was made to understand its role in depression, stress and health related quality of life. Seventeen subjects were randomly assigned to experimental group whereas 19 others in control group. They carried out laughter yoga for eight weeks (60 minutes weekly program). Using non-parametric tests like Mann-Whitney U test the values were assessed. Results showed improvement in stress, depression and the functional and

emotional domains of health-related quality of life (Lee, Kim, & Park, 2020) Care must be taken in interpreting and generalizing the results since laughter yoga incorporated with music and dance has been used in this research. The consequent results could be due to music and dance rather than laughter yoga.

2.2.6 Laughter Yoga and Diabetes

Laughter yoga has been applied and studied not just with patients with terminal illness but also with more common health conditions. It is also known to reduce blood glucose in diabetics. In a study in Taiwan 211 patients (With Type 2 Diabetes and not taking insulin therapy) were recruited. Out of these 110 comprised the experimental (that did laughter yoga) and 101 comprised the control group. Initially that is before the start of the experiment measure of blood sugar was recorded for a baseline. This was carried out after ensuring that all the participants had consumed a standard brunch of 250 Kcal. This established an equivalent measure at baseline. The experimental group instructed with a single laughter yoga session which included both lecture and laughter session. Control group was only given lecture and no laughter yoga. After 120 minutes blood glucose levels were assessed for both the groups. As a result, it was found that here was a significant attrition in increase of postprandial blood sugar (blood sugar after meal) in experimental group ($p<0.001$) whereas in control group postprandial blood glucose rather increased. Also, to understand changes in general wellbeing (including stress, mood, optimism, muscle relaxation etc) a 10-point rating scale was used in experimental group before and after the session. This was facilitated in a pre and post-test manner only with laughter yoga group that is the experimental group and overall, a positive impact was seen in the group as a result. (Cokolic, Herode & Krebs, 2013). This study incorporated a relatively large sample unlike most of the previously mentioned studies.

2.2.7 Laughter Yoga Among Organ Transplantation Patients

Kaspar, Baldwin, Johnson, Edling and Sethi (2012) studied the impact of laughter yoga on heart rate, heart rate variability (HRV), blood pressure (B.P) and immediate and long-term mood and anxiety and depression among those patients who were awaiting an organ transplantation. Beck Anxiety Inventory to measure anxiety and Beck Depression Inventory II was employed for measuring depression respectively. Both the measures were administered twice, once before and once again after laughter yoga and results were then compared. Thus, they used repeated measures design. The participants included three patients for heart transplantation and three for lung transplantation. Due to such a small sample size meaningful statistical analysis was not possible as intended but observational report suggested positive results related to immediate mood and heart rate variability. Since the study was a pilot study which had a very small sample size and lacked the intended quantitative analysis demands much caution in drawing any generalizations.

2.2.8 Laughter Yoga and Hemodialysis Patients

In a study effect of laughter Yoga on psychological variables (like quality of life, subjective well-being, level of optimism, amount of self-esteem, depression, variable of mood, anxiety and stress) and blood pressure, intradialytic hypotension and lung function among patients under hemodialysis was conducted in Australia. Design used in the study incorporated pre-post intervention design. Participants were administered laughter yoga once a week for 30 minutes each (in a total of four-week programme). There were 18 participants in total with a dropout. Although a decrease in stress and increase in happiness, mood and optimism was reported, but this was a non-significant one. As far as intradialytic hypotension is concerned, occasions of intradialytic hypotension declined from nineteen to four after laughter yoga intervention. However, no change in lung function or blood pressure was recorded. Additionally, a positive result was found on laughter yoga attitudes and perception scales that were administered on nurses working in the dialysis unit. They were asked to depict their degree of agreement as to whether laughter yoga had positive impact on patient mood or not and whether it is a feasible intervention or not. All the nurses either strongly agreed or agreed with the statements. A strongly convincing function of perception and attitude is

reflected in laughter yoga's success Calculation of sample size estimates indicated a minimum of 204 participants for future research for one to study any meaningful change in psychological variables. Therefore, it is possible to say that a small sample could have been a limitation of the study in not giving conclusive results. (Bennett et al.,2015)

In 2016, a study similar to the one done in Australia in 2015 was done in Korea. This study measured impact of laughter yoga on mood, cortisol level and health related quality of life among patients undergoing hemodialysis. The researchers used visual analogue, blood sample and The Kidney Disease Quality of Life Instrument to measure mood, cortisol level and health related quality of life respectively. Forty participants were randomly delegated to either control or experimental condition. Laughter yoga sessions were administered for 60 minutes once a week for four weeks and additionally for 15 minutes every day individually via telephone. Experimental Laughter group that did laughter yoga showed a significant betterment in mood and better quality of social interaction, role limitations due to physical health, emotional well-being, Mental Component Summary (MCS), and Kidney Disease Component Summary (KDCS) in health-related quality of life. However, as far as cortisol levels are concerned there was no was no significant change in serum level cortisol between two groups. (Heo, Kim, Park &Kil, 2016).

Another study was carried out to study the role of laughter yoga with hemodialysis patients. The study measured the number of people with depressive symptoms as a primary measure along with measuring subjective wellbeing, anxiety and patient reported outcome. Seventy-two of the sample formed a part of experimental group while 79 of the control group. The proportion of people with self-reported symptoms of depression reduced from 17% to 8% in the intervention group unlike the control group where it decreased only from 22% to 20%. No difference was seen as far as anxiety, subjective wellbeing or patient reported dialysis was concerned (Bennett et al., 2020)

Similarly, in another study with patients with hemodialysis, laughter yoga's impact on sleep quality, pain and endorphin levels was measured. Laughter yoga was carried out for 16 sessions in total, these lasted for 30 minutes each, twice a week. A significant decrease in pain and significant improvement in sleep quality was observed. However,

no changes were seen in terms of endorphin levels (Ozer & Ates, 2021)

2.2.9 Laughter Yoga Among Parkinson's Patients and Mentally Ill and Caregivers

Laughter yoga has also been applied with patients who have Parkinson's and their caregivers. They have also been scientifically studied. A pre-experimental study by using a pre-test, post-test design measured the impact of laughter yoga on well-being among Parkinson's patients and their caregivers in southern California. The sample comprised (convenience sample) 47 patients and 38 caregivers. "How do you Feel" questionnaire of laughter yoga international (it measures enthusiasm, energy, mood, optimism, stress, muscle relaxation mental relaxation, ability to laugh and level of friendship in groups) was used. Significant improvements on well-being were seen among both Parkinson's patients and their caregivers. (Decaro & Brown, 2016) An important limitation of the study would be the choice of tool to gather data. It lacks information on validity and reliability in spite of its very frequent use in studies.

To understand how laughter yoga impacted anxiety and sleep quality among Parkinson's patients, another study was carried out in Iran. Twenty-four participants were a part of the study. They were put (randomly) into control and experimental group. Laughter yoga was done by experimental group (instructed by a trained instructor) for 45 minutes each twice in one week (for a total eight weeks). Anxiety was measured using Beck scale for anxiety and sleep quality inventory of Pitezbourg was used to measure sleep quality. A The difference that was found in anxiety and sleep quality between control and experimental group was found to be significant (Memarian, Sanatkaran & Bahari, 2017).

Similarly, another study was carried out to understand the role of laughter yoga with respect to care givers of mentally ill patients. Impact of laughter yoga on perceived stress, quality of sleep and caregiver burden was measured. Sixty participants that is the caregivers were recruited for this study, using a convenience sampling method. They were randomly allocated to experimental and control group (30 each) and pre-test and post-test (after 7 and 14^{th} day) measures were taken. A significant decrease in perceived

stress and caregiver burden and improved sleep quality ($p < .001$) was observed in experimental group unlike the control group (Merin, Khakha & Satapathy, 2021)

2.2.10 Laughter Yoga and Community Care Workers

Laughter yoga's impact on community care workers have also been explored. This study was carried out in Africa with community care workers, working with HIV patients and their family members. The study used a mixed methods approach thus both quantitative and qualitative assessment were made. Since the study was relatively intensive a smaller sample size of seven community care workers was recruited and justified. They were administered laughter yoga for a month and after the intervention individual interviews were carried out and then was seen that the intervention had resulted in positive emotions, better coping and improvement in community care work. Qualitative results that measure anxiety, stress and depression were also in line with results from quantitative data. Thus, decline in anxiety, stress and depression was recorded after intervention (Hatzipapas, Visser & Rensburg, 2017)

2.2.11 Laughter Yoga Among Obese Women

Significant impact of laughter yoga has been recorded as far as perceived stress, stress response and fasting blood sugar of obese women is concerned. In this study that was carried out in 2018, 40 obese women participated and impact of laughter yoga on psycho- neuro- endocrine- immune responses were measures (Young & Sun, 2018).

2.2.12 Laughter Yoga and Military Graduates

Laughter yoga has also been applied in military settings. The rigorous and discipline lives that form a part of military life is full of stress too and optimistic results pertaining to laughter yoga will be of much benefit. Thus, it was seen that laughter yoga had a beneficial influence on physiological state, perceived stress, affect and resilience of military graduates. Forty-one graduates participated using pre-test post-test design, various psychological tools like perceived stress scale (PSS), positive and negative affects schedule (PANAS) and Connor Davidson Resilience Scale (CD-RISC) and qualitative self-report were used to gather data on stress, affect and resilience. As a result, a significant variation between experimental and control group on positive effect

(P < .005) and role emotional (P = .046), mental health (P =.033) and physical component (P < .005) aspects of general health were reported. Also, significant improvement was seen in resilience scores (P = .031). Thus, laughter yoga impacted military graduates in a beneficial manner (Killian, 2017).

2.2.13 Spontaneous Laughter Vs Laughter Yoga

In section 2.1 emphasis was on laughter, wherein most of the studies used humour dependent laughter for their studies. Thus, it was based more on spontaneous laughter. Whereas section 2.2 focused on laughter yoga which utilizes the forced laughter model. There have also been some studies that attempted to compare these two.

From literature we get to know that both forced laughter of laughter yoga and spontaneous laughter decrease cortisol levels. In a study in 2017, a sample of 120 students participated in a study that attempted to find out the difference in impact of forced laughter and spontaneous laughter. Hence the participants were enrolled to laughter yoga condition (Experimental group, watching comedy film (which is spontaneous laughter condition, second experimental group) and reading books (which became control group). This was done randomly. The study wanted to see if there were alteration in cortisol level, dehydroepiandrosterone (DHEA) levels and the ratio of these two (C/D ratio). It was found that both spontaneous laughter and laughter yoga decreased cortisol levels and C/D ratios with no changes in DHEA. However, it was also noted that effect of spontaneous laughter was slightly different than stimulated laughter for spontaneous laughter had longer lasting impact on cortisol levels (Fujisawa, 2017). In some classic study too, no difference was seen in blood pressure measurement between forced or spontaneous laughter (Fry & Savin, 1988).

2.3 Perceived Stress

Perceived stress seems to play an all-important role. Perceived stress is the result of appraisal of a situation, if the situation is perceived as stressful it will be stressful for that individual unlike the other. Hence, making perceived stress and its measurement more important than stress alone. The impact of perceived stress is detrimental to one's health as has been addressed in the previous section. There exits empirical support for

the same. Perceived stress predicts higher level of depression along with direct and in direct impact on various facets of mental health (loneliness, fatigue) as found in a study with the elderly. The study found mediation using structural equation modelling, as to whether social support and physical activity mediate relationship between stress and mental health (Kwag et.al., 2011)

Since perceived stress stems from the cognitive appraisal model of stress, studies have investigated the mediating role of self-efficacy (secondary cognitive appraisal) on relation between perceived stress (primary cognitive appraisal) and life satisfaction. The Perceived stress scale, self-efficacy scale and satisfaction with Life scale were used. The same was studied in a sample of 282 Korean undergraduates and a partial mediation effect was found. (Lee, Kim, & Wachholtz, 2016).

Disadvantaged neighborhood and environment seem to play an all-important role in perceived stress. One such study investigated relationship between characteristics of these disadvantaged neighborhoods and perceived stress. Multivariate linear regression models were used. Lower perceived stress was associated with improved neighborhood, social cohesion and perceived safety (Henderson, Child, Moore, Moore, & Kaczynski, 2016). Similarly, perceived stress seems to have been affected by various interventions, laughter yoga being one of them. There is empirical support to look at the way laughter yoga has been impacting stress and perceived stress. Apart from the research studies already discussed, (where significant difference in mean scores between experimental and control group at $p < .01$ and within laughter yoga group $p < .02$ was witnessed among IT employees (Nagendra et. al., 2007), military graduates (Killian, 2017) and the like), very recent research also shows a positive impact of laughter yoga's role in decline of perceived stress.

Perceived stress among aphasia patients seem to have been positively influenced by simulated laughter. The research study investigating the same involved a three day intervention program with twenty minutes sessions. The study used a within group design, thus comparing the results within the intervention group, wherein, data was compared with findings of three days laughter yoga intervention with results from three days of sitting (no laughter yoga) for the same set of patients. Pre and posttest measures were used along with qualitative feedback. Response was mostly positive although no significant changes were found with regards to perceived stress and laughter yoga

(McGuire, Laures-Gore, Freestone & Leer, 2021)

Using a quasi-experimental design, a study was carried out with 60 caregivers of mentally ill patients. The caregivers were split into control and experimental group. Seven sessions of laughter yoga were administered to the experimental group. Pre-test and post test data was collected (after 8^{th} and 14^{th} day of the intervention) and compared. A significant reduction in perceived stress was witnessed among caregivers in experimental group on the 8^{th} ($p<0.001$) and 14^{th} day ($p<0.001$). The control group did not witness any such significant change (Merin, Khakha & Satapathy, 2021)

2.4 Positive Emotions

2.4.1 Positive Emotions Broadening Impact

With much focus on negative emotions for a very-very long time and positive emotion taking a backseat, research on positive emotions finally emerged. It was 1959 that it was proposed that negative emotions narrow down people's attention forces (Easterbook, 1959). This viewpoint is empirically accepted till date. However, opposite has been proposed for positive emotions that is positive emotions lead to opposite effect which is widening of attentional focus.

Alice Isen, is a name of one of those pioneering researchers who has been studying the impact of positive emotions on cognition.

The claim has been made in Derrberry and Tucker (1994) wherein clinical research based on manic cognition has been used to support this claim. The expansive cognitive powers manifested by maniacs is affected by lithium treatment since it evens out mood and also thus diminishes patient's creativity.

Many such attempts are made with laboratory experiments to study the above claim that positive emotions enhance attention focus one such tasks use global- local visual processing. One of them involves participants to choose which out of two figures/ visuals is similar to another standard visual presented. One of the pictures looks like standard from global configuration whereas other visual looks similar to standard picture by looking at local elements (Kimchi, 1992).

Also, research based on the paradigm suggests that when failure feedback is given (as a part of experimental independent variable) it leads to local bias whereas, when failure feedback (again experimentally manipulated) is given it leads to global bias (Brandt, Derryberry & Reed, 1992 as cited in Derryberry & Tucker, 1994). However, testing these by employing a neutral condition (as control) is very essential to come to meaningful conclusions. However, these classic laboratory experiments do support those positive emotions broaden one's attentional focus unlike negative emotions.

The initial research laid the foundation for the relatively new and well acclaimed Broaden in Build Theory of Barbara Fredrickson (2004). Also, many more studies support the widening attention by means of positive emotions. Thus, a study was conducted wherein 104 participants were recruited. They were then randomly either assigned to experimental groups or control group one of the experimental groups was made to experience positive affect like amusement or serenity. Whereas the other experimental groups were made to feel anger or fear and the control group was made neutral that is to feel nothing. After being exposed to any of these conditions, the participants were asked to make a list of all that they wanted to do at that point. The ones in positive affects group had the longest list. This it can be inferred that passivity widens possibilities and cognition (Fredrickson & Branigan, 2005).

Similarly, using the global-local visual processing, attempt has been made how emotional state can influence perception by narrowed cognition or broadened cognition. Thus, along with measuring the length of list. Barbara Fredrickson and Christian Branigan (2005) went on to use the global local visual processing images & these were adopted from Kimchi and Palmer (1982). These consisted of triads that were made up of two comparison figures and one figure was standard.

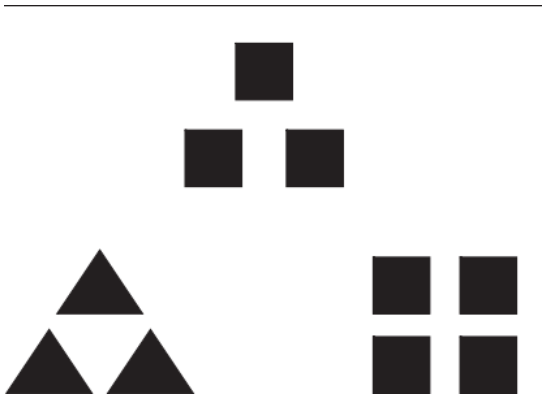

Figure 2.1 Sample item as used in global local visual images (Fredrickson, 2004)

The task of the subject was to choose one of the given figures and match with the standard. There was supposed to be no correct answer but only an either global or local configuration in matching the figures. Some may look at the picture as a whole whereas others will look at the detailed elements more. Thus, the main aim of the experiment was to see now emotional state impacts these differences. And it was fraud that those who were in positive affect group showed broadened thinking as compared to neutral group in terms of significant higher global bias (P=.032) and also higher global bias (P=.035) compared to negative affects group. However, the group that was made to experience negative affect did not show narrower scope of attention. Thus, no significant data was found pertaining to narrowed attention as is suggested by literature.

Attempt have been to replicate these studies that support the role of positive emotions in broadening people's attention. In this study (Wadlinger & Isaacowitz, 2006) which used eye- tracking technique, the participants eye movement was being recorded (60 times a second) by a camera while they watched pictures on a computer screen. Participants were randomly assigned to a group to either experience positive mood or none. Thus, participants were naturally looking at pictures that appeared. The arrangement was such that two pictures appeared at the periphery and one in centre. It was seen (by means of tracking eye movement) that those in positive mood group, moved their gaze and fixated as periphery, which was inferred as expansion of view and cognition. Thus, the role of positive emotions in broadening attentional resources is well established.

2.4.2 Positive Emotions Interaction with Negative Emotions

One thing is clear that positive emotions widen one's thoughts and cognition but not only these positive emotions are also known to undo the effect of negative emotions. Since the two emotions are contrasting in their function positive emotions should act as an antidote to the ill effects of negative emotions that are known to narrow down thought actions.

This effect of positive emotions on negative emotions have been tested in a study wherein negative effect was induced among participate by making them watch a firm that induced fear (confirmed by self-report) and increased cardiovascular activity. This acted as baseline and put all participant in air aroused condition after which, randomly some of them were assigned to a condition in which they would experience positive emotions (contentment and amusement by means of secondary films) whereas some others well assigned to experience negative emotions and others to a control condition to experience neutral mood. All participants had shown heighted cardiovascular activity but the participant who had been exposed to the positive emotions condition recovered to normal cardiovascular activity much faster (20 seconds) than those with neutral (40 seconds) and negative (60 seconds) emotional state (Fredrickson & Levenson, 1998).

Another attempt was made to study the above phenomena in a more neutralities setting as will wherein a spontaneous combination of both negative and positive emotions was studied for this subject were shown a film that reliably aroused negative emotion and increased cardiovascular response. After which it was noted that almost 2/3rd of participants happened to smile during the film for whatever reason or no reason. The researchers noted that these

participants on an average recovered faster (By 20 seconds) than non-spillers to their baseline cardiovascular rate. Most interesting to note is the fact that both smilers and non-smilers reported having similar cardiovascular activity and experienced the negative emotions. (Fredrickson & Levenson, 1998). Thus, situations that are adverse or known to arouse negative affect will affect all negatively but the ones who somehow apply as use some form of positivity recover faster from the adverse effects of negativity. Life cannot be devoid of negatives but our response can determine than far we let the negatives impact us.

Similarly, using similar secondary films that would arouse position, negative and neutral effect, another study was conducted wherein instead of film that was used to initially arouse negative affect in all, other tasks were used to induce anxiety (speech preparation task) and similar trend was observed, thus confirming how positive emotions play a role in undoing the effects of negative emotional (Fredrickson et al., 2000).

2.4.3 Other Implications of Positive Emotions

Broaden and Build theory has also been applied to understand how it affects and modulates own race bias. It is seen that positive emotion reduces own race bias as far as facial recognition is concerned. In an experimental study that tested this, 89 Caucasians were made to view both black and white faces for recognition bases task. The experiment comprised four stages, ranging from inducing emotional state like joy followed by learning phase, then exposure once again to a video to induce a particular emotional state followed by testing phase of the recognition task. Learning phase simply meant presentation of the stimuli material that consisted of the faces and testing phase incorporated presentation of stimuli material that included half the pictures as same as the one shown in first phase and the subjects were required to recognize which once, they had seen. As a result, it was seen that there was improved recognition of black faces when positive affect was experienced before both testing and learning phase as compared to when experiencing neutral or negative emotions (Johnson & Fredrickson, 2005). Thus; one can possibly give credit to positive emotions reducing own race bias and increasing in group identification rather than categorization.

Furthermore, positive emotions are proven to buffer genetic vulnerability to depression. In a study in 2007 whereas 279 twin pairs were tested on appraisals of stress and effect and life diagnosis of depression. A significant interaction between appraisal of stress and positive affect in association with negative affect showed the positive influence of positive affect. It was seen that higher positive affect brought a reduction in interaction between stress and co-twin depression. Thus, it can be concluded that positive emotions not only reduce or undo effect of negative affect but also buffer against genetic vulnerability by attenuating this genetic influence on negative mood biases. (Wichers et

al., 2007).

Also, as far as health is concerned positive emotional is known to have positive results. In a study comprising 334 healthy participations, it was seen how emotional style could affect susceptibility to common cold. These participants tendency to experience positive affect and negative effect was first measured. Then they were administered nasal drops that would lead to common cold. As a result, it was seen that those who had shown higher positive emotional style was associated with lowers risk of common cold. Various confounding variables were controlled before coming to this conclusion (Cohen et al., 2003).

2.5 Resilience:

Resilience, one's ability to bounce back in the face of adversity involves not Just survival but flourishing.

2.5.1 Resilience And Positive Emotions

In the previous sections we have already learned that positive emotions are known to build one's resources to cope and face adversities. Also, we learned that resilient people tend to express and experience more positive emotions (Block & Kremen, 1996). Much research has been carried out that supports then claims. In 2004, Michele Tugade along with Barbara Fredrickson set out to understand more about positive affect and resilience. Thus, 57 participants were recruited and baseline measurements of their cardiovascular activity were recorded. After which anxiety was induced among participants. This was done by giving them

60 seconds to prepare a speech. After this a three-minute recovery period followed. Furthermore, participants were assessed on resilience and positive and negative affects schedule. Also, they finished a self-report, sharing their emotional experience. It was seen that being asked to prepare a speech led to heightened cardiovascular activity (as compared to baseline) and increased anxiety as reported through self-report. Hence, we can say that the speech task was valid enough to induce anxiety. As a result, it was seen that those participants who showed higher trait resilience also showed faster recovery

from cardiovascular reactivity. It was found that duration of cardiovascular activity was negatively correlated with resilience (P<.05). Furthermore, it is interesting to note that there was a positive association between trait resilience and positive emotionality (P<.01) but no association with negative mood. It showed

association with happiness and interest during the task (P<.01, P<.01 respectively). And most importantly it was also found that positive emotionality mediated the effect of resilience on cardiovascular recovery since no significant effect of resilience was found on cardiovascular activity when positive emotions were controlled for. Thus, the role of positive emotions in immunity is vital and, it is seen that some individuals (the ones who are more resilient) can better use these positive emotions to cope with situations, rather they are more inclined to use positive emotions for recovery. It is important to note that irrespective of sex and trait resilience, all the participants experienced anxiety and cardiovascular activity after the speech task, thus it may be inferred that whether a person be resilient or not , they feel negative emotions, anxiety and stress in much the same manner as others but the only difference lies in coping or facing that situation, wherein resilient individuals use positive emotions more effectively and these in turn facilitate recovery that is much faster and hence better coping results.

Long term consequences of such positive emotionality are known to also be linked with mortality. A longitudinal study with 180 Catholic runs concluded so. The archival seconds this claim that included their hand written autobiographic and their medical records were obtained.

Thus, doing a content analysis of those essays, analysis of emotional content was done. Instances of positive emotions were recorded. Association was found between mortality and positive emotional state. The nuns who lived the longest were the ones who expressed the most positive emotions. They lived 10 years longer on an average (Danner et al., 2001). However, there are many more studies that high light link between living longer and positive affect (Ostir et al., 2000, 2001).

Positive emotions are also known to bring about reduction in experiencing pain as less distressful among patients of rheumatic arthritis. For these 43 participants who had arthritis were studied using telephonic interview. This happened over a period of eight

weeks. Using multi modelling a Pain X Positive affect interaction effect was found on Negative affect (P<.01) Thus when there was higher positive affect, a weaker relationship was seen between pain and negative effect. Thus, positive emotions which reduces negative affect in times of high pain among patients may thus be a factor of resilience (Strand et al., 2005).

A study that consisted of the sub studies was carried out in 2006 to understand the role of resilience and positive emotions in stress. Using multilevel coefficient modelling, it was found out that daily positive emotions mediated stress recovery. Furthermore, differences in trait resilience was responsible for changes in emotional responses. It was seen that high level of positive emotions help resilient people use their ability to recover from stress (Bergeman, Bisconti & Montana, 2006).

Furthermore in 2009, in a study conducted with 86 students, positive emotions were found out to predict increases in life satisfaction and resilience. The participants emotions were measured daily for a month. Furthermore, life satisfaction and resilience were measured at the start and end of that month. Where positive emotions were found to have a positive impact on life satisfaction and resilience negative emotions were found to have weak or no effect and also did not interfere with positive emotions benefits. Also, it was found that positive emotions mediated between initial resilience scores and final resilience however, life satisfaction did not show similar result. This point out that it is the momentary positive affect that to forms association between happiness and desirable outcomes unlike general positive evaluations (Cohen et al., 2009).

In another study carried out in 2009, the relevance of emotional memories in generating positive emotions was carried out two sub studies formed a part of this research wherein from the first study it was found that positive emotional memories network mediated expenses of positive effect and resilience in a situation of negative affect that is sadness. (Positive affect before experiment being controlled for). Study 2 rather was replication of first study, but here it reported context of anxiety instead of sadness and controlled for trait for positive affect (Philippe, Lecours & Pelletier, 2009).

Positive emotions are also known to be related with perceived advancement or betterment after terrorist attacks. This was tested in a study that recruited 194 university students and 309 of general population. This was carried out a week after March, 11, 2004 Madrid attack. Overall positive emotions were found to be associated with perceived benefits. However, 'attentive' and 'strong' were most closely linked to perceiving benefits from the event (regardless of their exposure level). One negative emotion that is hate also revealed a negative correlation with perceived benefits. Thus, it was crystal clear that positive emotions can and do exists in such stressful situations along with negative emotions. They not only exist but play important role in perceiving benefit of given situation (Vazquez & Hervas, 2010).

Similarly, positive correlations have been reported between positive emotions and psychological resilience among survivors and witness of 9/11 terrorist attacks. The co-relational study carried out by Young U. Onwukwe in 2010 recruited 159 participants randomly from a population of 500 (who had either survived or witnessed the 9/11 attacks). A modified version of Connor- Davidson Resilience Scale (CD-RISC) was used by the researcher to measure resilience. A positive correlation between resilience and positive emotions was reported. This clearly depicts the strong relationship between positive emotions and resilience following adversities such as terrorist attacks. Both the studies, be it with terrorist attack survivors or 9/11 terrorists attack yielded similar results highlighting importance of positive emotions link with resilience. However, the studies only highlight relationship between the two but nothing can be said about causation. Do positive emotions make one resilient or resilient individuals use positive emotions to cope with adversities.

Till here it is seen that positive emotions and resilience share a relationship however there could be some moderating factors between the relationships. One such factor that was seen in Philippe, Lecours and Pellier, 2009 was emotional memories. Another factor being cognition more specifically positive and negative thinking styles. In a study in 2015 this was investigated. Eighty-seven men and 184 women from a college participated. Results of the study showed positive affect's direct association with resilience. However, it was also seen, that thinking styles were associated with resilience too. But only negative thinking styles were known to have a moderating impact on the

relationship between positive emotions and resilience (Judd, 2015).

Role of cognition in terms of cognitive reappraisal, including positive appraisal and its impact on positive emotions and then subsequently on resilience have been widely discussed (McRae & Mauss, 2016).

There also exists a relationship between positive emotions, social support, resilience and post traumatic growth. A study with 1733 Chinese women who were diagnosed with infertility was conducted. The participants were administered Conner Davidson Resilience Scale (CD-RISC), Post traumatic growth inventory, Positive and Negative affect Schedule (PANAS) and perceived social support questionnaire to measure post traumatic growth resilience, negative and positive affect and social support respectively. It was found that participants had high post traumatic growth and this was related to perceived social support (P<.001) positive affect (P<.001) and resilience (P<.001). Furthermore, it was found that a mediating role may be possible on part of positive affect in relationship among resilience (P<.001), social support (P<.001). Thus, positive affect has on optimistic role as far as resilience, social support and post traumatic growth of Chinese infertile women is concerned (Kong et al., 2018).

In another study, the interrelation between positive emotion and resilience became evident. The study was designed to investigate the mediating role of resilience with regards to wellbeing and psychological maltreatment along with finding that positive emotions played moderating role on mediating effect of resilience. Participants were college students (n=381). Psychological maltreatment was found to have significant predictive effect on both social wellbeing and resilience. Resilience was known to decrease the psychological maltreatment's adverse impact on social wellbeing and positive emotions showed a cushioning impact on link of what psychological maltreatment had with resilience and also had a moderating impact of resilience on social wellbeing (Arslan, 2021)

Another study that highlights the link between resilience and emotions is the one carried out amidst the Covid 19 pandemic. The study comprised a total of 2000 participants representative of United Kingdom and United States of America. The results showed a positive correlation between resilience and positive emotions specially more so for those

with high negative emotions (Jacob, 2021)

2.5.2 Resilience And Perceived Stress

Resilience and stress do go hand in hand, but the direction of their relationship is known to be negative. It was found in a study with 520 students of nursing department of a university that there existed a significantly negative correlation between perceived stress and resilience (r
=- 0.51) and a significantly positive correlation between life satisfaction and resilience (r =- 0.39) and negative correlation between perceived stress and life satisfaction (r = -0.47). The sample was selected using random sampling method and resilience, life satisfaction and stress were measured using Conor Davidson Resilience Scale (CD RISC) Perceived stress scale (PSS) and Satisfaction with life scale (SWLS). Thus, working on students' resilience will make them more adaptive and show less stress and better satisfaction with life (Elzohary et. al., 2017).

To further understand more about stress and resilience, let's look at a study done with homeless youth. A longitudinal study was carried out with homeless adults, who had mental illness. They were in process of 24 month noting that changes in perceived stress and resilience

were recorded during the housing trial. Furthermore, it was seen how social support and social functioning and days of being housed (stable) related with measures of perceived stress. And resilience. It was found that resilience had increased and perceived stress decreased on an average after the housing term (24 months). Interesting to note is that high scores on social functioning and social support were associated with more resilience (Using multivariable analyses) whereas days of being stably housed were not found to be associated with resilience. As far as perceived stress was concerned, high scores on social support on social functioning were found to have been associated with lower scores on PSS. Furthermore, lower scores on PSS were also associated with greater percentage days of being housed stably. Thus, social support and social functioning play a vital role in stress reduction and enhancement of resilience among the homeless (Durbin et al., 2019). It is interesting to note the percentage stably housed

days had a role to play in reducing perceived stress but not increasing resilience. However, if perceived stress and resilience are also known to be correlated (from previous studies) then in a way stable housing conditions could and may impact resilience.

Another study carried around Covid 19 pandemic looked at and compared resilience and perceived stress among single, those in relationship without any inter partner violence and those in relationship with partner violence. Results showed significantly lower level of resilience and higher level of perceived stress in those who are in a relationship with partner violence unlike the other two groups (Buttell et al., 2021).

2.5.3 Resilience Among Women

2.5.3.1 *Resilience And Battering Experience.*

A study was carried out with 50 women who were residing in battered women shelter home. The study was carried out for 21 days. Using the conflict Tactics scale, battening experience was assessed and using Symptom Checkout-90 Revised (SCL-90) Psychological distress was measured. Finally using Residence Scale (RS) by Wagnild Young, 1993, resilience was measured. The present sample composed 20 African American, 11 Hispanic women 11 European-American 5 Asian- American, one Native or two mixed as far as bettering was concerned the scores were calculated based on frequency of minor to severe assaults (including sexual assault). It was 76% that had undergone an experience of ten or more minor assaults and 70% experienced ten or more severe assaults, it was only a small proportion of 8% who reported no assault. More intense and frequent distressful symptoms were recorded by battered

women in comparison to normative sample. In this, battered women sample 56% of them were found to have symptoms of PTSD. Also, a significant correlation was found between resilience and rating of health ($P<.05$). Also, inverse and significant correlation was found between resilience and all three measures of SCL 90 that is positive symptom total ($P<.05$), positive symptom distress index (PSDI) ($P<.01$) and global severity index ($P<.01$). Thus, those women who had higher amount of resilience, showed lower and fewer symptoms of psychological and physical distress overall. The battered women of this study who had higher resilience scores. Showed lesser cognitive impairment, lesser

symptoms of bodily dysfunction, lesser depression, anxiety and feeling of inferiority and inadequacy (Humphreys, 2003). Thus, it is crystal clear that psychological distress is associated with battering experience and resilience. The more the resilience the lesser the psychological distress. However, battering was not correlated with resilience and hence it is important to note that there is no particular relationship between battening and resilience. Thus, resilience may manifest in the face of adversity but its presence among human beings does not necessarily depend on presence or absence of adversity.

2.5.3.2 *Resilience And Women With Child Sexual Abuse History.*

A sample of 136 girl (who were victims of sexual abuse in their childhood) participated in a study. Sexual assault raging from fondling sexual intercourse, touching by males. It was seen that 60% of the cases reported sexual penetration along with 62% of some kind of pushing, chocking, slapping etc. In 34% of cases the perpetrators were immediate family member or extended family members. Thus, it was seen that 52% of the women had shown poor or fair amount of resilience and the ill effects of the abuse were overwhelming for them. On the other hand, 29% of them had shown good amount of resilience. As far as their coping was concerned, they overcome many ill consequences of child sexual abuse, but not in totality. Most importantly the 18% women who showed an excellent level of resilience score of 10 and above they showed competent functioning. Furthermore, analysis revealed that six variables that would explain the resilience of women in this study. Those variables being growing in a stable family, experiencing child sexual abuse but not by immediate family members, not experiencing physical pressure or force, doing high school education, not arrested and finally not being victimized again when an adult (Hyman & Williams, 2001) from this study it is clear that childhood sexual abuse is traumatizing and scaring , however presence of some protective factors can make individuals differ in their resilience from those who lacked these factors in the face of the savaging experience. Hence, if a vulnerable section that is facing adversity can be supplied with some sort of protective factors, one may hypothesize that resilience can result in their coping. Anything that reduces stress (since stress and resilience are related) and enhances positive affect (since positive emotion too are related to reliance) may act as a protective factor for road to

resilience.

Another similar study was carried out in 2008 to understand the role of family characteristics like family cohesion and family conflict and characteristics of child sexual abuse (severity and intensity of abuse, age of abuse, relationship to perpetrator) to resilience. Here resilience was operationalized (in terms of self-acceptance, environmental mastery and ability to form positive relationship with others). The sample consisted of 177 women with child sexual abuse history. They completed questionnaires that would assess the characteristics of their abuse experience, their family environment and present level of resilience in terms of self- acceptance, mastery environment and ability to engage in positive relationships with others). It is very interesting to note that 13-22% of the variance in well-being outcomes were accounted for by family characteristics and only a mere 3% or less of variance in wellbeing result could be attributed to abuse characteristics (McClure, 2008).

2.6 Female And Disadvantage

Females across the globe and specifically India have been at a disadvantage for many years. They have been at a financial, educational, Physical and Psychological disadvantage. And most likely the trend sees an association between there factors thus lower financial status would be correlated with lower psychological function. In spite of development and progress with regard to gender, relative position of women in India is weak and reflective of the sad scenarios of female deprivation (Kynch & Sen, 1983). In India it is seen that women are twice likely than man to suffer from depression (Patel, 1999 as cited in Rao, Vanguri & Premchand, 2011). Psychological intervention is known to have a positive outcome. Using qualitative research method, a study was conducted with women of two villages, who were a part of a self- help group practicing psychological wellbeing intervention and credit SHG activity for nearly one year and four years respectively. A focus group discussion was used as a qualitative method for this study and the focus of this was women's perception as to how useful was mental health intervention and women's perception as to how the credits and savings activity of SHG had impacted them. Women reported a positive outlook as far as savings and

credit activity was concerned. They reported increases income generating capability and economic security. This in turn increased their respect in family and incorporated them in decision making.

As far as mental health intervention was concerned women reported an improvement in the same. They reported improved quality of sleep facilitated by regular relaxation exercise, decrease fatigue and pain. Within family problems, poverty social exclusion lack of male child was some reported source of stress and the group setting and sharing with SHG was found to be destressing and relieving (Rao, Vanguri & Premchand, 2011). Females have been seen scoring higher on perceived stress across various studies. In one study (Pangtey et al., 2020) females scored 19.75 on Perceived Stress Scale as compared to men who scored 18.69 on an average. Similarly, in a study in Denmark (for norms for PSS) women scored 11.7 compared to 10.2 in men with similar trend in USA (Wilkinson & Pickett, 2007)

Thus, female have been under constant source of stress and discrimination and interventions like these ensure a buffer against suffering mind.

2.7 Conclusion From Literature Review

After getting the in depth of understanding of laughter and laughter yoga, positive and negative emotions and its relationship with resilience, resilience's relationship with perceived stress and disadvantage section of females and their resilience and psychological well-being some conclusions can be made to summarize the literature reviewed.

It is clear that both laughter that is spontaneous or simulated have a beneficial impact on human beings (whether be it blood pressure, cardiac responses, stress related hormone response system or more psychological variables like stress, anxiety, depression emotions and the like). Simulated laughter's benefit over spontaneous laughter lies in its universal unconditional, unbiased, culture-free, sustained and non-offensive nature.

Further to this, it is also clear how important are positive emotions that had taken a rather backseat in the light of negative emotions. It is known how positive emotions broaden ones thought action repertoire and builds personal resources and resilience. Most of the literature is suggestive of the strong correlation between positive emotions and stress, with very little depicting clearcut direction of any causation. The review suggests both positive emotion's role in building resilience and use of positive emotions by resilient individuals (depending on how resilience is operationalized, whether as a trait or as a process). Furthermore, the inverse relationship between perceived stress and resilience is also made crystal clear. Thus, it is clear that resilient individuals show better coping of stressors. Modalities and variables that bring about stress reduction also bring about increased resilience (Durbin et al., 2019).

Finally, an understanding was established that various protective factors like education, financial standing and family cohesion influence resilience among disadvantaged women. Specifically, resilience among the battered women and females with childhood sexual assault history varied due to family characteristics more than characteristics of abuse. Thus, protective factors, at the periphery of adversity and not the adversity itself is a more important factor in resilience among disadvantaged females. Hence ways and means to enhance protective factors should be given importance when adverse circumstances are inevitable to remove.

Putting all this together, there exist a huge room to join all the dots. Owning to the benefits of simulated laughter over spontaneous laughter more studies are required to be carried out to test its efficacy. Laughter yoga as a modality using simulated laughter and breathing exercise has been widely applied in clinical setting with patients of cancer, diabetes, hypertension, arthritis, Parkinson's and their care givers. It has been widely been explored with the elderly. However, not much work in done with general population (non-clinical) and no work is done with the disadvantaged females of society.

Furthermore, there is a dearth of scientific research studies on laughter yoga in India (in spite of being the birth land of laughter yoga), specifically North India. Also, it has mainly been used as a complimentary therapy and not studied to investigate its role as a preventive tool, a tool to build resilience.

Boone, Hansen and Eriadson (2000) made a mention of unknown psychological variables with some physiological variables in laughter prescription of health. Much more research is needed with many psychological variables that have not yet been usually explored. There exists limited research with respect to laughter yoga and resilience. And in the studies that have tried to understand the link between laughter yoga and resilience, mediating role of variables like positive emotions and stress have not been incorporated.

Positive emotions are known to be positively related to resilience that build personal resources. And laughter enhances positive emotions. Thus, there is a scope to understand if laughter yoga can act as protective factor to resilience, increase positive and decrease negative emotions and perceived stress among disadvantaged females.

CHAPTER 3 METHODOLOGY

3.1 Statement of the Problem

The problem is to study the efficacy of laughter yoga on resilience, emotions and perceived stress among disadvantaged females.

3.2 Definition Of Terms

This study made use of the intervention of laughter yoga which is a widely popular term across the globe and is being practiced in more than 100 countries (Laughter Yoga International, 2019). The intention of the present study was to see its impact on both positive and negative emotions and perceived stress and resilience. In the following section these terms are discussed.

3.2.1 Laughter Yoga

Laughter yoga (LY) refers to a relatively novel exercise schedule that incorporates simulated laughter and breathing exercises. It was developed by medical doctor, Dr Madan Kataria in 1995 in Mumbai (Laughter Yoga International, 2017). This study has used the standard procedure for laughter yoga which included the following fixed steps

Step I

- Clapping with chanting Ho Ho Ha Ha
- Laughter exercises (Foundation exercises were always included) along with deep breathing in between exhaustive exercises

Step II- Laughter meditation and

Step III- Conclusion by guided relaxation (humming was used)

Thus, a fixed procedure was used to administer laughter yoga in order to ensure that a standardized procedure is adopted. The researcher is a trained laughter yoga teacher certified both in basic laughter leader training and advanced laughter teacher training from Laughter Yoga International, Bangalore.

3.2.2 Positive And Negative Emotions

Positive and negative emotions were measured using PANAS. The PANAS scale or Positive and Negative Affect Schedule as we call it consists of a list of feelings and emotions on which one rates, based on how one is feeling. The scale was developed in 1988, by David Watson, Anna Clark, & Tellegen. PANAS investigates some of the negative emotions we face on a daily basis: ashamed, distressed, guilty, hostile, irritable, nervous, upset, jittery scared, and afraid and some positive emotions like joy, pride, strong, enthusiastic, alert, attentive and active. Since for our population English language was not a feasible option the Hindi version of the scale was used (Pandey & Srivastava, 2008). A time-span can be/should be selected before filling in the scores. Thus, the respondents were required to fill in their responses by keeping in mind the last month. This scale was administered twice, once before the laughter yoga intervention that is at the start of the study and once again after one month of laughter yoga intervention.

3.2.3 Perceived Stress

Perceived stress as the term suggests is an individual's perception and appraisal of how stressful a stimulus is. Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983) PSS as we know it is used to measure perceived stress. It is both a valid and reliable tool. Since, English was not a favorable and feasible language for our population, Hindi version of the scale was used (Pangtey, Basu, Meena, & Banerjee, 2020). Again, the respondents were required to record their responses as experienced in the last month.

3.2.4 Resilience

Resilience has been operationalized in different ways. One way of looking at it is an individual's ability to not just survive but also thrive in the face of adversity. CD- RISC- The Connor- Davidson Resilience Scale is one measurement tool popularly used to measure resilience. The CD-RISC literature is vast, the scale has many translations and

wide populations including survivors of various traumatic events, large communities, adolescent, elderly, patients with PTSD, Alzheimer's caregivers, members of different ethnic groups and many more. CD- RISC- The Connor- Davidson Resilience Scale- Hindi version 10 item scale has been used for the present study (Connor & Davidson, 2003). The scale has a very high construct validity, convergent validity and divergent validity along with high test re test reliability (r=0.87)

3.2.5 Laughter Quotient

This is a measure of one's ability to laugh without a reason. It was a measure as devised by Laughter Yoga International. It also helps to assess one's ability to express emotions and 4 elements of joy. These include singing, laughing, dancing and playing. The final score gives a quotient (Laughter Yoga International, 2017). It is a widely used measure, however, data regarding its validity and reliability are not available. It is used as a supplementary tool in this research.

3.2.6 Perceived State of Mind and Body

This refers to one's state of mind and body as perceived by them. Thus, this may not necessarily reflect a person actual bodily state in terms of physiological indicators like blood pressure or skin conductance but refers to their self-reported state and change in state of body and mind. Thus, making it more relative than absolute and thus helping to understand how participants may feel or perceive the change in their physical and mental states which include their self- reported level of mental relaxation, muscular relaxation, their awareness of breathing, level of friendship in group to just name a few (Laughter Yoga International, 2017)

3.2.7 Disadvantaged

Many ways can be used to understand the term disadvantaged. It usually means deprivation or lack of advantage. It refers to unfair, inferior condition and absence of equality that puts one in an unfavorable condition ("Disadvantaged", n.d.) And here the term disadvantaged refers to those females who are by virtue of their condition deprived of what would make them equal to men, they are deprived of basic quality of life and psychological well-being. Here only females in NGO setting either shelter homes or day

care or self-help groups have been included. Both girls below the age of 18 and women above the age of 18 were included.

3.3 Variables

Independent Variable

Laughter yoga intervention is the independent variable

Dependent Variable

Resilience, Positive and negative emotions and Perceived stress are dependent variable

3.4 Objectives

- To investigate the impact of Laughter yoga on perceived stress.
- To investigate the impact of Laughter yoga on positive and negative emotions
- To investigate immediate impact of laughter yoga on state of mind and body.
- To investigate the impact of Laughter yoga on positive emotions among those who show high level of perceived stress.
- To investigate the impact of Laughter yoga on negative emotions among those who show high level of perceived stress.
- To investigate the impact of Laughter yoga on positive emotions among those who don't show high levels of perceived stress.
- To investigate the impact of Laughter yoga on negative emotions among those who don't show high levels of perceived stress.
- To assess the efficacy of Laughter yoga on resilience
- To investigate the efficacy of laughter yoga on ability to laugh and express emotion

3.5 Hypotheses Of The Study

Hypotheses refers to a tentative solution to a problem. For this investigation the following directional hypotheses have been used.

- There will be a significant decrease in perceived stress after laughter yoga in experimental group
- There will be a significant increase in positive emotions after a laughter yoga intervention in experimental group
- There will be a significant decrease in negative emotions after laughter yoga intervention in experimental group
- There will be a significant increase in positive emotions after a laughter yoga intervention among those who show high level of baseline perceived stress in experimental group
- There will be a significant increase in positive emotions after laughter yoga intervention among those who don't show high levels of baseline perceived stress in experimental group
- There will be a significant decrease in negative emotions after laughter yoga intervention among those who show high levels of baseline perceived stress in experimental group
- There will be a significant decrease in negative emotions after laughter yoga intervention among those who don't show high levels of baseline perceived stress in experimental group
- There will be no significant change in positive emotions in control group
- There will be no significant change in negative emotions in control group
- There will be a significant increase in resilience after laughter yoga intervention in the experimental group.
- There will be a significant difference between immediate perceived state of mind and body before and after single trial laughter yoga intervention in the experimental group
- There will be a significant increase in the ability to laugh and express emotion

after laughter yoga intervention in experimental group

- There will be a significant difference in perceived stress between control group and experimental group after the intervention
- There will be a significant difference in positive and negative emotions between control group and experimental group after the intervention
- There will be a significant difference in resilience between control group and experimental group after the intervention
- There will be a significant difference in ability to laugh and express emotion between control group and experimental group after the intervention

3.6 Description of the Participants

Purposive and convenience sampling was done to carry out the research. Purposive sampling technique is a non-probability sampling technique. A non-probability sampling technique is the one that does not guarantee the probability of each member of its population to get a chance to be a part of the sample. And purposive sampling is one which is based on researcher's purpose and belief that the sample being picked is serving the purpose and is representative of the population in question (Singh, 2015). This sample is purposive because of the investigator's judgement that non-governmental organizations (NGO') and shelter homes for underprivileged

women is representative of disadvantaged female population and would serve the purpose. Convenience sampling is a non-probability method of sampling. As the term suggests it is based on the researcher's convenience (Singh, 2015). However, this sample is convenient since whichever non-governmental organization and/or shelter home was convenient to approach and gave permission to conduct research was included. In this way sampling is purposive yet convenient.

3.6.1 Number Of Participants

Total 130 participants were recruited and randomly assigned to either control or experimental group. Out of which seven were dropouts from experimental group and one from control group. Various Non-governmental organizations working with underprivileged or disadvantaged females were identified and two of them (in Dehradun, Uttarakhand) were both feasible geographically and also easily gave

permission to carry out research. The participants who were staying in these NGO's were all recruited

- Inclusion Criteria
  - Must be a female
  - Must be living in shelter home or residing in the NGO
  - Must have been there for minimum six months
  - Must not be receiving any psychotherapy, counselling or relaxation intervention (including sports and exercise)
- Exclusion Criteria
  - Male
  - Living in the premises less than six months
  - Care taker
  - Economically independent

Table 3.1

Showing Group details based on Number of participants

Group			
Variable	Sub Variable	Frequency	Percent
Group Females (Aged 25 to 45)	Experimental	65-8=57	47.10
	Control	65-1=64	52.90
	Total	121	100.0

The Table 3.1 Shows the group details on the basis of the number of participants. The table reflects that the control group and experimental group had 65 each at the beginning of the research. However due to various reasons (such as overlapping music class, board exam and the like) a total of 8 participants left the experimental group after initial few sessions and one left from control group. Thus, meaningful result could be analyzed

with 57 in experimental and 64 in control group. A visual representation of the sample as presented in table 3.1 is given below.

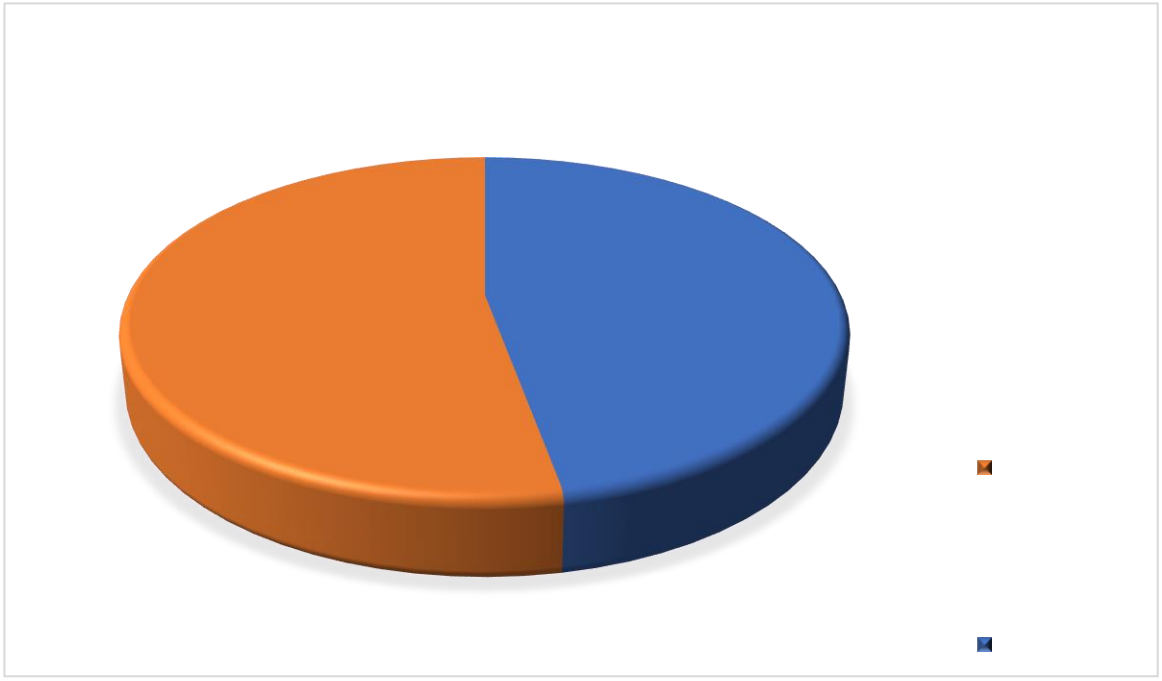

Figure 3.1 Showing Group details based on Number of participants

3.7 Schematic Representation Of Research Design

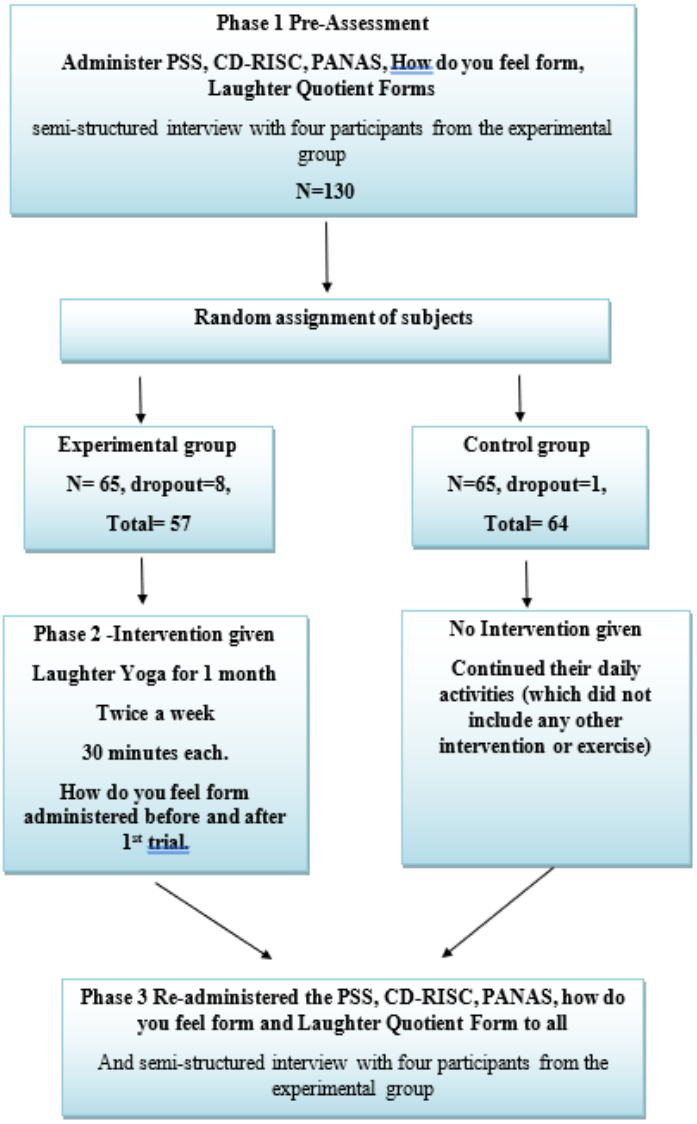

Figure 3.2 Showing the step-by-step design of the study

The above schematic representation gives a comprehensive summary of the process. A pre-test post-test randomized control group test was followed. Thus, all the scales were

administered before and after laughter yoga intervention. The experimental group did laughter yoga (for 1 month, twice a week for 30 minutes each) whereas the control group did not do laughter yoga and engaged in their daily activities. After the one-month period both the groups were administered the same scales. Apart from this, semi structured interview was carried out both before and after the intervention with four participants from experimental group (since only four agreed)

3.8 Measures

3.8.1 PANAS Scale or Positive and Negative Affect Schedule

As mentioned earlier this scale was originally constructed by David Watson, Anna Clark, and Auke Tellegen in the year 1988. This looks at some of the negative emotions and some positive emotions as elaborated earlier. Also, it was mentioned that for our population English language was not an option therefore a Hindi version of the scale was procured (Pandey & Srivastava, 2008). The respondents were supposed to fill in their responses by keeping in mind the previous month. This scale was once before the laughter yoga intervention and then after one month of laughter yoga intervention.

Properties of the scale PANAS H-

Translation of original PANAS was done (Pandey & Srivastava, 2008). Some properties of the Hindi version of the scale are as follows-

Sample

The sample consisted of 179 Hindi speaking participants on whom the test was administered for the purpose of psychometric evaluation. This consisted of 112 males 67 females using incidental sampling (Pandey & Srivastava, 2008).

Procedure and Results

The original PANAS English version was translated and given to experts who rated the adequacy of translation on rating scale of 1 to 3. If rating was less than 3 their suggestions were incorporated and changes made in the wording of the scale. The scale with instructions in Hindi was administered to 25 participants (to ensure its

comprehensive) before being administered to 179 subjects. Using exploratory factor analysis a convincing result was found. It indicated a clear occurrence of two factors of positive and negative affect in Hindi lexicon and thus can validly measure using Hindi words (Pandey & Srivastava, 2008).

3.8.2 Perceived Stress Scale PSS

PSS or the Perceived Stress Scale as it is known (Cohen, Kamarck, & Mermelstein, 1983) is a reliable tool that is used to measure perceived stress. As mentioned earlier in this section that English was not a favourable language for this study's population, Hindi version of the scale was procured (Pangtey, Basu, Meena, & Banerjee, 2020). The participants were to give their responses as experienced in the previous month. This too was administered before and after the intervention.

The psychometric evaluation of the Hindi version was carried out with 480 participants in Delhi. They aged between 25 to 65 years old. Translation was done by firstly carrying out a forward translation of English PSS into Hindi. This was done by a native speaker. This was followed by next step that included a back-translating thus again back to English language. This was carried out by another native speaker. Furthermore, this forward translation and backward-translation was carried out till the back-translated version aligned with the English (original version). After all this, 10 adults were used to pre-test the translated version. These participants were not part of the further study. After translating the original English PSS to Hindi, the tool was validated in the participants. The internal consistency was given by Cronbach alpha value which was .73. Thus, it had a good level of internal consistency. Reliability coefficient was found to be 0.71. This was done using a particular reliability method that is -Spearman-Brown split-half reliability. Thus, reliability was adequate too. Furthermore, the result of component analysis showed three-component structure (Pangtey, Basu, Meena, & Banerjee, 2020).

3.8.3 CD- RISC- The Connor- Davidson Resilience Scale.

The CD-RISC or the Connor- Davidson Resilience Scale is used to measure resilience. It has many translations, including Hindi which made it a worthwhile tool for our population which could be tested more easily in Hindi language. The Hindi version is called the CD- Risk- The Connor- Davidson Resilience Scale- Hindi version. This consists of 10 items (Connor & Davidson, 2003). The scale has a very high test re test reliability of r=0.87. It also has high validity in terms of construct validity, convergent validity and divergent validity. Construct Validity is evident in many ways like augmentation of five points on the CD-RISC 10 with simultaneous decrease of two and a half points on another inventory- the Beck Depression Inventory (BDI) is a mark of construct validity. There are innumerable studies that back the high construct validity of the scale. (Connor & Davidson, 2003). Equally numerous are number of studies that back its high convergent validity like the one where a correlation (significant one) was found (r = 0.60) between Wagnild and Young's Resilience Scale-25 and the CD- RISC-25 (Sarubin et al, 2015 as cited in Connor & Davidson, 2003) Similarly, many studies show high divergent validity. A study like the one that found no relationship between the extent of spinal cord damage of 60 spinal cord injured patients and CD-RISC 10 (Kilic et al, 2013 as cited in Connor & Davidson, 2003).

3.8.4 Laughter Quotient.

Laughter Quotient Form was originally constructed by Laughter Yoga International (Laughter Yoga International, 2017). Again, owning to it being in English a translated version in Hindi was required. This was not available hence the translation procedure had to be carried out. Thus, a translation was carried out from original English to Hindi by an expert from languages department of a leading high school (Also, translation was carried out by researcher for sake of expertise in terms of subject area and content and shown to the expert). A final agreed upon version of the Hindi language was backward translated by another expert from the organization. The two versions were then looked at closely. Then both original English and Hindi translated version was administered to a bilingual sample of 30 participants. Strong positive correlations (r=0.99) were found between Hindi and English questionnaires on Laughter Quotient form on respondents' scores indicative of authenticity of translated version of the tool to be used.

3.8.5 How Do You Feel Form?

Similarly, perceived state of mind and body was measured using a self-report inventory that again was in English (Laughter Yoga International, 2017). This had to be done in the same way as it was done for Laughter Yoga Quotient. Thus, following similar procedure of forward and backward translations by expert and statistical calculations on the data obtained on bilingual sample of same 30 participants. This yielded a high positive correlation of r=0.98 indicative of the authenticity of the translation.

3.8.6 Semi Structured Interview.

A semi structured interview schedule was prepared. This could only be used with a smaller number of participants who gave consent. This was used to get an in depth understanding of the participants and the impact of the intervention. This helped in creating an environment of trust where they could discuss and share openly. The pre-intervention interview was conducted to get an understanding of the participants' life, stressors, emotions and ways of coping. Subsequently, post intervention interview focused on their experience during and after laughter yoga sessions. These were used to supplement the quantitative data.

3.9 Ethical Issues

Ethical considerations are primary concerns to be considered when doing research with humans or even animals. Certain principles have to be kept in mind for their good and basic rights. For the same the ethical issues are taken care of as follows:

- An informed consent for participation in the research was taken. Informed consent means the participant is informed clearly what the research would require them to do, if there are any potential risks. Sometimes, if deception is used, debriefing is carried out too
- Furthermore, no participant was forced to participate in the study.
- Confidentiality of all the information was assured. The participants knew that their responses will be cumulative and their individual responses shall be kept

confidential

- There subjects were allowed to withdraw from the research if they wished to and total 8 participants did withdraw
- The subjects were not subject to any undue harm
- The subjects were given full right to see the results of the research and had the right to withdraw their results if they wished to
- They were told that their identity will not be revealed.

3.10 Statistical Analysis

The obtained data was statistically evaluated after the scoring was done according to the steps of scoring to be followed. All the scoring was carried out manually. After all the subjects' responses were scored and summated for a total score on each of the variables, the data was organized into an excel sheet. Thus, the analysis was carried out using excel and SPSS 23

Following statistical treatments were given

1. The data collected was analyzed using descriptive statistics such as central tendency using mean, and variability using Standard Deviation.
2. Normality of data figured out using Kolmogorov-Smirnov Test
3. The sample being non probability and non-normal non parametric equivalents of independent t-test and paired t tests were used depending on variables and the design
4. Significance of difference between Control and Experimental group was measured using Mann Whitney U test since it was an independent measures design (two independent groups)
5. Similarly, significance of difference before and after the intervention for the same group was measured Wilcoxon Sign Rank test since a repeated measures design was used here
6. Semi structured interview responses were analyzed using phenomological approach and also making a word cloud

CHAPTER 4 RESULTS AND DISCUSSION

Systematically carrying out analysis and testing our ideas requires careful planning and use of statistical analysis to be able to test one's hypothesis. This research used a mixed method approach thus various statistical analysis were carried out. This chapter consists of the stages of analysis and interpretation.

The data has been presented graphically and tabularly. *Means and Standard Deviation* have been used to describe the data. Furthermore, inferential statistics are used to test the observations. The decision to choose inferential statistics is based on various assumptions like normality of distribution, sample and design. Therefore, the first step was to find if the data was normal or not (using Kolmogorov Smirnov test). Also, since non-probability sample has been used apart from non-normality of data thus, using *Mann Whitney U test* differences between control and experimental groups have been calculated (Independent measures design) and similarly using *Wilcoxon signed-rank test* differences between before and after the intervention is calculated (Repeated measures design).

4.1 Comparison Between Experimental and Control Group Before The Intervention

This section would tell us about the baseline measurement of various variables. Thus, it will help understand if there were any significant differences between experimental and control group before the intervention took place. If the differences are small and not significant then the changes in experimental group can be attributed to the intervention.

Table 4.1

Mean Scores Standard Deviation, Significance of Difference between mean on Resilience before the intervention

Variable	Group	Mean	Standard Deviation	Z Value	P Value*
Resilience	Experimental	30.07	3.95		
	Control	28.46	3.45	-2.25	<.05

**Using Mann Whitney U test*

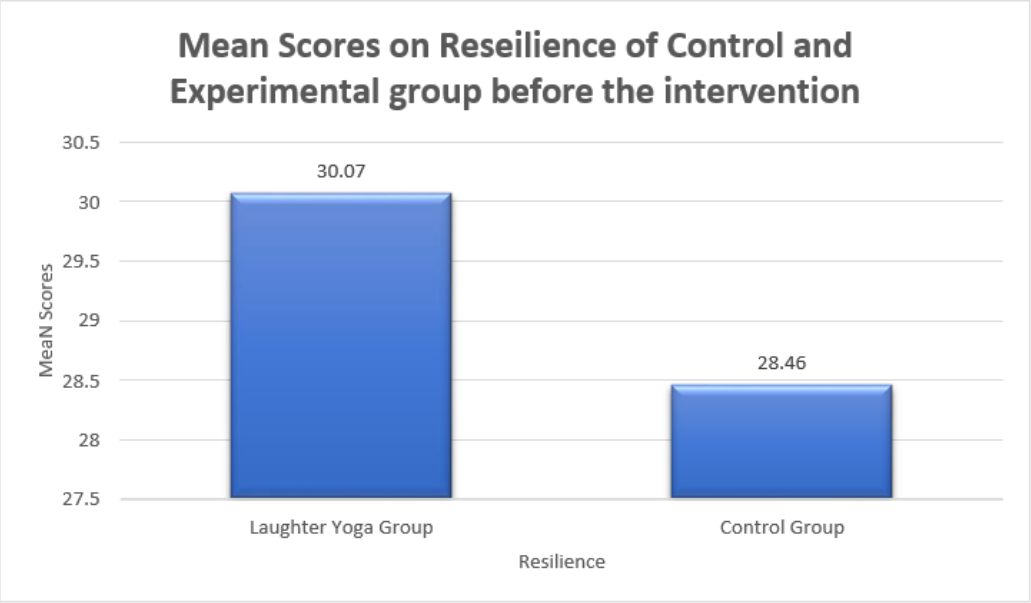

Figure 4.1 Mean Scores on Resilience before the intervention

There does not seem to be much of a difference between control and experimental group on resilience. The control group has slightly lower level of resilience than experimental group. But the difference is minor. However, the difference is significant at .05 level.

Table 4.2

Mean Scores Standard Deviation, Significance of Difference between mean on Positive Affect before the intervention

Variable	Group	Mean	Standard Deviation	Z Value	P Value*
Positive Affect	Experimental	34.35	4.692		
				.80	.21
	Control	34.60	4.062		

**Using Mann Whitney U test*

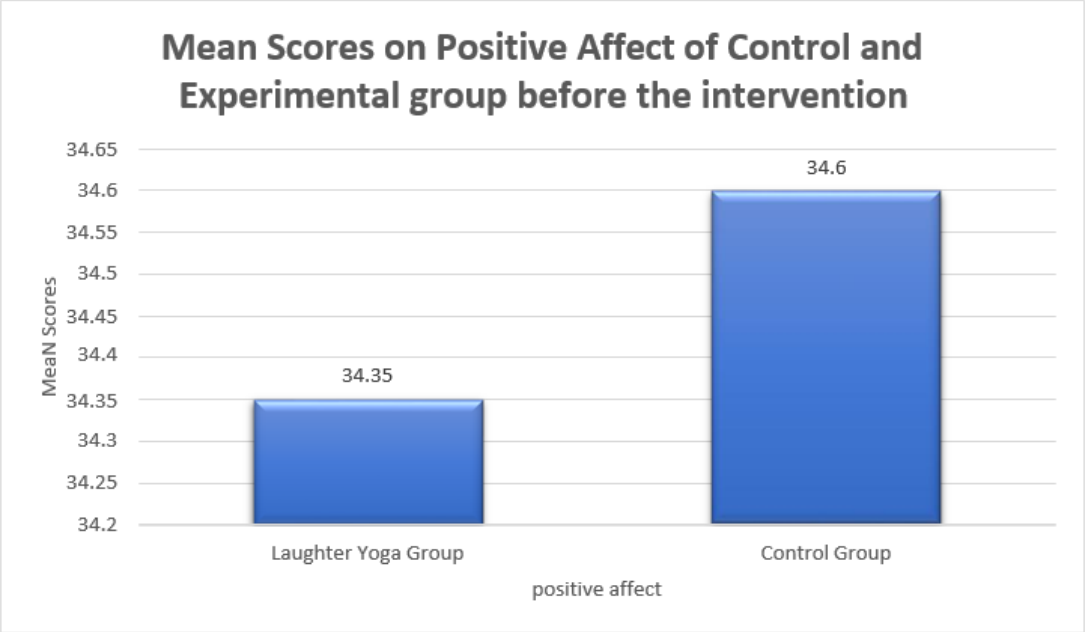

Figure 4.2 Mean Scores on Positive Affect before the intervention

The difference between control and experimental group on Positive Affect is hardly anything. Both have more or less similar average score. This makes it quite clear that their level of Positive Affect at baseline is the same. Thus, they have similar emotionality. And this becomes very important to know in the light of huge difference that was seen in these same scores after the intervention. This lends great credibility for the intervention's success.

Table 4.3

Mean Scores Standard Deviation, Significance of Difference between mean on Negative Affect before the intervention

Variable	Group	Mean	Standard Deviation	Z Value	P Value*
Negative Affect	Experimental	24.8	4.187	.26	.40
	Control	24.70	4.215		

**Using Mann Whitney U test*

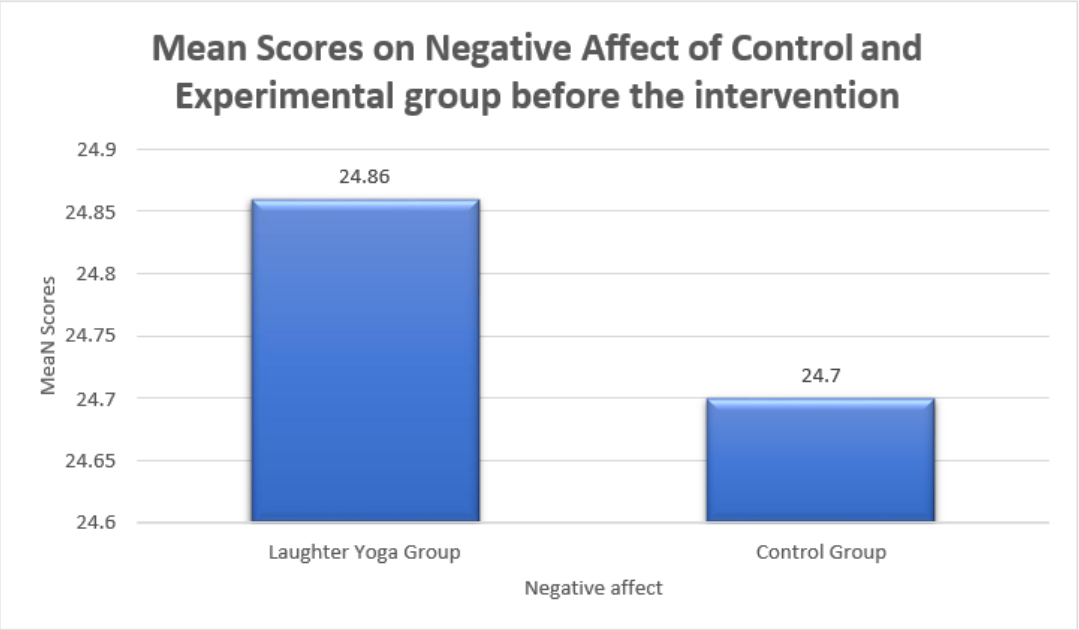

Figure 4.3 Mean Scores on Negative Affect before the intervention

Similarly, the difference between the two groups on their negative affect is also negligible. Not only is it negligible but also not significant. The negligible difference seems to have occurred by chance. Once again this points out at the basal similarity in terms of their emotionality.

Table 4.4

Mean Scores Standard Deviation, Significance of Difference between mean on Perceived Stress before the intervention

Variable	Group	Mean	Standard Deviation	Z Value	P Value*
Perceived Stress	Experimental	20.21	5.74		
				.33	.37
	Control	21.11	6.624		

**Using Mann Whitney U test*

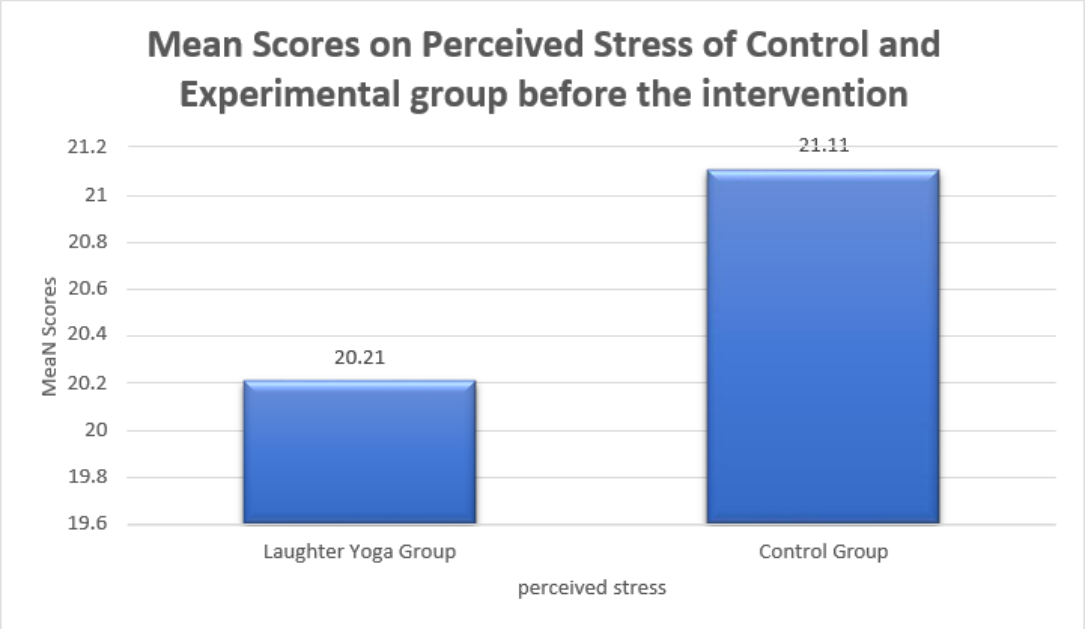

Figure 4.4 Mean Scores on Perceived Stress before the intervention

The difference between the two groups as far as perceived stress is concerned is not a big one. However, the control group has a very slightly higher level of perceived stress. Moreover, this slight difference is not significant at .05 level of significance.

Table 4.5

Mean Scores Standard Deviation, Significance of Difference between mean on Laughter Quotient before the intervention

Variable	**Group**	**Mean**	**Standard Deviation**	**Z Value**	**P Value***
Laughter Quotient	Experimental	45.51	9.1691	.34	.37
	Control	46.87	9.719		

**Using Mann Whitney U test*

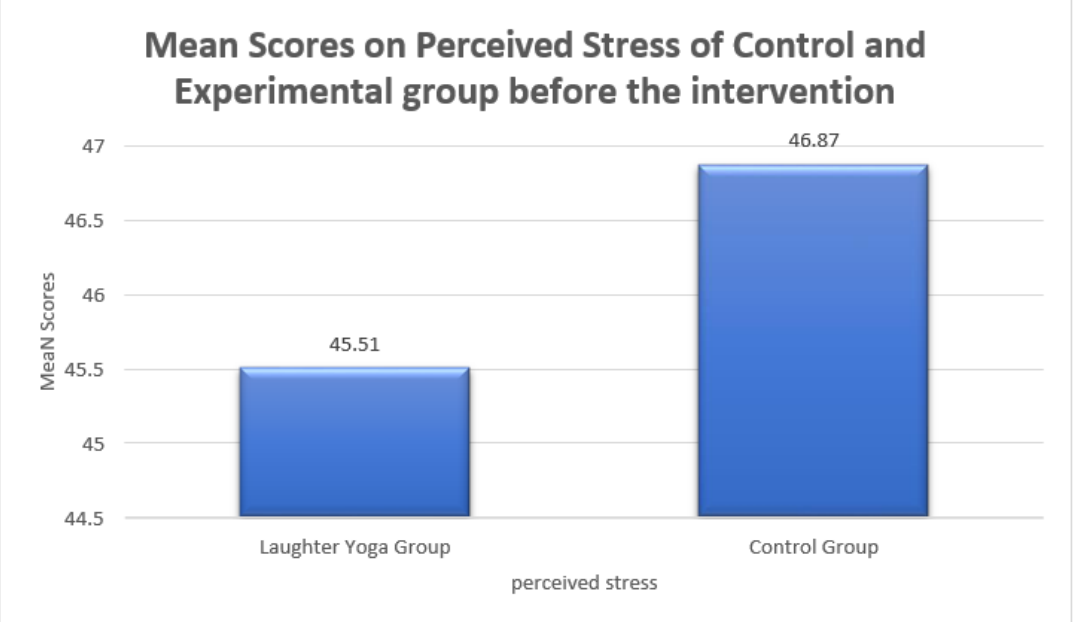

Figure 4.5 Mean Scores on Laughter Quotient before the intervention

There is not much of a difference between the two groups. And any minor difference is not even significant at .05 level. Interestingly, the control group on an average has a slightly more laughter quotient. This becomes all the more interesting to see if laughter yoga would work on the group with lower laughter to quotient to enhance and pull it up, and it significantly did.

4.2 Comparison Between Experimental And Control Group After The Intervention

Table 4.6

Mean Scores Standard Deviation, Significance of Difference between mean on Resilience between Experimental and Control Group after Intervention

Variable	Group	Mean	SD	Z Value	p-value**
Resilience	Experimental	31.88	4.54	-4.22	<.001
	Control	20.78	3.520		

***Using Mann-Whitney U Test*

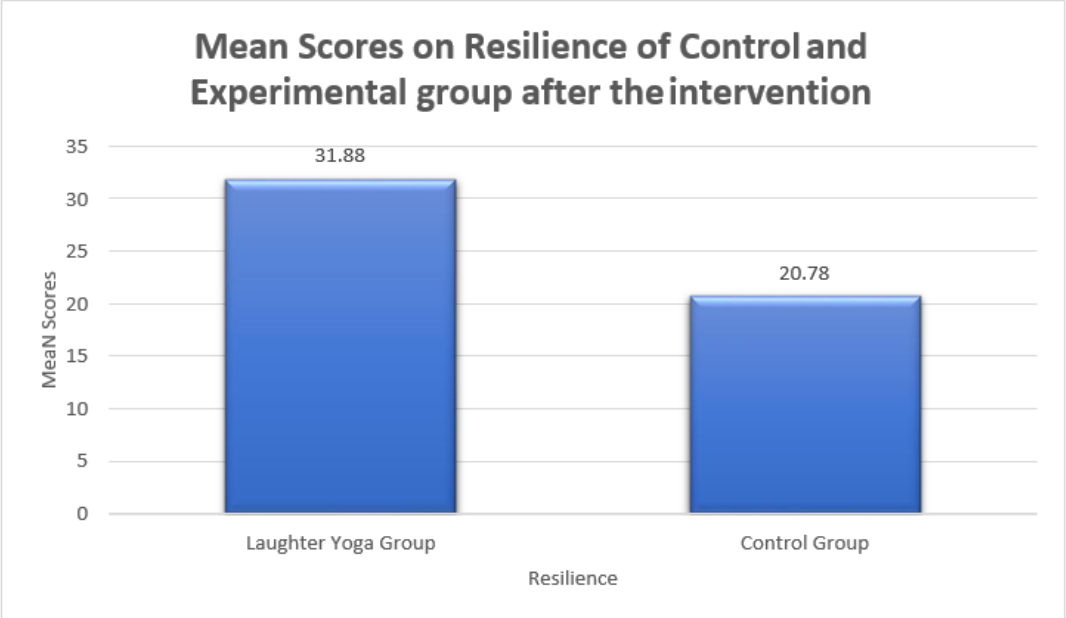

Figure 4.6 Mean and Difference between means on Resilience between Experimental and Control Group after Intervention

The Experimental group was the one that was administered laughter yoga in a one-month intervention schedule and their resilience was expected to be built or increased by the intervention. A significant increase was seen in that (Table 4.4.4). However, one cannot be certain if it was because of the intervention without taking into consideration

a control group. Thus, the control group was not administered laughter yoga and it was seen that the average score on resilience of experimental group was 31.8 after the laughter yoga intervention and it was 20.78 for the control group, that is much lesser. Thus, there was a stark difference and this difference happens to be a significant one ($p<.001$) using Mann Whitney test. Mann-Whitney test was used because the data was not normally distributed and the design here involved two independent samples, the experimental and control group respectively. Mann-Whitney thus becomes a good equivalent of independent t test. Seeing a significant difference between the two groups on resilience points out to the role of laughter yoga. Thus, we can say that resilience can improve with a laughter yoga program.

Table 4.7

Mean Scores Standard Deviation, Significance of Difference between mean on positive Affect between Experimental and Control Group after Intervention

Variable	Group	Mean	Standard Deviation	Z Value	P Value**
Positive Affect	Experimental	41.91	3.398	-7.43	<.001
	Control	24.51	4.221		

***Using Mann-Whitney U Test*

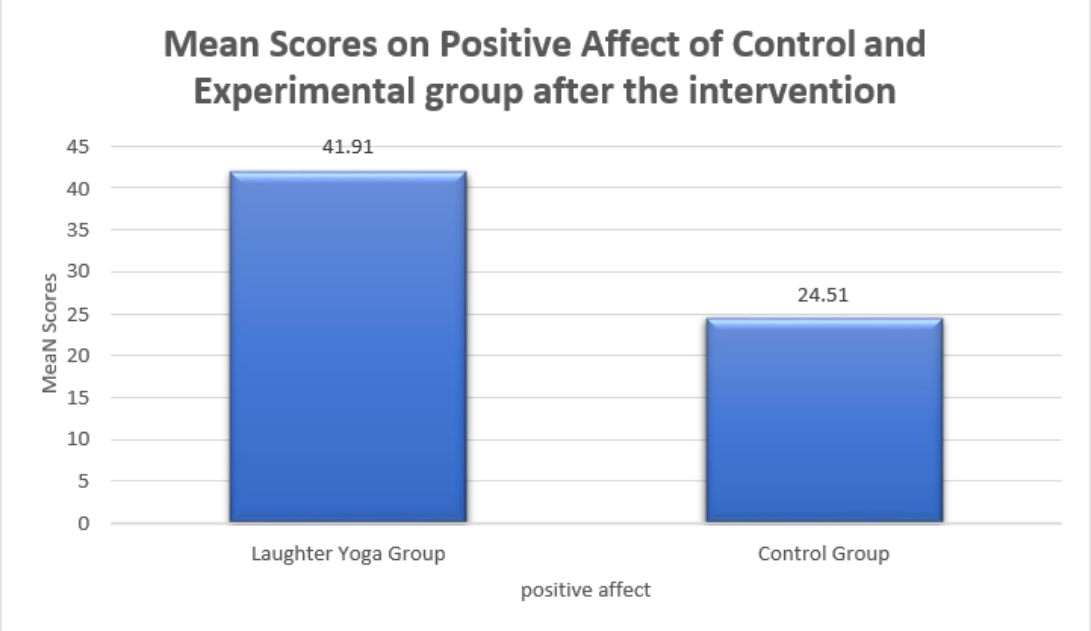

Figure 4.7 Mean and Difference between means on positive Affect between Experimental and Control Group after Intervention

As far as positive affect after the intervention is concerned it is crystal clear that positive affect is more in experimental group than control group and this difference is highly significant (p<.001). Not only was it seen that positive affect increased significantly in experimental group but also it is significantly different from control group at the end of the intervention. This clearly points out to the role of laughter yoga on positive emotions. Additionally, it was intriguing to also notice a decline in positive emotions in control

group after laughter yoga was administered to experimental group and control group was deprived. However, this was not a significant decline and may have occurred by chance.

Table 4.8

Mean Scores Standard Deviation, Significance of Difference between mean on Negative Affect between Experimental and Control Group after Intervention

Variable	Group	Mean	Standard Deviation	Z Value	P Value**
Negative Affect	Experimental	15.70	2.236	8.91	<.001
	Control	46.94	4.130		

***Using Mann Whitney U test*

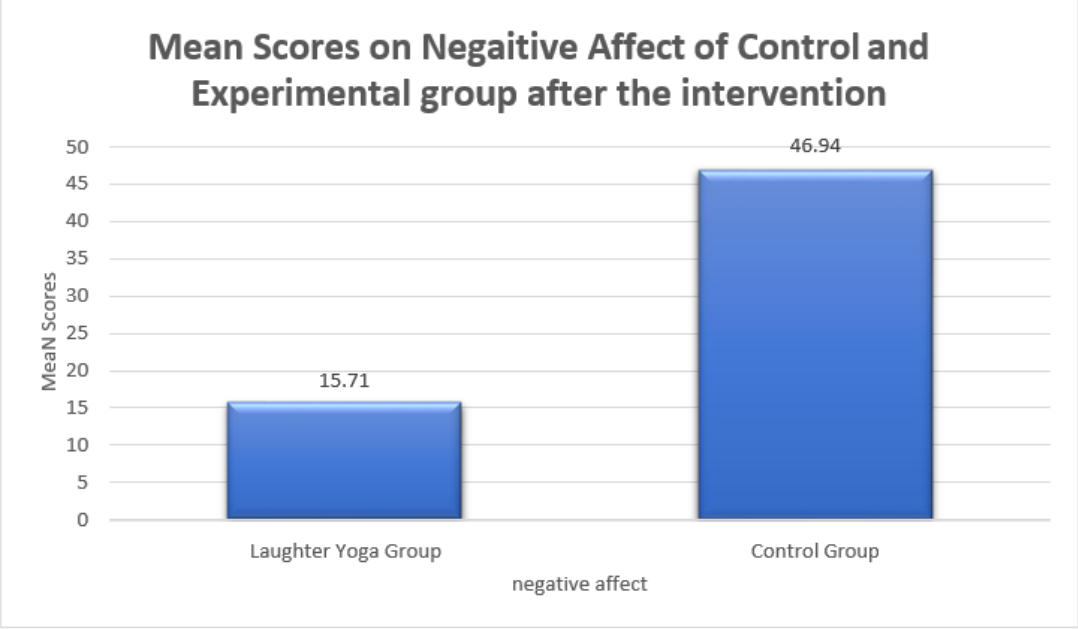

Figure 4.8 Mean Scores on Negative Affect between Experimental and Control Group after Intervention

Similarly, when it comes to negative affect the experimental group reported less amount of negative affect after doing laughter yoga as compared to the control group. Also, the

difference is a very stark one. The experimental group's average being 15.71 as compared to an average of 46.94 for the control group. The difference amounting to 31.23 units which is not a small difference. This difference is not only huge enough but also significant to verify the role of laughter yoga on negative affect. It is quite natural for participants to have high negative affect at amidst the Covid 19 scenario and its seen how laughter yoga decreased the negative affect so effectively.

Table 4.9

Mean Scores Standard Deviation, Significance of Difference between mean on Perceived Stress between Experimental and Control Group after Intervention

Variable	Group	Mean	Standard Deviation	Z Value	P Value**
Perceived Stress	Experimental	14.71	3.96	5.37	<.001
	Control	34.27	6.571		

***Using Mann Whitney U test*

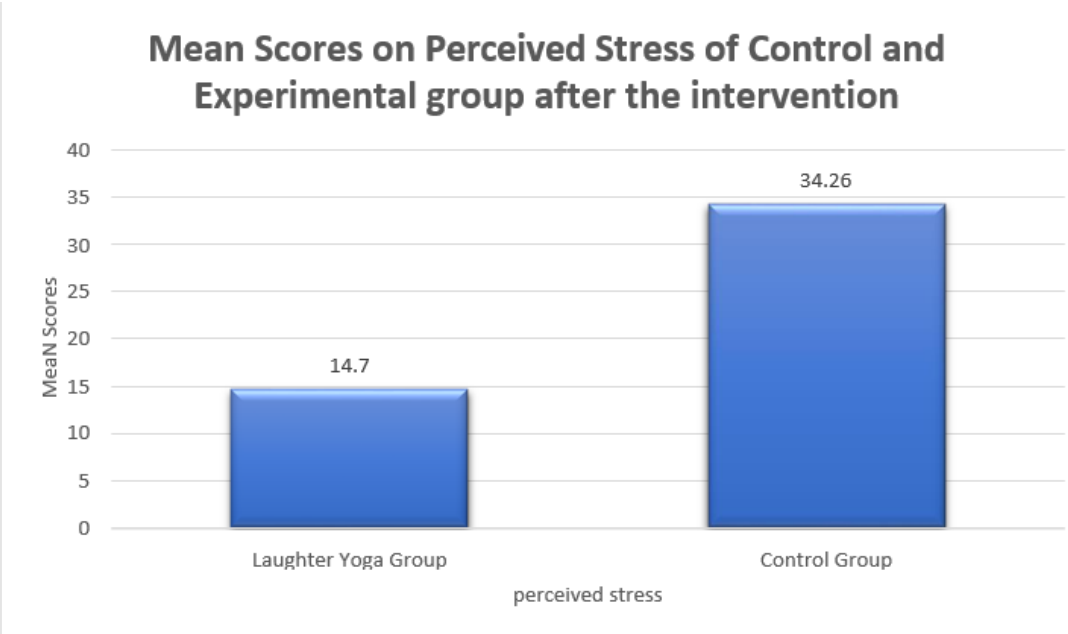

Figure 4.9 Mean Scores on Perceived Stress between Experimental and Control Group after Intervention

When it comes to perceived stress again a stark difference is visible between experimental and control group. Experimental group reported lower level of perceived stress after the intervention and this was significantly different from the average score of control group. Again, this points out at the important role of laughter yoga in decreasing their levels of perceived stress.

Table 4.10

Mean Scores Standard Deviation, Significance of Difference between mean on Laughter Quotient between Experimental and Control Group after Intervention

Variable	Group	Mean	Standard Deviation	Z Value	P Value**
Laughter Quotient	Experimental	64.58	12.491	-6.92	<.001
	Control	46.94	9.682		

***Using Mann Whitney U test*

Figure 4.10 Mean scores on Laughter Quotient between experimental and control group after intervention

When it comes to laughter quotient, the laughter yoga group that is the experimental group has significantly higher mean score of 64.58 as compared to 46.94 of the control group. Thus, laughter yoga also seems to enhance a person's ability to laugh. The difference between the two groups is significant.

4.3 Distribution Of Variables In Control Group

Table 4.11

Mean Scores, Standard Deviation, standard error of mean on Resilience before and after intervention

Control Group		Mean	Standard Deviation	Standard Error of Mean	Z Value	P Value*
Resilience	Before	28.46	3.449	.435	-1.88	.067
	After	20.78	3.520			

**Using Wilcoxon Sign Rank Test*

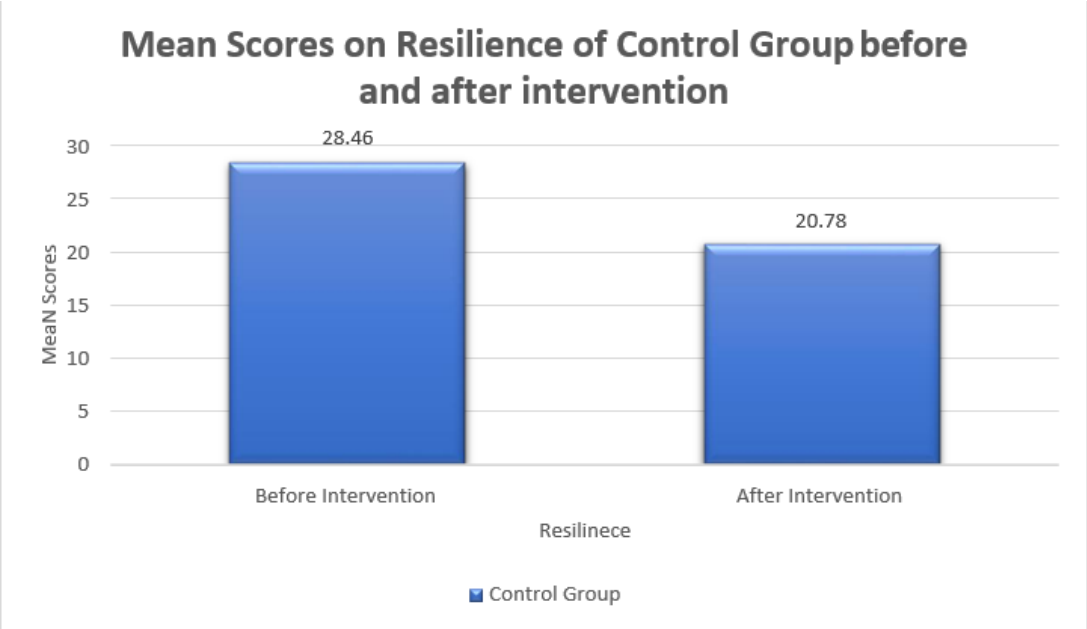

Figure 4.11 Mean Scores on Resilience before and after intervention

Looking at the mean scores on resilience for control group, there seems to be a difference. However, the difference is not significant at .05 level of significance.

Table 4.12

Mean Scores Standard Deviation, Standard Error of Mean, Significance of Difference between mean on Perceived Stress before and after intervention

Control Group		Mean	Standard Deviation	Standard Error of Mean	Z Value	P Value*
Perceived Stress	Before	21.11	6.624	.835	-.82	.415
	After	34.27	6.571	.828		

**Using Wilcoxon Signed Rank Test*

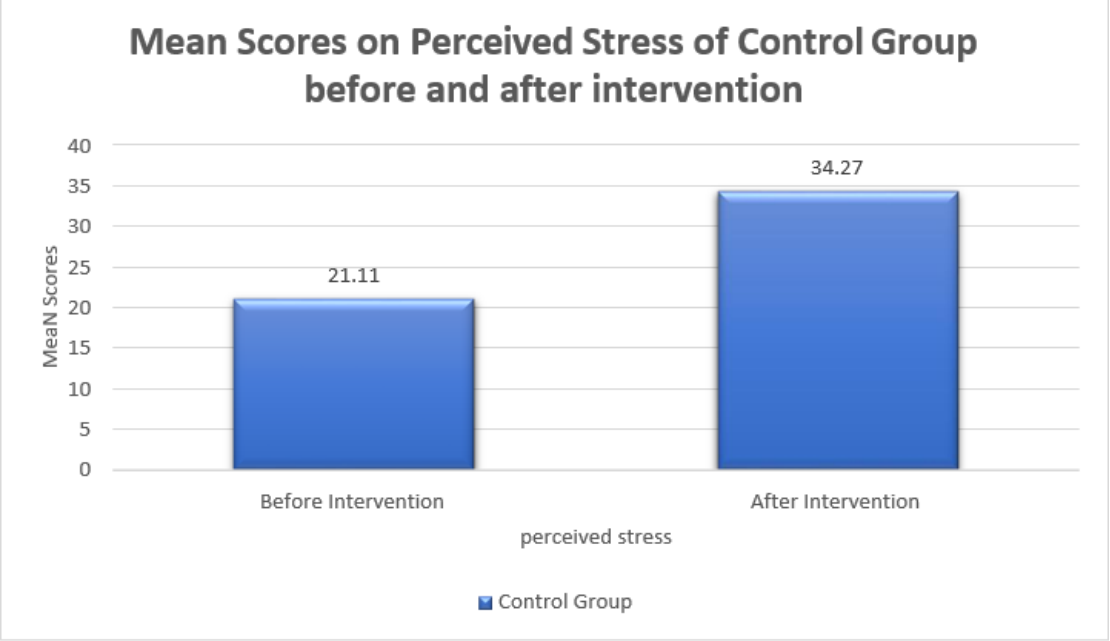

Figure 4.12 Mean Scores on Perceived Stress before and after intervention

It is visible that amount of perceived stress was also slightly more after the intervention ended for experimental group. However, again this was not a significant difference

Table 4.13

Mean Scores Standard Deviation, Standard Error of Mean, Significance of Difference between mean on Perceived Stress before and after intervention

Control Group		Mean	Standard Deviation	Standard Error of Mean	Z Value	P Value*
Positive Affect	Before	34.60	4.062	.512	-1.09	.273
	After	24.51	4.221	.532		

***Using Wilcoxon Signed Rank Test*

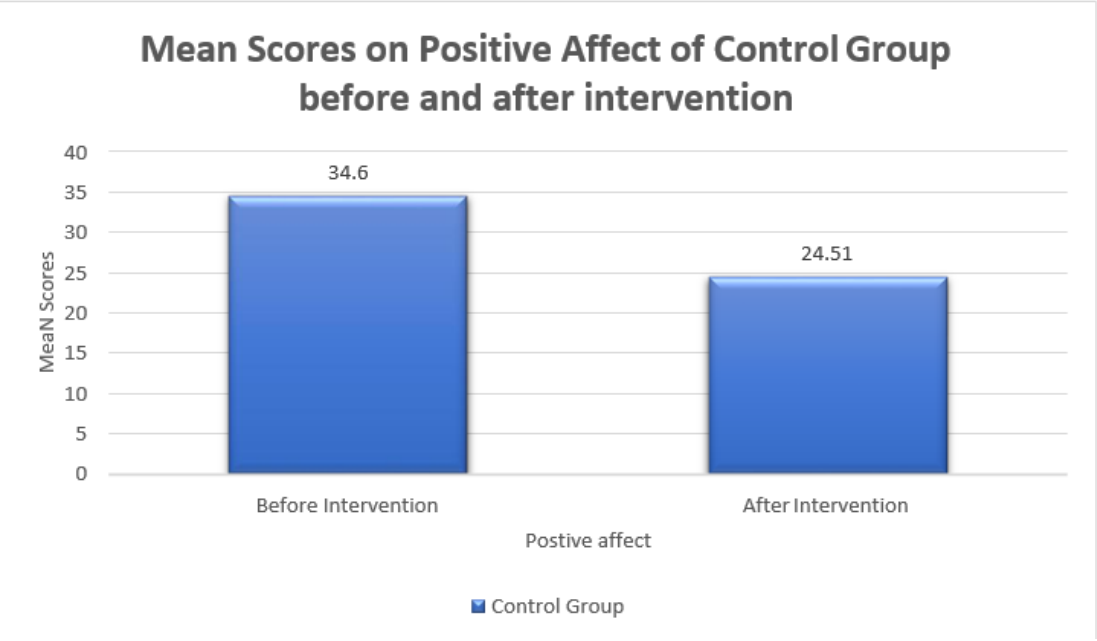

Figure 4.13 Mean Scores on Positive Affect before and after intervention

It is interesting to note that in control group the positive affect decreased when measured second time. The control group did not get a chance to do laughter yoga during the experiment and was called the waitlisted group. They carried out their daily activities. However, they would see their friends going for laughter yoga, they would see the instructor coming to their institution. These could have, perhaps, made them feel left out or irritated for being denied laughter yoga then and consequently resulted in low score on positive affect. Keeping in mind this scenario they were made to do laughter

yoga after the research study was over. However, this difference was not found to be significant and could have occurred by chance.

Table 4.14

Mean Scores Standard Deviation, Standard Error of Mean, Significance of Difference between mean on Negative Affect before and after intervention

Control Group		**Mean**	**Standard Deviation**	**Standard Error of Mean**	**Z Value**	**P Value***
Negative Affect	Before	24.70	4.215	.531	-.91	.361
	After	46.94	4.130	.532		

**Using Wilcoxon Sign Rank Test*

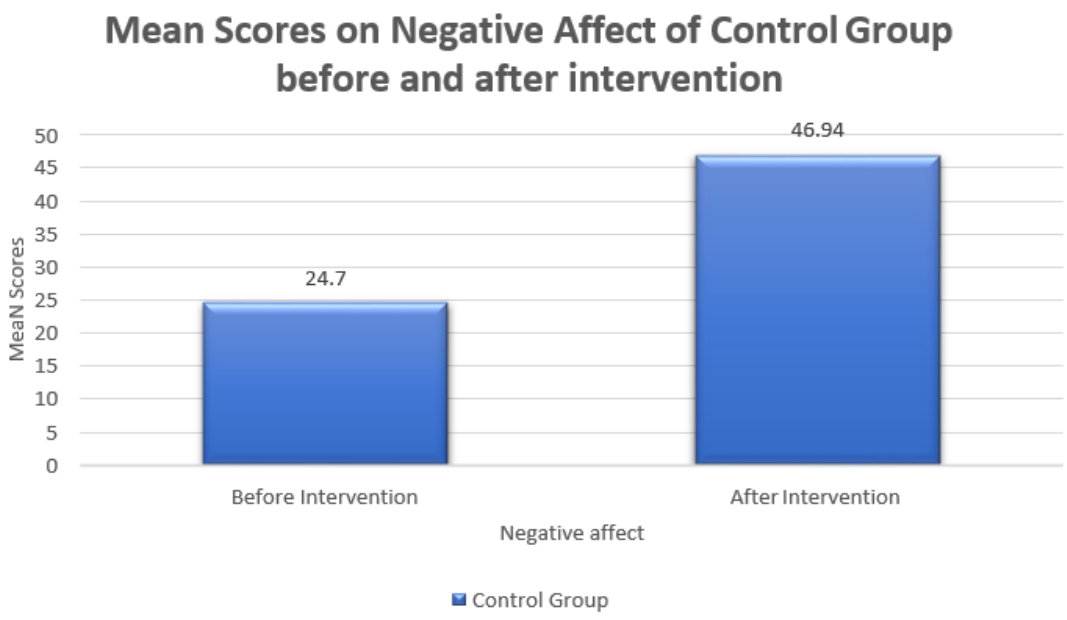

Figure 4.14 Mean Scores on Negative Affect before and after intervention

Surprisingly, the average score on negative affect increased in post-test measurement. However, this seems to be simply a coincidence since the difference is not significant. However, again there could be a similar explanation for such a result. The fact that this group continued its daily work, that too in post lock down and Covid-19 like situation

and wherein their friends get to do an intervention that involves laughter and group dynamics perhaps increases their negative emotion.

Table 4.15

Mean Scores Standard Deviation, Standard Error of Mean, Significance of Difference between mean on Laughter Quotient before and after intervention

Control Group		**Mean**	**Standard Deviation**	**Standard Error of Mean**	**Z Value**	**P Value***
Laughter Quotient	Before	46.87	9.719	1.225	-.511	.609
	After	46.94	9.682	1.220		

Using Wilcoxon Signed Rank Test

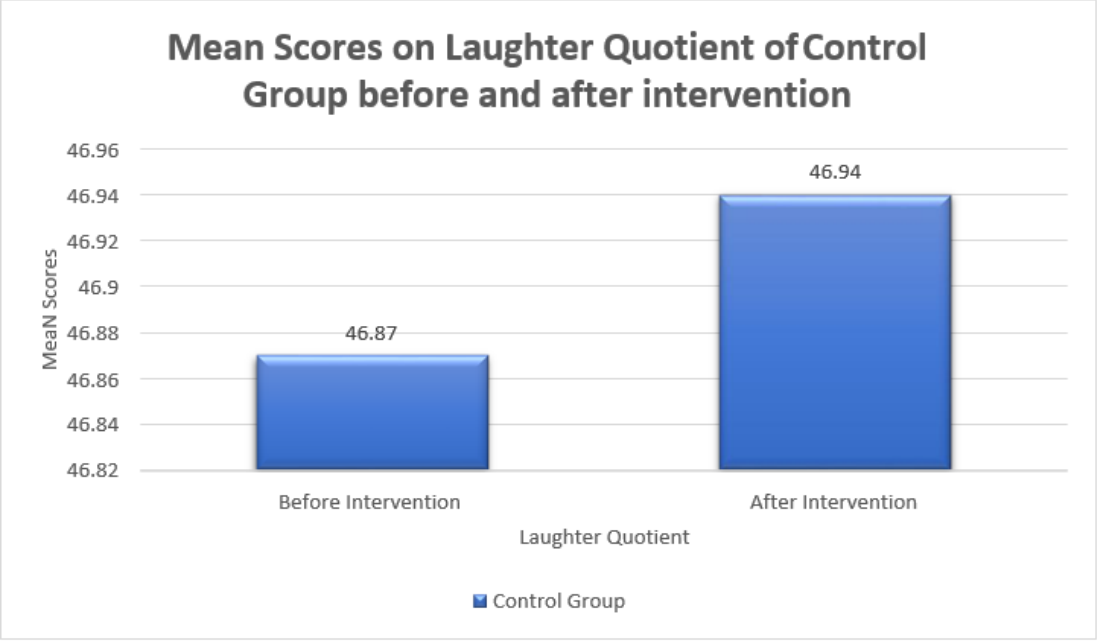

Figure 4.15 Mean Scores on Laughter Quotient before and after intervention

This aspect does not show a major change. Not much change is seen in their ability to laugh. This also makes sense since they had no experience with laughter yoga, they did not necessarily

understand how laughter yoga could be bringing about this change among the experimental group.

4.4 Distribution Of Variables In Experimental Group

Table 4.16

Test of Normality of variables- Resilience, Perceived Stress, Positive Affect, Negative Affect and Laughter Quotient before and after the intervention employing the use of Kolmogorov-Smirnov and Shapiro-Wilk test for Experimental Group

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Resilience Before Intervention	.226	57	.000	.911	57	.000
Perceived Stress Before Intervention	.180	57	.000	.879	57	.000
Positive Affect before Intervention	.254	57	.000	.857	57	.000
Negative Affect before Intervention	.175	57	.000	.871	57	.000
Laughter Quotient before Intervention	.180	57	.000	.944	57	.010

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Resilience After Intervention	.147	57	.004	.964	57	.090
Perceived Stress after Intervention	.175	57	.000	.862	57	.000
Positive Affect after Intervention	.222	57	.000	.838	57	.000
Negative Affect after Intervention	.131	57	.016	.960	57	.055
Laughter Quotient after Intervention	.220	57	.000	.935	57	.005

From table 4.4.1 it can be seen that all the variables show a significance of less than .05 on Kolmogorov-Smirnov test which means none of them are normally distributed. This required the use of non-parametric statistics to test whether the difference between scores in the before and after of intervention have occurred by chance or are real difference that can be attributed to the intervention itself.

Table 4.17

Total Scores on Resilience, Perceived Stress, Positive Affect, Negative Affect and Laughter Quotient before and after the intervention- Skewness and Kurtosis

Variables	Skewness	Description	Kurtosis	Description
Resilience Before Intervention	-.564	Negative	1.495	Platykurtic

Variables	Skewness	Description	Kurtosis	Description
Perceived Stress Before Intervention	-.079	Negative	-1.507	Leptokurtic
Positive Affect before Intervention	.251	Positive	-1.586	Leptokurtic
Negative Affect before Intervention	1.257	Positive	3.152	Platykurtic
Laughter Quotient before Intervention	.059	Positive	-.929	Platykurtic
Resilience After Intervention	-.262	Negative	.094	Leptokurtic

Perceived Stress after Intervention	-.860	Negative	1.448	Platykurtic
Positive Affect after Intervention	.868	Positive	-.623	Leptokurtic
Negative Affect after Intervention	.249	Positive	-.557	Leptokurtic
Laughter Quotient after Intervention	.518	Positive	-.253	Leptokurtic
How do You feel immediately before Intervention	.423	Positive	-1.210	Leptokurtic
How do You feel immediately after Intervention	.144	Positive	-.387	Platykurtic

Kurtosis refers to peakedness of a distribution. If the distribution is more peaked it is leptokurtic and if it is flatter than normal it is platykurtic. If kurtosis is more than .263 it is platykurtic and if less than .263 it leptokurtic (Garrett, 2011)

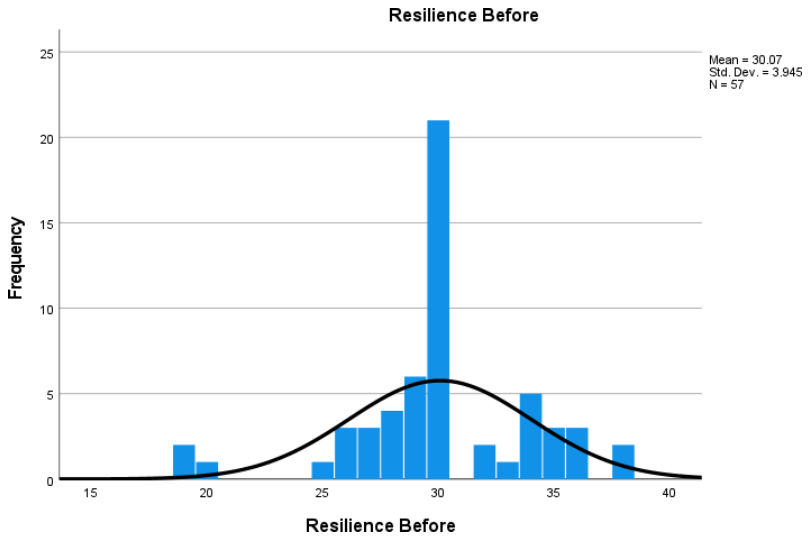

Figure 4.16 Distribution of scores on Resilience before the Intervention

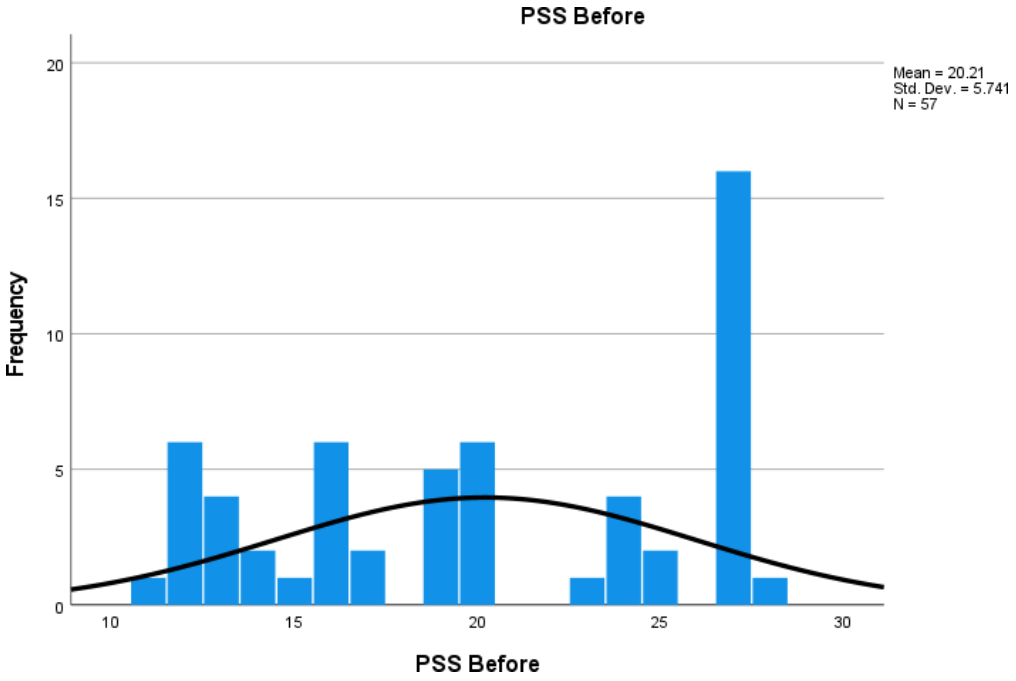

Figure 4.17 Distribution of scores on Perceived Stress before the Intervention

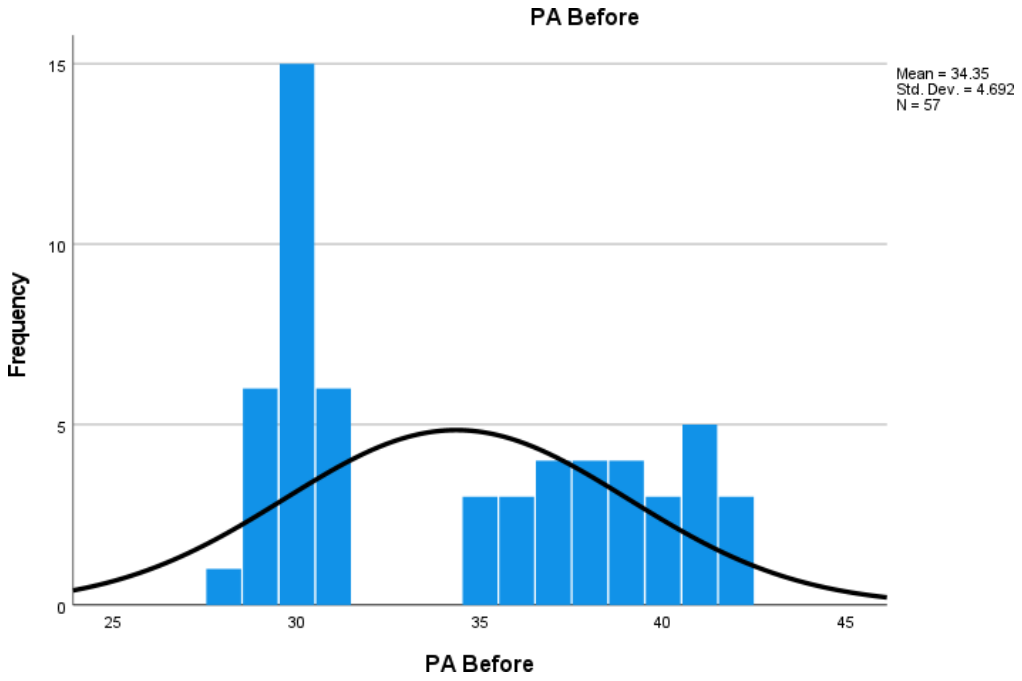

Figure 4.18 Distribution of scores on Positive Affect before the Intervention

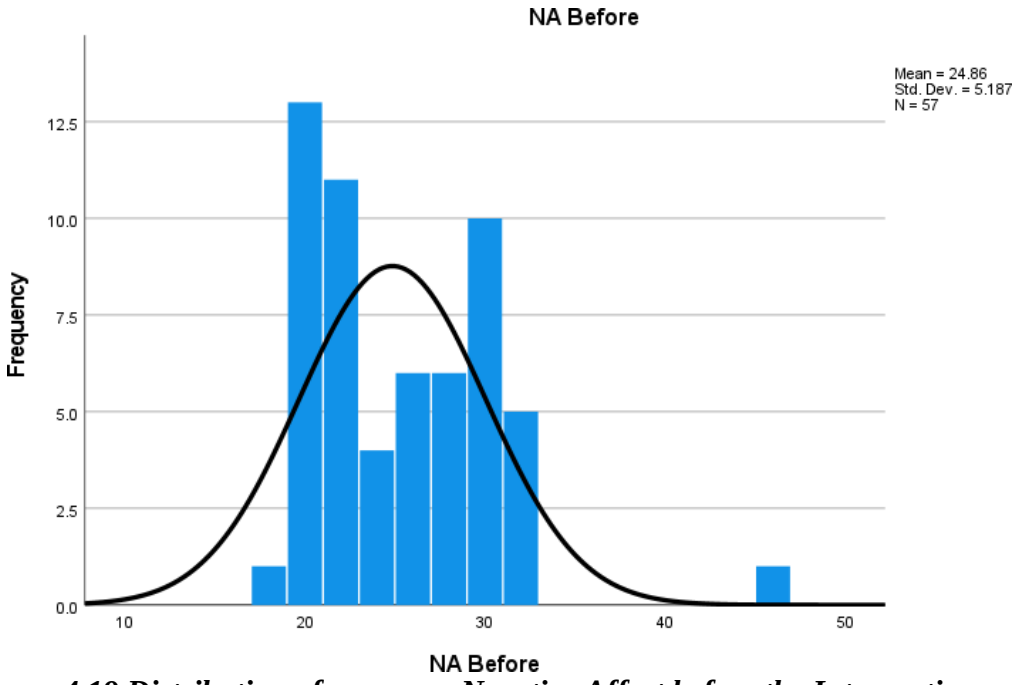

Figure 4.19 Distribution of scores on Negative Affect before the Intervention

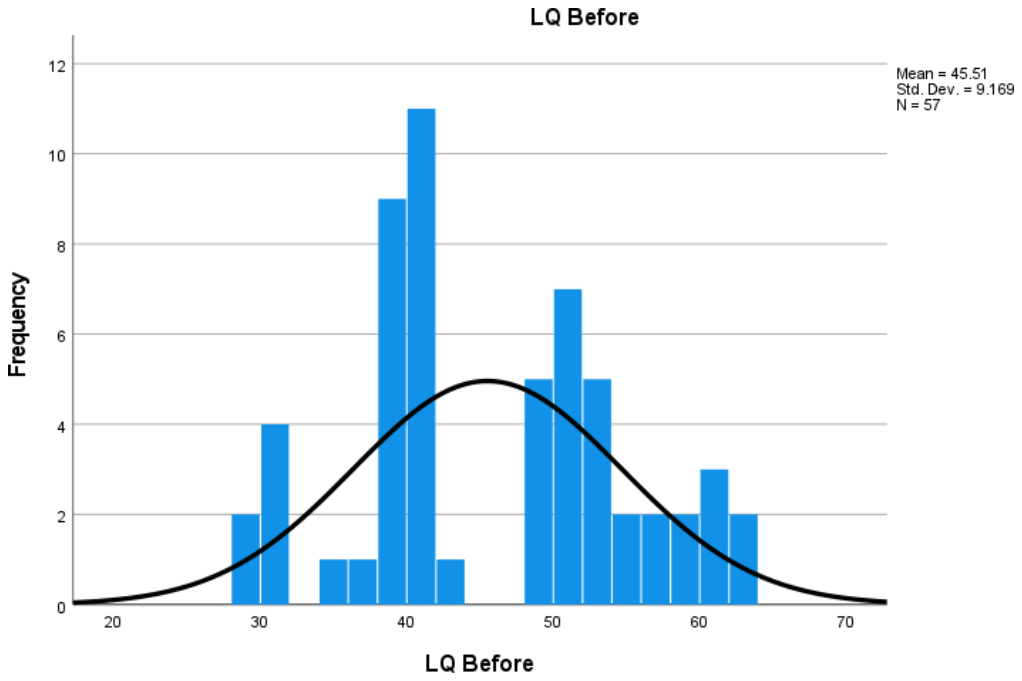

Figure 4.20 Distribution of scores on Laughter Quotient before the Intervention

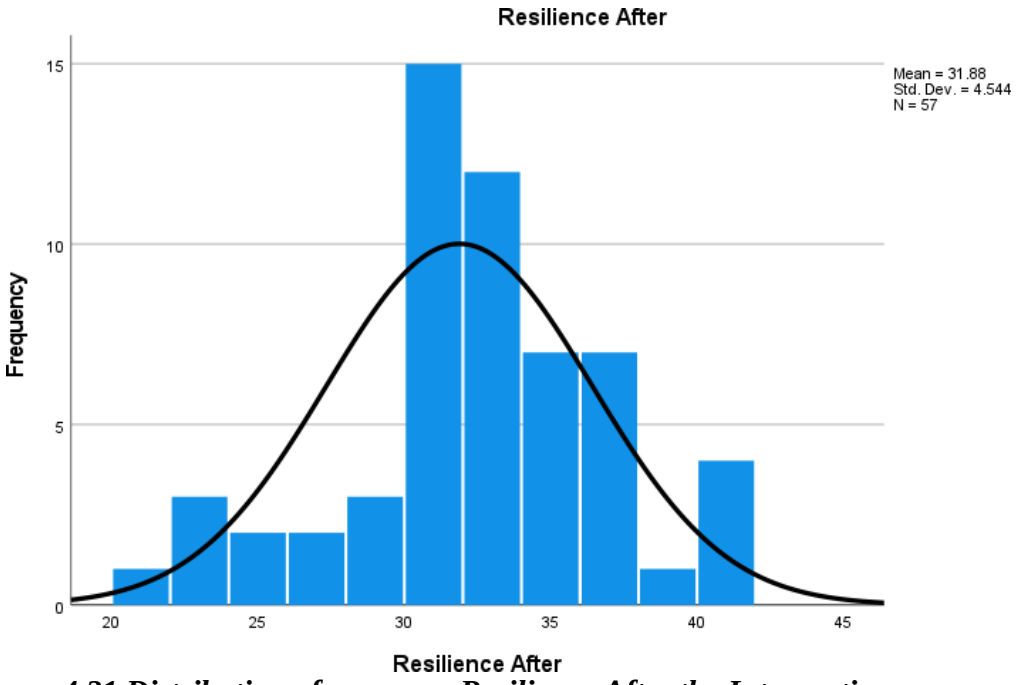

Figure 4.21 Distribution of scores on Resilience After the Intervention

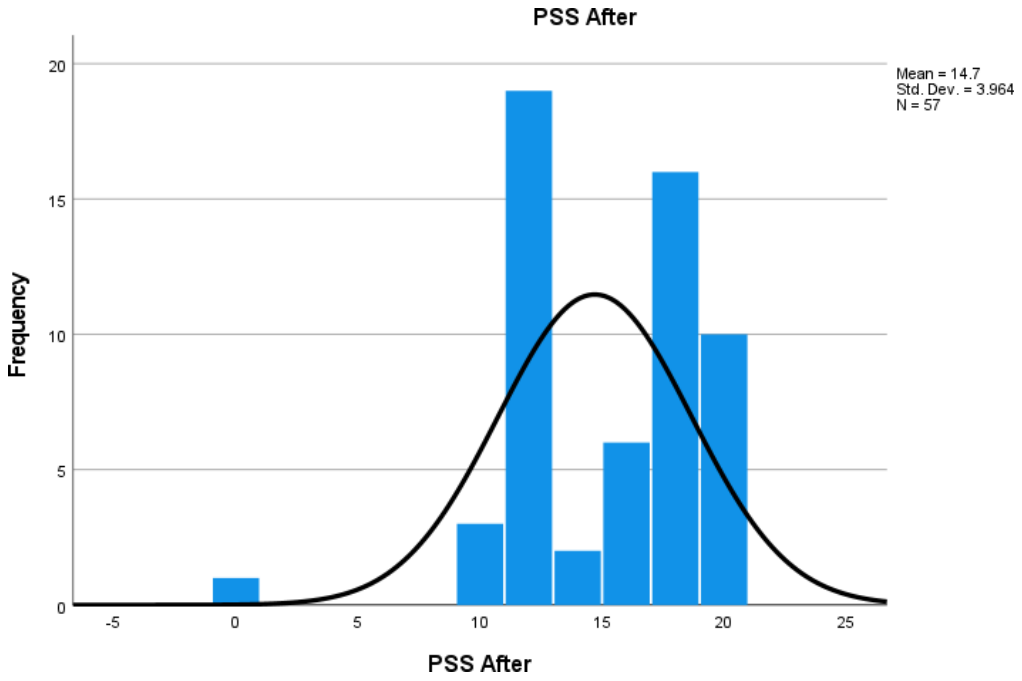

Figure 4.22 Distribution of scores on Perceived Stress After the Intervention

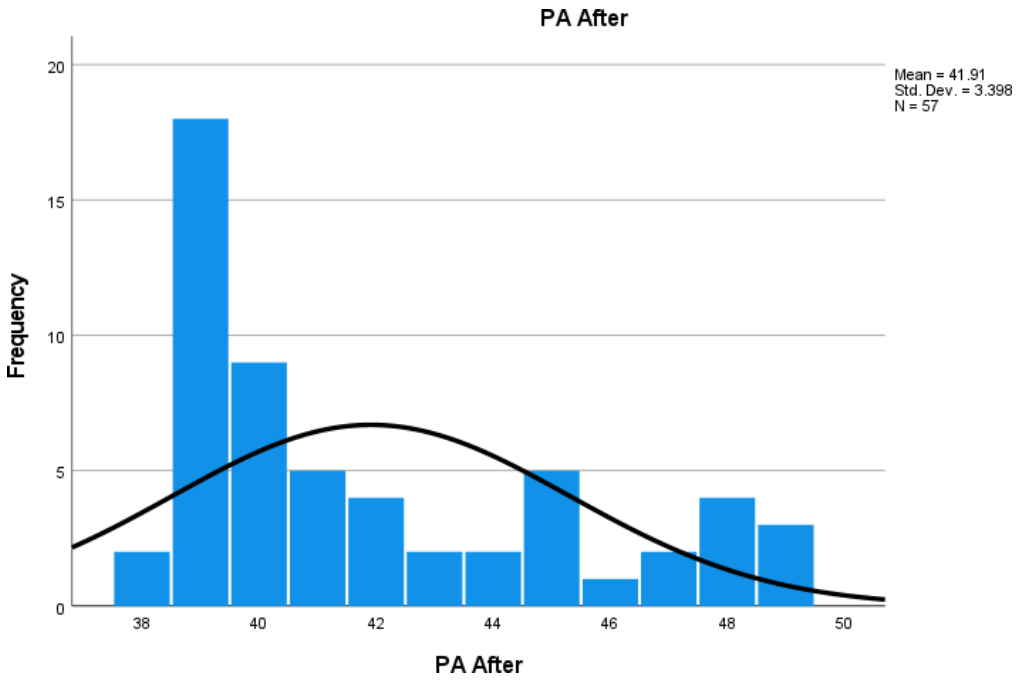

Figure 4.23 Distribution of scores on Positive Affect After the Intervention

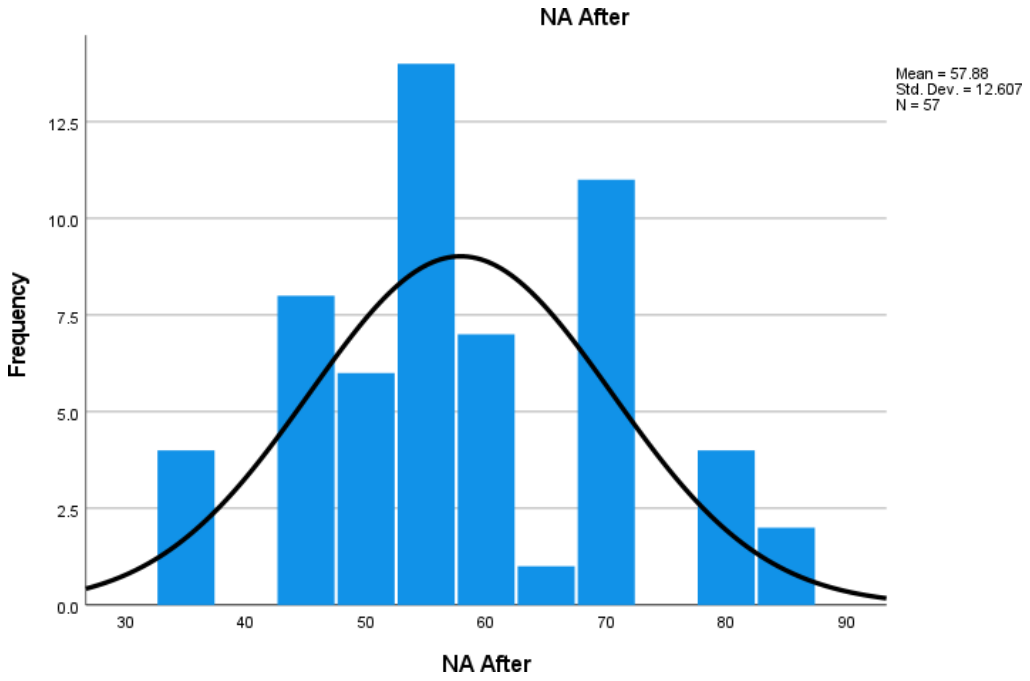

Figure 4.24 Distribution of scores on Negative Affect After the Intervention

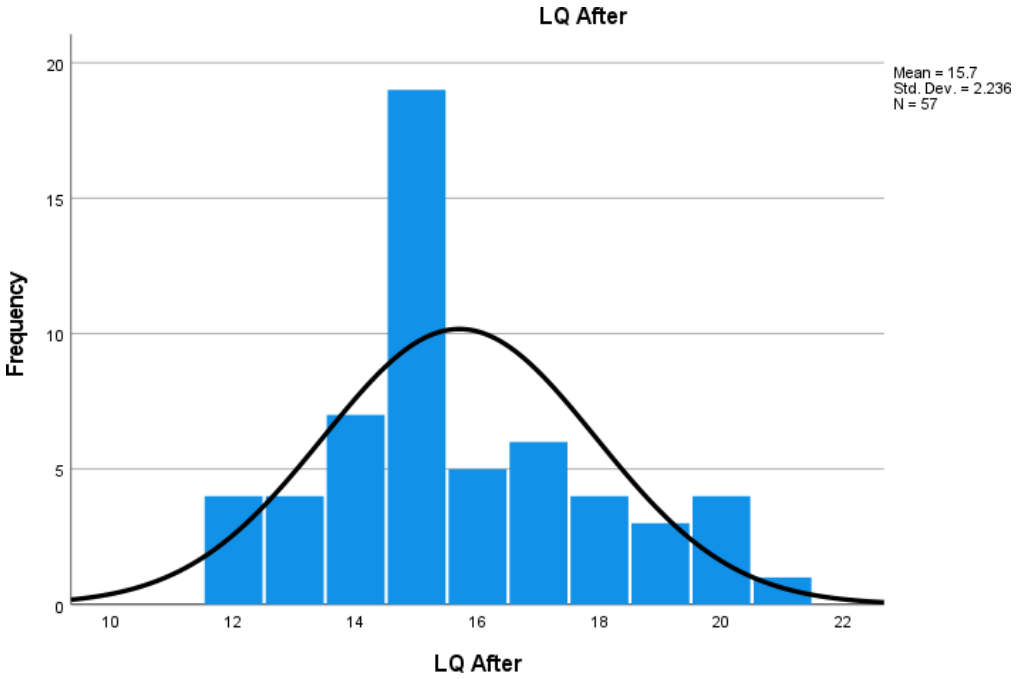

Figure 4.25 Distribution of scores on Laughter Quotient After the Intervention

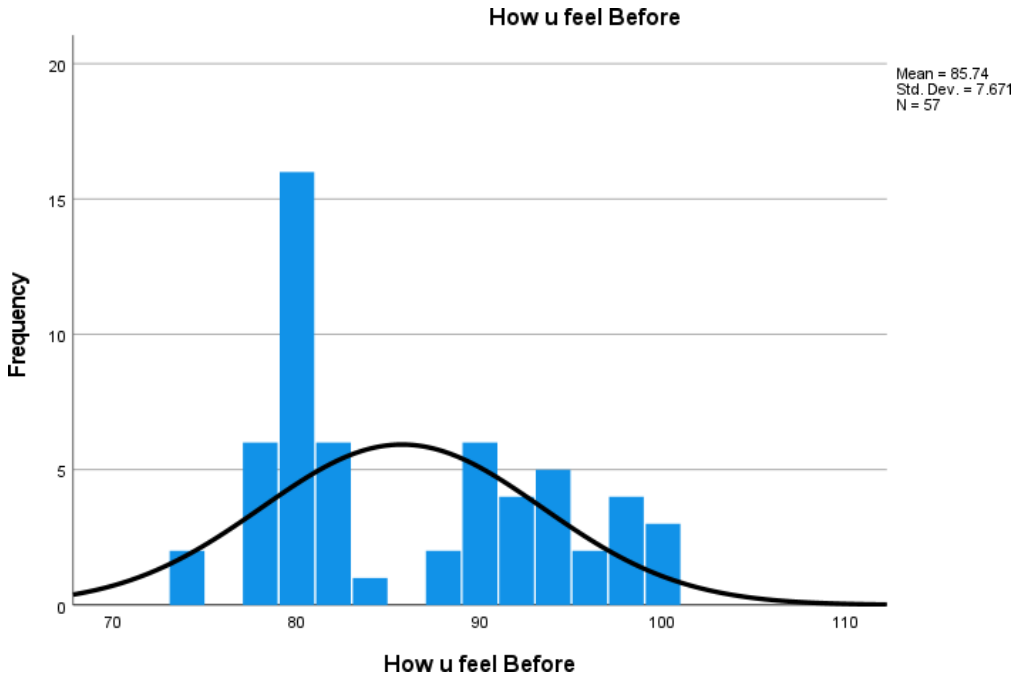

Figure 4.26 Distribution of scores on How You feel before the Intervention

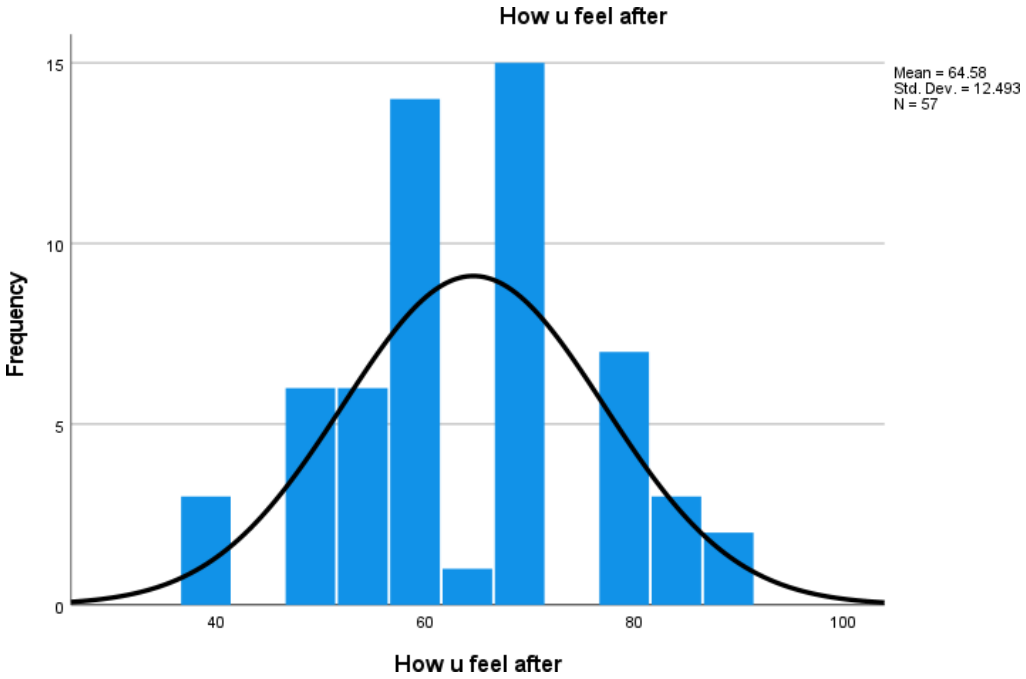

Figure 4.27 Distribution of scores on How You Feel immediately after the Intervention

Table 4.18

Summary of Means, Standard Errors of Mean and Standard Deviations on Resilience, Perceived Stress, Positive Affect, Negative Affect, Laughter Quotient and How do you feel before and after the intervention respectively

Experimental Group		Mean	Standard Deviation	Standard Error Mean	P of Value*
Resilience	Before	30.07	3.95	.523	.013
	After	31.88	4.54	.602	
Perceived Stress	Before	20.01	5.74	.760	<.001
	After	14.7	3.96	.525	
Positive Affect	Before	34.35	4.692	.622	<.001
	After	41.9	3.398	.450	
Negative Affect	Before	24.8	5.487	.687	<.001
	After	15.70	2.236	.296	
Laughter Quotient	Before	45.51	9.1691	1.651	<.001
	After	64.58	12.491	1.215	
How Do you Feel	Before	57.88	12.61	1.016	<.001
	After	85.74	7.671	1.655	

Table 4.19

Showing the Mean, Standard Deviation, Standard Error of Mean, Significance of Difference between mean on Resilience before and after the intervention in experimental group

Experimental Group		Mean	Standard Deviation	Standard Error of Mean	Z Value	P Value*
Resilience	Before	30.07	3.95	.523	-2.47	.007
	After	31.88	4.54	.602		

**Using Wilcoxon Signed Rank Test*

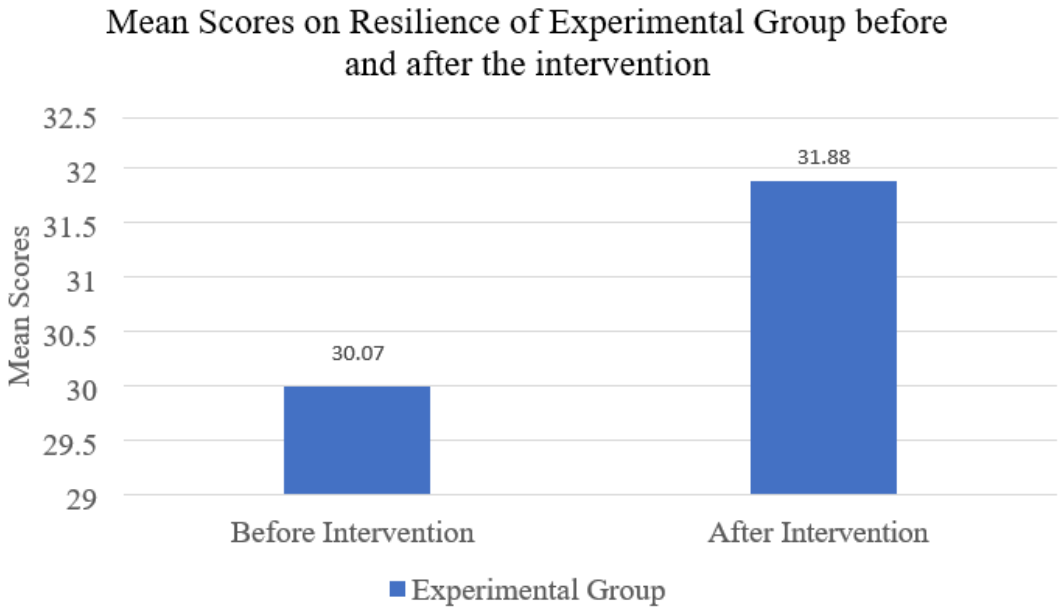

Figure 4.28 Comparison of Mean Scores on Resilience before and the intervention in experimental group

A glance at the above table and figure makes it quite clear that the resilience scores increased after the intervention. This points out at the positive role of the intervention of Laughter Yoga. However, this can never be accepted with certainty without the use of inferential statistics which allow us to confirm whether the difference has occurred

by chance or is a real one. Since difference between same participants had to be calculated before and after an intervention, making it repeated measures design. Thus, Wilcoxon Sign Rank test was used (A non- parametric equivalent of paired t-test) since the data is not normally distributed. The results of which are discussed in a later section after discussing means of each variable before and after the intervention.

Table 4.20

Mean Scores Standard Deviation, Standard Error of Mean, Significance of Difference between mean on Perceived Stress before and after the Intervention

Experimental Group	**Mean**	**Standard Deviation**	**Standard Error of Mean**	**Z value**	**P Value***
Perceived Stress Before	20.21	5.74	.760	6.56	<.001
After	14.71	3.96	.525		

**Using Wilcoxon Sign Rank Test*

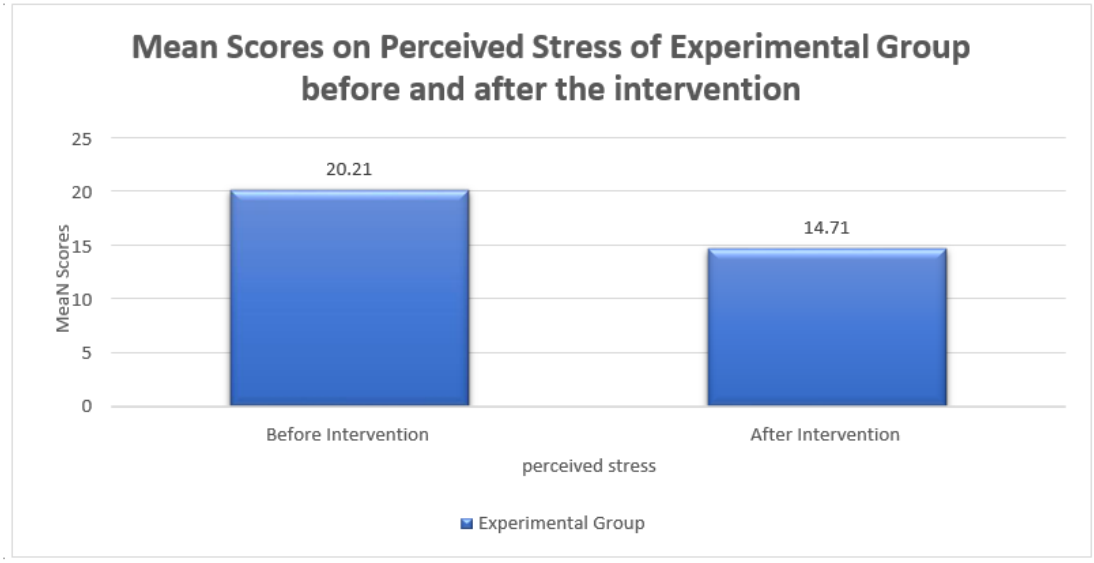

Figure 4.29Mean Scores on Perceived Stress before and after the Intervention

It is absolutely evident that the amount of perceived stress decreased after laughter yoga.

The mean scores on perceived stress before the intervention was 20.21 which decreased to 14.71 after one month of laughter yoga. A difference of 5.5-unit score can be seen here. This points out to the positive impact of laughter yoga in reducing perceived stress. It is important to note that the difference is a significant one (p<.001)

Table 4.21

Mean Scores Standard Deviation, Standard Error of Mean, Significance of Difference between mean on Positive Affect before and after the Intervention

Experimental Group	**Mean**	**Standard Deviation**	**Standard Error of Mean**	**Z Value**	**P Value***
Positive Affect Before	34.35	4.692	.622	-6.59	<.001
After	41.91	3.398	.450		

**Using Wilcoxon Sign Rank Test*

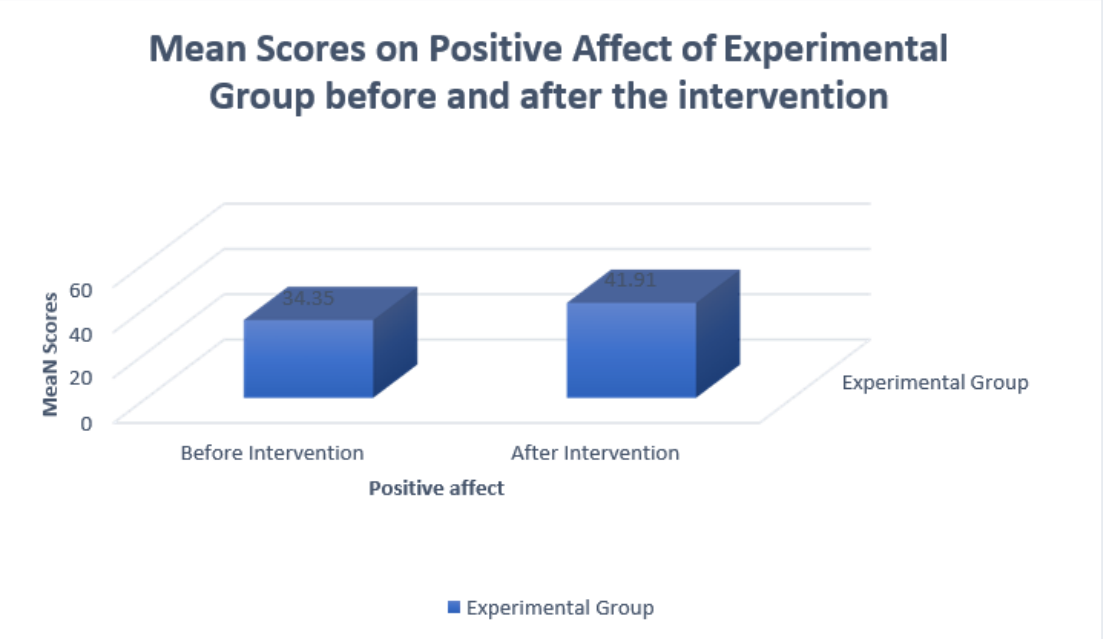

Figure 4.30 Mean Scores on Positive Affect before and after the Intervention

Looking at the table and graph above it is quite evident that there has been a sharp increase in positive affect after the intervention. In fact, this increment is much more as compared to increment in resilience. Laughter yoga has played an important role in

increasing positive affect from 34.35 score point average to 41.91 score point average. Also, this is a significant increase ($p < .005$) as can be seen in the following section.

Table 4.22

Mean Scores Standard Deviation, Standard Error of Mean, Significance of Difference between mean on Negative Affect before and after the Intervention

Experimental Group		**Mean**	**Standard Deviation**	**Standard Error of Mean**	**Z Value**	**P Value****
Negative Affect	Before	24.8	5.487	.687	-6.57	<.001
	After	15.70	2.236	.296		

***Using Wilcoxon Sign Rank Test*

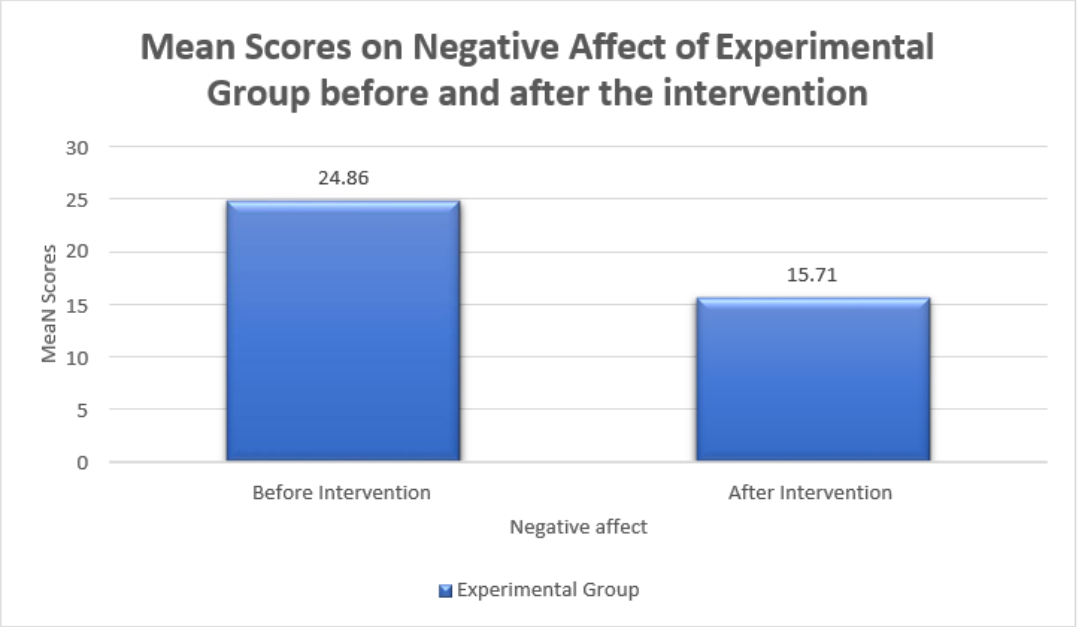

Figure 4.31 Mean Scores on Negative Affect before and after the Intervention

As far as negative affect is concerned a steep decline was seen after the laughter yoga intervention. A decline from a mean of 24.86 to 15.71. Thus, a stark difference of 9.15 units is visible. This difference is larger than the difference seen in terms of positive affect. And the difference is significant at .01 level since $p < .001$. Hence it seems

laughter yoga is more successful in reducing negative emotions than increasing positive emotions.

Table 4.23

Mean Scores, Standard Deviation and Significance of difference between means on Positive Affect before and after the intervention among those who had high baseline perceived stress in experimental group

Experimental Group		Mean	Standard Deviation	Z value	P Value**
Positive Affect in those who had High Baseline Perceived Stress	Before	30.42	2.02	-4.28	<.001
	After	39.92	1.72		

***Using Wilcoxon-Signed Rank Test*

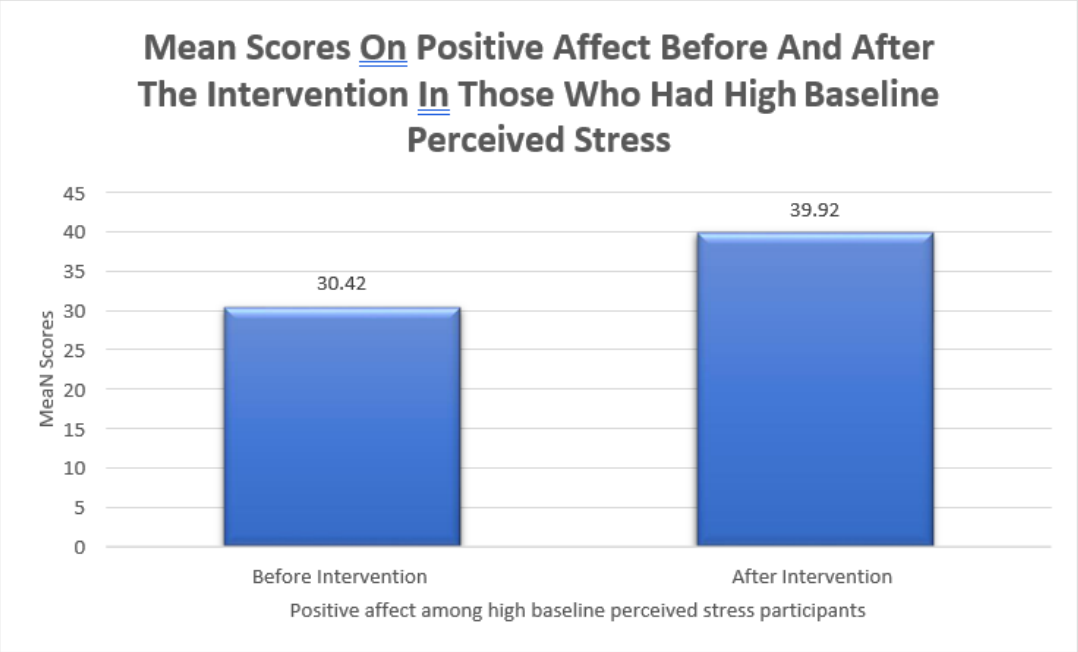

Figure 4.32 Mean Scores on Positive Affect before and after the intervention in those who had high baseline Perceived Stress

An increase in positive affect was seen after the intervention among those who showed high level of perceived stress at baseline that is before the intervention. Overall, our

sample showed higher perceived stress than norms wherein, normatively mean for women was found to be 12.1 (Cohen, Kamarck, & Mermelstein, 1983) and mean 19.75 for women in the Indian population (Pangtey, Basu, Meena, & Banerjee, 2020). However, the mean score on perceived stress for our sample was 20.21 before the intervention and all those who scored above 20.21 were classified as showing higher baseline perceived stress as compared to the average for the sample. After the intervention an increase in positive affect was witnessed from 30.42 on an average to 39.92 on an average. And this increase was found to be significant at .01 level of significance.

Table 4.24

Mean Scores, Standard Deviation and Significance of difference between means on Negative Affect before and after the intervention among high baseline perceived stress participants

Experimental Group		**Mean**	**Standard Deviation**	**Z value**	**P Value****
Negative Affect in High Baseline Perceived Stress	Before	26.79	3.77	4.28	<.001
	After	15.62	2.16		

***Using Wilcoxon-Signed Rank Test*

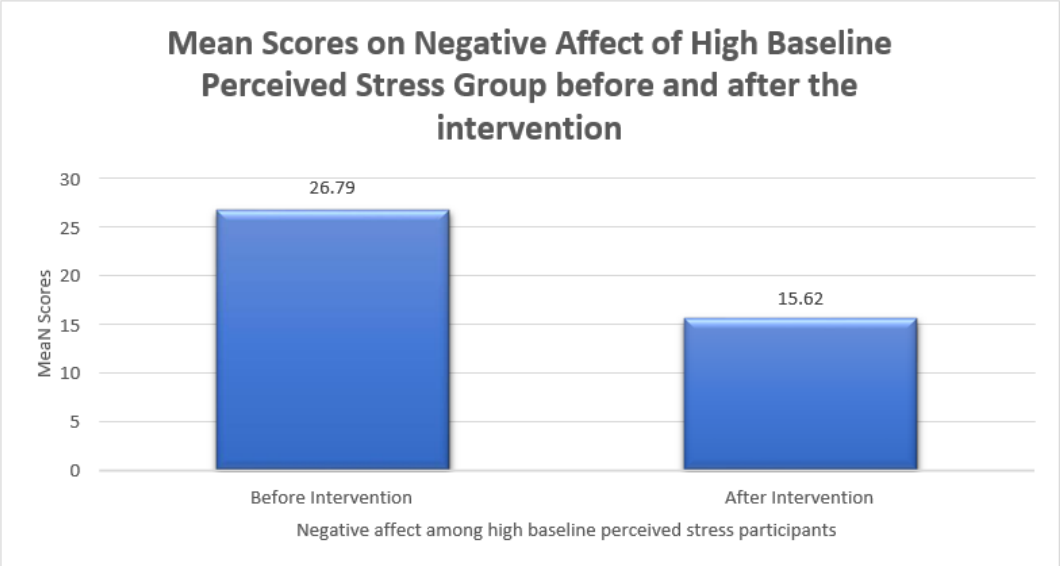

Figure 4.33 Mean Scores on Negative Affect of High Baseline Perceived Stress Group before and after the intervention

Similarly, when it came to negative affect a decline in negative affect was witnessed after the intervention among those who showed high amount (above average) of perceived stress at baseline that is before the experiment. It declined from 26.79 to 15.62 on an average. This decline is significant at .01 level of significance.

Table 4.25

Mean Scores, Standard Deviation and Significance of difference between means on Positive Affect before and after the intervention among those who don't show high baseline perceived stress

Experimental Group	**Mean**	**Standard Deviation**	**Z value**	**P Value****
Positive Affect in those who don't have high Baseline Perceived Stress	Before	37.21	3.94	-5.01	<.001
	After	43.36	3.59		

***Using Wilcoxon-Signed Rank Test*

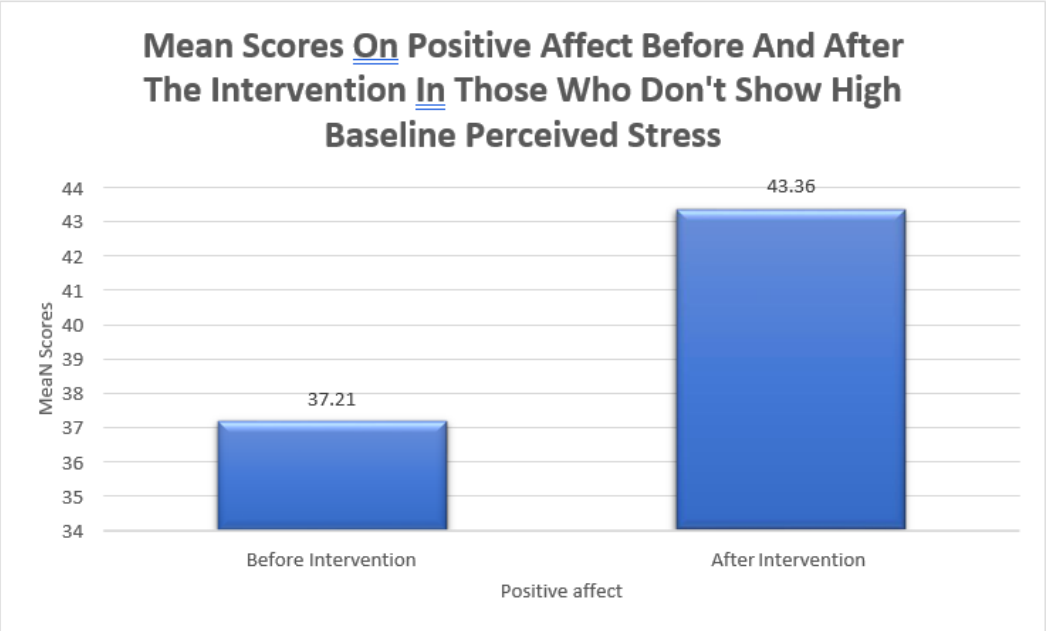

Figure 4.34 Mean Scores on Positive Affect before and after the intervention in those who don't show high baseline Perceived Stress

One the most interesting findings with regards to the modality's impact on emotions has been with regard to increase in positive affect after the intervention even among those who didn't have high baseline perceived stress (that is who showed average or below average level of perceived stress in this sample). The average increase in positive affect was from 37.21 to 43.36 after the intervention. This is a rather stark rise and increase in positive affect and shows the important role laughter yoga plays in increasing and uplifting positive affect even among those who may not have high level of stress. It can be contested that a decline in perceived stress after the intervention may have been related with emotions in some way. However, only a weak correlation was seen (r=.23) between perceived stress and positive affect after the intervention. Thus, it implies that as a modality it is successful in uplifting emotional state of not just with those who experience stress but also who exhibit lower levels of stress.

Table 4.26

Mean Scores, Standard Deviation and Significance of difference between means on Negative Affect before and after the intervention among those who don't show high baseline perceived stress

Experimental Group	**Mean**	**Standard Deviation**	**Z value**	**P Value****
Negative Affect in those who don't show high Baseline Perceived Stress	Before	23.45	5.67	4.93	<.001
	After	15.76	2.32		

***Using Wilcoxon-Signed Rank Test*

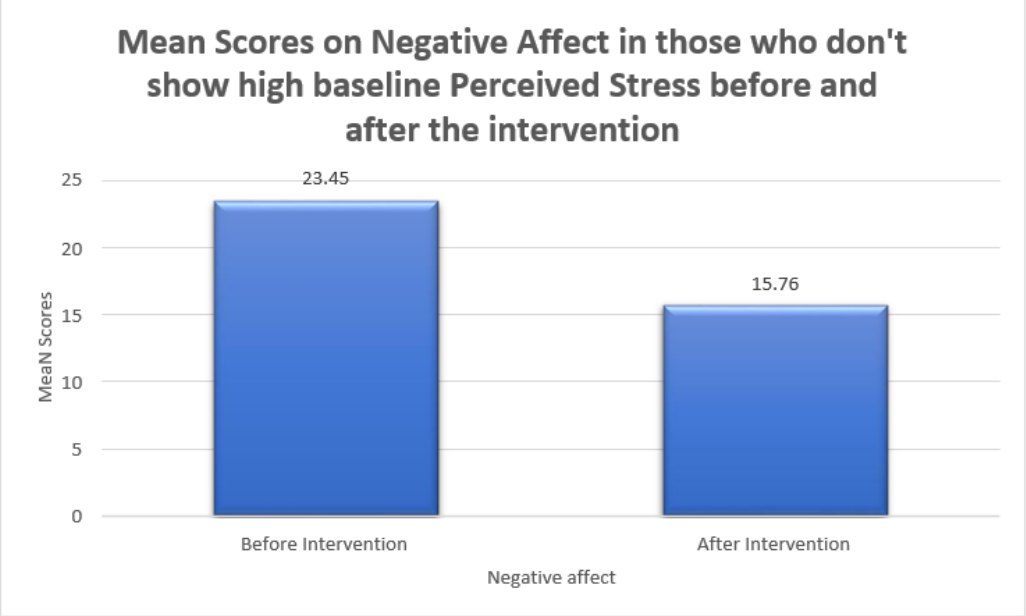

Figure 4.35 Mean Scores on Negative Affect in those who don't show high baseline Perceived Stress before and after the intervention

Not just was an increase in positive emotions seen, but also a decline in negative affect after laughter yoga among those who showed average to below average level of perceived stress. Thus, laughter yoga was successful in reducing negative affect from

23.45 on an average to 15.76 on average. And this reduction proved to be a significant one at .01 level of significance.

Table 4.27

Mean Scores Standard Deviation, Standard Error of Mean, Significance of Difference between on Laughter Quotient before and after the Intervention

Experimental Group		**Mean**	**Standard Deviation**	**Standard Error of Mean**	**Z value**	**P Value****
Laughter Quotient	Before	45.51	9.1691	1.651	-6.57	<.001
	After	64.58	12.491	1.215		

***Using Wilcoxon Sign Rank Test*

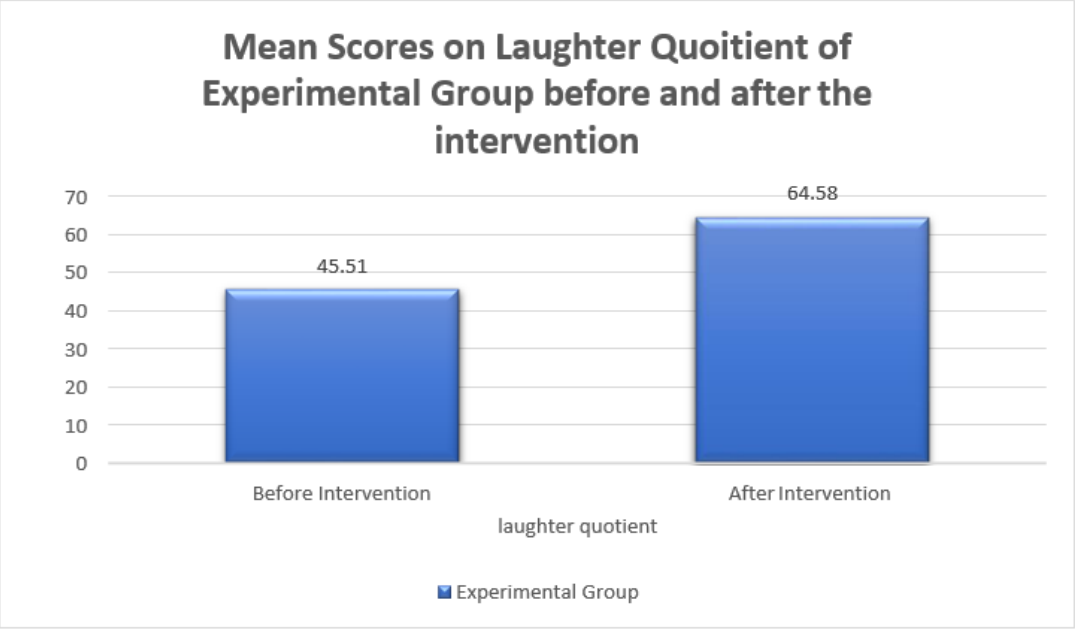

Figure 4.36 Mean Scores on Laughter Quotient before and after the Intervention

Laughter Quotient also increased after laughter intervention. It increased from an average score of 45.51 to 64.58. This is indeed a very huge jump of 19.07 units. And this was found to be significant at .01 level of significance. A laughter quotient of

average 45.51 was the baseline measure of population's laughter quotient which increased manifold after the intervention. Thus, their ability to laugh, and laugh without reason had increased due the intervention. Thus, even if they don't regularly manage to engage in laughter yoga after the intervention the increased laughter quotient will give them much the benefit.

Table 4.28

Mean Scores Standard Deviation, Standard Error of Mean, Significance of Difference between mean on How do You feel immediately before and a single trial of laughter yoga

Experimental Group			**Mean**	**Standard Deviation**	**Standard Error of Mean**	**Z value**	**P Value***
How	do you feel	Before	57.88	12.61	1.106	-6.32	<.001
		After	85.74	7.671	1.215		

**Calculated using Wilcoxon- Signed Rank Test*

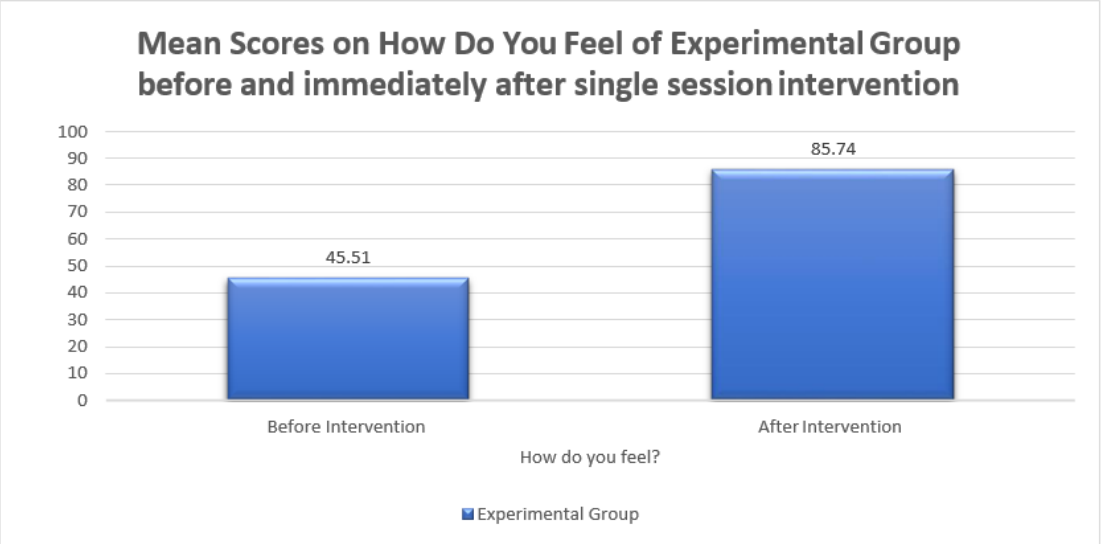

Figure 4.37 Mean Scores on How do You feel immediately before and after a single trial

It is also interesting to note how even a single trial of laughter yoga can have an impact. Using a self-report of the participants about how they felt after a single trial, a huge difference was witnessed. This form measured their level of energy, mood, muscle relaxation, stress, optimism levels, level of friendship, mental relaxation within group and ability to laugh without reason as reported by them. A huge difference was seen on average scores ranging from 57.88 to 85.74 thus there seemed to have been much improvement in terms of their level of energy, muscle relaxation, mental relaxation, stress, mood, optimism, level of friendship within group and ability to laugh without reason after a single session of laughter yoga as reported by them.

4.5 SEMI-STRUCTURED INTERVIEW

Semi-structured interviews were carried out to get a deeper and richer understanding of the participants life, their family dynamics, stressors, ways of coping, prevalence of laughter and influence of the intervention. Owning to the Covid 19 situation and stricter rules the organization allowed interview with a limited number of participants. Also, many participants refused to respond to the interviews and could not be forced. The ones who agreed to participate also took time to open up and showed much hesitation and reluctance to answer honestly. They were not pushed much or compelled at any point although attempt was made to form a rapport and make them comfortable to report as honestly and openly as possible. Thus, four participants from experimental group (from one of the organizations) completed the interview before and after the intervention. Before the intervention a number of questions were asked for rapport formation. This build trust and confidence. However, they were not as interested or intrigued by laughter yoga intervention then. Also, all four of them took some time to open up and were more of introverted. They also took more time to blend in and let loose in the laughter sessions. After a week or so (2 to 3 sessions) they participated more proactively and had free flow laughter. They were interviewed again after the laughter yoga sessions. The interview was not audio-visually recorded since permission was not given. Also, that would have made them uncomfortable as it is it took time to form rapport with them. The responses were recorded verbatim along with any important non- verbal cues. Responses of each one of them are discussed below. The names used are not real names to abide by ethical standards of anonymity.

Participant 1

Amita has a regular schedule in the organization. She reported feeling pressurized by forced decisions of parents to send her to the organization. She also feels that her biggest failure lies in her inability to speak English. She tried but failed. Her social support and coping mechanism are a particular friend of hers and life in the organization collapses without her. Amita hardly used to laugh as expresses by her. Occasionally when she laughed it was with this very friend only. She also expressed unequal treatment meted out to girls. She shared how men in her family treat her and females unequally. However, she mentioned that men in her house are not bad to them. She belongs to a patriarchal family since all the economic and education related decisions are taken by father and grandfather and hierarchy starts with grandfather, father, brother, grandmother. She shared feeling not understood, sad, and getting upset too easily.

Non-Verbal cues reflected sadness and an attempt to hide the same without giving out any negative details. She kept attempting to balance out by saying whatever is bad but it is good too.

After the intervention, she reported feeling very good. She also honestly shared those problems in her life have not reduced at all but she is able to generally face them better. This was a reflection of a genuine response. She also expressed her ability to face it with happiness, become more agile and happier with her friend too.

Participant 2

Anuradha is a girl who expressed her biggest fear around unemployment and subsequent marriage if not employed. She shared how her dad decided to take her out of the organization and get her married. She also mentioned that there is no one who loves her. Thus, there was a total lack of social support and deprivation of affiliation needs. She seems to have been feeling quite hopeless which was evident in her statements about ‘no one loving her’, ‘having no friends’ and rating ‘two’ on confidence in future on a scale of 0 to 10. Much more of what was expressed by her is indicative of it as well. She shared that she never feels like laughing in spite of some friends in the organization trying hard for her to laugh. She also expressed how she gets disturbed very easily. With

respect to the question about treatment of girls at home, she very hopelessly (and with anger) expressed that girls are always strangers and never have any home as theirs. It was quite evident from these statements that she does not feel like she belongs anywhere. As far as family dynamics are concerned it is a clearcut patriarchal family where father takes all the decisions be it economic, education, religious and she feels all the decisions are not for her welfare and she gets really stressed and helpless for she can do nothing about it.

Her non-verbal cues reflected her intense anger, frustration and helplessness. She was not treated well and regrated being a girl.

After the intervention she said she had enjoyed. She shared how she thought that this laughter yoga is such a foolish thing and never took interest initially. But she was surprised to have started laughing. She again reported how she would not laugh in spite of friends trying hard and during the intervention could not stop only at times.

Her nonverbal cues showed marked changes in the second interview. She still discussed her problems. However, the frustration and anger had soothed.

Participant 3

Tania's father is an alcoholic and abandoned her mother due to which mother had to start working. She also reported the rude behaviour of her father with her and his forcing her to leave the city. Tania is close to her mother but cannot do much for her since away from her in this organization. Tania used to laugh a lot as a child but almost stopped laughing as she grew older. When asked about treatment of girls at home she shared that it was not good, sharing again how father was an alcoholic and rude and on top of that brother supported him since he is a boy and cannot support females. Since father lost everything mother has to make major economic decisions but that too in consultation with brother since she is a female. (She has a younger brother who is not even mature enough). She also reported being treated like a servant by her father and her father being selfish. She had wet eyes when she was sharing about her mother. She could not maintain constant eye contact.

After the laughter sessions she reported feeling very good and that it had given her

freshness and strength. Even then she expressed that her mother could also attend the sessions. She seems to be very attached and stressed about her mother.

As per observation, she did not laugh for the 1st session and was very hesitant. She looked quite and stressed but by the 2nd session she started participating.

Participant 4

Mudita, while in a general conversation started, she broke down. However, she wanted to continue and talk a lot. Mudita does not have parents (died) and has a brother. She reported violence at home. Her brother has always been beating her. She expressed how his wife was very bad and Mudita does not want to live with them. Mudita was asked by his brother to marry one of his friends who was a ruffian. She mentioned that 'everyone takes advantage of being a girl' when asked about treatment of girls at home. However, it was not clear whether she meant the above statement generally or specific to her since she did not want to discuss further even when prodded. She expressed that nobody loved her and her mother would have loved her if she was alive. She also shared that till the time mother was alive she used to laugh. However, ever since she has not laughed and said 'brother has taken away my laughter'. She reported being hopeless and thoughts of futility of being alive. With moist eyes she said that it was very bad to be a girl and no one should be born a girl. Paradoxically she told how her brother was really good to his wife who is also a girl and that was because she was modern and well educated. As far as decision making was concerned all decisions are taken by her brother and none of them are keeping in mind her welfare

She broke down once and continued talking. She almost broke down again and continued having moist eyes. She was anxious and also embarrassed at one point and did not open up with few points. Neither was she pestered further keeping in mind the ethical consideration.

After the intervention she reported being able to laugh and felt 'magical' after initial failure to laugh. She expressed how she stays happy and that problems have not disappeared but have decreased. This was rather slightly new to hear since most have them shared how laughter yoga simply helped them let off steam and generally cope with better emotionality but never really resolved the problems, which continued.

However, this participant also mentioned a decline in problems. When probed further to understand she expressed that her happy go lucky approach helped her to incorporate in every realm and she managed to laugh it off at her brother too (on the phone) and he was surprised to see her new found strength which decreased his ill- mannered behaviour.

There was a sense of exuberance and confidence in her communication after the sessions.

Apart from discussing responses of each of individual as expressed by them and inferring them an attempt was made to make a word cloud to see if there were any keywords that could be picked up before and after the intervention. Following visuals illustrate the difference before and after the intervention.

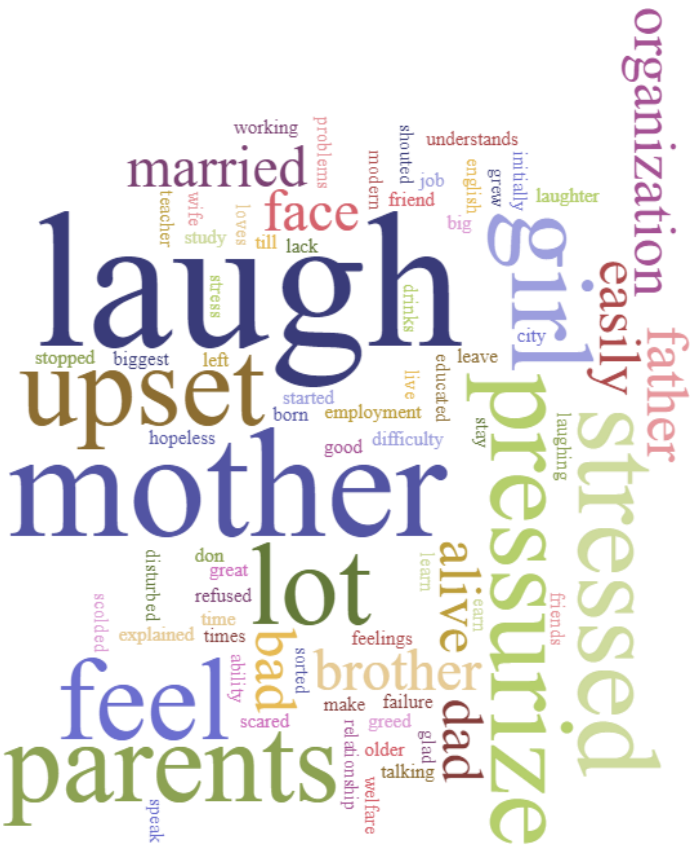

Figure 4.38 Showing a word cloud based on responses before the laughter yoga intervention

Figure 4.39 Showing a word cloud based on responses after the laughter yoga intervention

From the visual illustration above it can be seen very clearly that words and themes like ‘pressurized’ ‘stressed’, ‘upset’ are emphasized before the sessions and words like ‘good’ ‘laughing’ ‘strength’, ‘happy’ ‘magic’ appear strongly and frequently after the intervention.

Discussion

In totality what can be seen from the four interview responses are that all of them belong to a patriarchal family set up with unequal treatment of girls and favoring of boys. However, the degree and intensity of that differed. With some being unfair and unequal treatment but not mal treatment and others experience mal treatment to the extent of physical abuse and torture.

Furthermore, another common aspect that comes out is the poor frequency of laughter or rather loss of laughter. This is also to some extent replete with the fact that laughter declines as we grow older and thus makes it important to restore this laughter and child like playfulness (for the multitudinous benefits known). Each of them found the program absurd and difficulty to laugh in the first go. However, each one of them reported how it became easy to laugh and how their emotionality had improved. Most of them reported that the problems continued but coping with those problems became easier. Each one had some or the other strong emotions attached to their responses ranging from anger, frustration, helplessness to sadness. None of them felt proud of being a girl.

In a nutshell, it is seen and can be inferred safely that laughter yoga does increase a person’s ability to laugh and help improve his coping mechanism. Some may argue that there could be a placebo effect, which is why the quantitative data from a control group experimental design supports the qualitative findings. Even if there is a chance of placebo it still has worked in the welfare of them all.

The findings of the interview are in line with other qualitative studies. One such study on members of laughter yoga club in UK reported laughter as good means for coping against stressors of life. A trend similar to one seen in the present study was that of being *‘skeptical’* in the beginning to being and *‘advocate’* by the end. (Hatchard, & Worth, 2021).

Overall findings of the present study are also in line with the findings of the pilot studies. In one of the pilot studies the immediate impact of laughter yoga was studied and a stark difference between mean scores before and after the single laughter yoga session was found. (Ahuja, Rai & Khullar, 2019). Other studies (Meier et al., 2021) too have shown that laughter yoga has been effective in stress reduction.

Other studies using mixed methods approach have also had results similar to the present study. The intervention resulted in positive emotions and better coping. Qualitative results showed declined anxiety, stress and depression in line with results from quantitative data. (Hatzipapas, Visser & Rensburg, 2017)

Another study depicts Laughter yoga's beneficial influence on physiological state, perceived stress, affect and resilience of military graduates. The study also used similar procedure and tools like the present study and has similar findings. A significant increase in positive emotions and resilience and decrease in perceived stress and negative emotions among military graduates was seen. (Killian, 2017). Similar findings were seen with regards to IT professionals. A significant decrease in negative affect and perceived stress and increased positive emotions (Nagendra et al., 2007). This depicts the replicability of the procedure and helps us accept the findings of the present study more confidently.

4.6 Discussion In Light of Hypotheses

4.6.1 Hypothesis 1: There will be a significant decrease in perceived stress after laughter yoga in experimental group

It is clearly seen from the statistical calculations, tabular presentation and graphical illustration that perceived stress decreased for the experimental group after laughter yoga intervention.

The mean score on perceived stress was 20.21 at baseline which decreased to 14.71 after intervention of laughter yoga for a month. Table 4.20 shows the difference between mean scores in the before and after intervention and illustrates a significant decrease in perceived stress ($p<.001$). This was calculated using the non-parametric Wilcoxon Sign Rank Test, equivalent of paired t-test since the design used was a within group, pre-post

design and the data was not normal. Thus, the results support the directional hypothesis about perceived stress. Laughter yoga does play an important role in reducing perceived stress.

4.6.2 Hypothesis 2: There will be a significant increase in positive emotions after a laughter yoga intervention in experimental group

The statistical findings have supported this hypothesis as well. Using an equivalent of non- parametric of t-test, The Wilcoxon Sign Ranked test it was found that the augmentation in positive emotions in experimental group after the intervention was a significant one ($p<.001$). Table 4.21 shows it very clearly how positive affect increased from an average of 34.35 to an average of 41.91.

4.6.3 Hypothesis 3: There will be a significant decrease in negative emotions after laughter yoga intervention in experimental group

Not just an increase in positive emotions but also a decrease in negative emotions was hypothesized and the statistical findings support that. Table 4.22 clearly shows a decrease in negative affect from 24.8 to 15.70. The difference is of 9.15 units, which is even greater than the difference on positive emotions before and after laughter yoga. This difference too is significant with a $p<.001$. Hence, one can see how laughter yoga has worked even better on negative emotions reduction than positive emotions' increase.

4.6.4 Hypothesis 4: There will be a significant increase in positive emotions after a laughter yoga intervention among those who show high level of baseline perceived stress in experimental group

The hypothesis about increases in positive emotions for even those who had high baseline perceived stress proved to be true. Laughter yoga seems to have worked well in increasing positive affect among those participants who scored above average score on perceived stress, that is, those who showed high level of perceived stress. Table 4.23 clearly shows an increase from 30.42 to 39.92 as mean scores on positive affect before and after the intervention, among the high perceived stress participants. This was found to be significant ($p<.001$)

4.6.5 Hypothesis 5: There will be a significant increase in positive emotions after laughter yoga intervention among those who don't show high levels of baseline perceived stress in experimental group

It was also hypothesized that an increase in positive affect would be seen after laughter yoga among even those who do not show high level perceived stress. The results support this hypothesis since table 4.25 shows a significant increase ($p<.001$) in positive affect after the intervention. This is an important finding since it shows how laughter yoga can be beneficial with regards to emotions even if the person is not stressed. It still works to uplift a person's emotional state.

4.6.6 Hypothesis 6: There will be a significant decrease in negative emotions after laughter yoga intervention among those who show high levels of baseline perceived stress in experimental group

Similarly, it was also hypothesized that negative affect would show a decrease among the high perceived stress participants after doing one month of laughter yoga. This too found to be accepted

Table 4.24 shows a decline in negative affect after the intervention among those who showed above average of perceived stress before the intervention. The decrease was from an average score of 26.79 to 15.62 on an average. This decline was found to be significant at .01 level of significance.

4.6.7 Hypothesis 7: There will be a significant decrease in negative emotions after laughter yoga intervention among those who don't show high levels of baseline perceived stress in experimental group

Similarly, it was hypothesized that there would be a decline negative affect after laughter yoga even among those who didn't show high perceived stress. And it was seen that laughter yoga did bring about a decline in negative emotions irrespective of the stress levels of participants. Thus, negative emotions of these participants who did not report high perceived stress also declined. Again, using non parametric Wilcoxon Sign Rank test, it was found that the negative emotions decreased significantly ($p<.001$) as shown in table 4.26.

4.6.8 Hypothesis 8: There will be no significant change in positive emotions in control group

Any intervention using experimental design is only complete when it can be compared with results of control group. Thus, having a control group makes it experimental and data more valid. Therefore, it was hypothesized that there would be no change in emotions in control group with respect to positive emotions. No change would show that laughter yoga did have an impact and exactly that is what was seen as depicted in table 4.13. Positive affect showed a decrease being measured the second time. Laughter yoga was not done by control group wherein they carried out daily activities. The difference was not significant and perhaps happened by chance.

4.6.9 Hypothesis 9: There will be no significant change in negative emotions in control group

Similarly, it was hypothesized that there would be no change in negative emotions as well in control group. In fact, an increase was seen in average score on negative affect in post-test measurement in control group. This is depicted in table 4.14. These findings could be coincidental too since the difference is not significant. This was found using non parametric Wilcoxon Sign Rank Test.

4.6.10 Hypothesis 10: There will be a significant increase in resilience after laughter yoga intervention in the experimental group

One of the objectives of this research was to see how laughter yoga could be effective in building resilience and hence it was hypothesized that there would be an increase in resilience after intervention among the experimental group participants. Table 4.19 shows the increase in average resilience score from 30.07 to 31.88. Although, the jump may be small but is significant (p=.013).

Difference in mean scores between same participants had to be measured in pre-test post-test design, again the non-parametric Wilcoxon Sign Rank test was used. The results clearly show a significant increase in resilience among participants of experimental group.

4.6.11 Hypothesis 11: There will be a significant difference between immediate perceived state of mind and body before and after single trial laughter yoga intervention in the experimental group

This was measured using a self-report inventory to understand a change in mental and physical state of the participants right after a single trial. It was interesting to find a variation in the mean scores before and after a single laughter yoga session which speaks volumes about the positive influence of even a single session. If one session can have a statistically significant influence, an intervention and incorporation of it as a practice can do wonders. Table 4.28 depicts the result very clearly with reference to this hypothesis. Their level of energy, friendship within group, muscle relaxation, mental relaxation, mood, stress, optimism, level of and ability to laugh without reason were measured. The scores showed difference from 45.51 to 85.74 on an average.

4.6.12 Hypothesis 12: There will be a significant increase in the ability to laugh and express emotion after laughter yoga intervention in experimental group as compared to control group

A hypothesis was also formulated to fulfil the objective of understanding how would a person's ability to laugh, that is, his laughter quotient changes after engaging in this forceful simulated laughter program. It was of interest to understand whether the intervention would increase a person's ability to laugh, if so, that would also become beneficial to them after the intervention (since benefits of laughter are well spelled out).

Table 4.27 depicts the results very clearly. Laughter Quotient increased from an average score of 45.51 to 64.58. This increase was found to be significant ($p<.001$). Also, the increase is a huge one.

4.6.13 Hypothesis 13: There will be a significant difference in perceived stress between control group and experimental group after the intervention

Table 4.9 depicts the result that supports this hypothesis. This was formulated in line with the research objective to study the influence of laughter yoga on perceived stress and to be able to study that effectively a comparative analysis between experimental and control group makes it all the more reliable. Non parametric Test called the Mann Whitney U test was used for the same (non-parametric measure instead of independent t-test, since data non normal) Table 4.9 shows a difference in experimental and control

group. Experimental group showed lower perceived stress after laughter yoga and this was significantly different from control group's average score (p<.001).

4.6.14 Hypothesis 14: There will be a significant difference in positive and negative emotions between control group and experimental group after the intervention

Similarly, to be able to fulfil the research objective to study laughter yoga's impact on positive and negative emotions it became imperative to compare the results between the two groups in the second administration of scales. The alternative hypothesis was formulated and using a between group design and non-parametric equivalent of independent t-test, that is the Mann Whitney U Test, significance of difference between experimental and control was found to be p<.001 on both positive and negative emotions respectively. Table 4.7 and 4.8 depict the results clearly.

4.6.15 Hypothesis 15: There will be a significant difference in resilience between control group and experimental group after the intervention

Similarly, to completely address the objective of studying laughter yoga's impact on resilience, measuring change in resilience before and after the intervention is not sufficient. Therefore, it was hypothesized to see the difference on this variable between control and experimental group. Table 4.1 shows the results that support this hypothesis and shows a significant difference between groups. The difference may be small but is a true difference with control group showing lower resilience compared with experimental group significant at .05 level.

4.6.16 Hypothesis 16: There will be a significant difference in ability to laugh and express emotion between control group and experimental group after the intervention

To be able to fulfil the objective of understanding laughter yoga's impact on a person's ability to laugh, the above hypothesis was framed. Table 4.10 depicts the same clearly.

The laughter yoga intervention group has shown significantly higher mean score of 64.58 than control group's mean score of 46.94. Again, using Mann Whitney U test this was found to be significant at .01 level of significance, hence with 99% confidence it can be said that the difference seen in the experimental and control group on laughter

quotient is a real one. However, there is 1% chance of it having occurred by chance. This means that laughter yoga has had a significant impact on a person's ability to laugh.

CHAPTER 5 SUMMARY AND CONCLUSION

5.1 Summary Of Main Findings

The objectives of the study were as follows

- To investigate the impact of Laughter yoga on perceived stress.
- To investigate the impact of Laughter yoga on positive and negative emotions
- To investigate immediate impact of laughter yoga on state of mind and body.
- To investigate the impact of Laughter yoga on positive emotions among those who show high level of perceived stress.
- To investigate the impact of Laughter yoga on negative emotions among those who show high level of perceived stress.
- To investigate the impact of Laughter yoga on positive emotions among those who don't show high levels of perceived stress.
- To investigate the impact of Laughter yoga on negative emotions among those who don't show high levels of perceived stress.
- To assess the efficacy of Laughter yoga on resilience
- To investigate the efficacy of laughter yoga on ability to laugh and express emotion And to fulfill these objectives various alternative hypothesis was formulated basically
- To compare before and after results after the intervention for experimental group
- To compare first and second administrations' results in control group
- To compare results between control and experimental group
- To see the instant effect of single laughter yoga session

And the main findings/conclusions after carrying out the statistical analysis using non-parametric (since data was non-normal) tests, such as Mann Whitney (for between group) and Wilcoxon Sign Rank Test (for repeated measures, within experimental group design) are as follows- Laughter Yoga was found

- To increase resilience
- Increase positive emotions
- Decrease negative emotions
- Decrease perceived stress
- Increase laughter quotient
- And improve perceived state of mind and body immediately after single session

All the alternative hypothesis were accepted and duly supported by statistical findings (with minimum requirement of .05 level of significance)

5.2 Strengths Of the Study

In the following section, strengths of this study are stated

- The design consisted of a control group
- The design followed a random assignment of subjects to control and experimental group
- Laughter Yoga intervention was given by certified and trained individual
- Standardized procedure of carrying out laughter yoga was followed
- Care was taken that the control group did not engage in any other regime or exercise program since that could have affected the results

- The subject's rights were respected by giving them choice to withdraw and protecting them from any harm
- Also, the information collected from interviews or questionnaires was kept confidential
- There was no discrimination based on caste, creed, color in any way
- Laughter Yoga sessions were carried out with the control group after the study was over. This is a mark of high ethical standards.
- Since researcher was the Laughter Yoga leader, a double-blind design was used to reduce confirmation bias

5.3 Delimitation Of the Study

It is very difficult to have any research that is perfect in all ways and it is imperative to acknowledge the limitations. Somme of the limitations of this study are

- Small sample size. The size of sample is not too large. However, for intervention- based approach it is still a decent sample size
- Since, it also involved discussion of sensitive issues along with time of the participants, many of them refused to participate in the interview
- Due to Covid 19 Pandemic not many organizations gave permission to conduct research
- Laughter Yoga was carried out by the research scholar herself. Although the researcher was a trained and certified instructor but there could be a possibility of confirmation bias.
- Since it was a month-long intervention there was some dropout too

This study only focused on emotions, stress and resilience but not the relationship between those variables

5.4 Relevance Of Research

Relevance of the findings of this study are multifaceted. Laughter Yoga has so many advantages and the results of this study are in line with that.

Laughter Yoga is an inexpensive intervention, thus making it a very economical intervention, especially for underprivileged women in shelter homes and NGO settings. This section of population does not have an easy access to mental health and wellbeing and an economical intervention like this can be very helpful. This has an immense significance for society at large and must be implemented in policy. Laughter Yoga can become a part of their regular schedule by policy makers. Laughter Yoga has received a place in theory (in textbooks in the Indian curriculum), however, its significance lies in practice and should be applied extensively.

Laughter yoga has shown a positive role in emotional wellbeing, both in increasing positive emotions and decreasing negative emotions and also played a significant role in perceived stress reduction. Hence, findings of this study are so relevant. Laughter Yoga is found to be very relevant in reducing perceived stress. It has also been found as an effective tool to reduce negative emotions and increase positive emotions.

5.5 Further Research

Since no research is perfect and limitations are acknowledged the scope for further research is inevitable and interesting. Since sample size was one of the limitations. Research with larger sample size should be carried out for better generalization.

Research should also be carried out with an independent laughter yoga leader to reduce any chances of bias. Since the researcher herself was the laughter yoga leader in this study, further research should ensure that laughter yoga is conducted by an independent leader who is not the researcher. Also, various neuro-psychological measurements should be carried out to further operationalize stress. Furthermore, a mediation effect if any can be studied too. Since this study did not take into account any relationship or mediation (For instance if and how emotions may have influenced resilience) between the dependent variables, further research can be carried out to investigate the same. That

would help us understand how the various variables play out.

Once the Covid 19 situation improves better access to participants and their time will ensure richer and deeper exploration hence research with more organizations should be carried out. Wider geographical area should be included.

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APPENDICES

Appendix 1a) CONSENT FORM FOR ORGANIZATION and PARTICIPANTS

a) CONSENT FORM FOR ORGANIZATION

CONSENT FORM

(Consent form to conduct research study in your organization)

Name of the Organization

_____

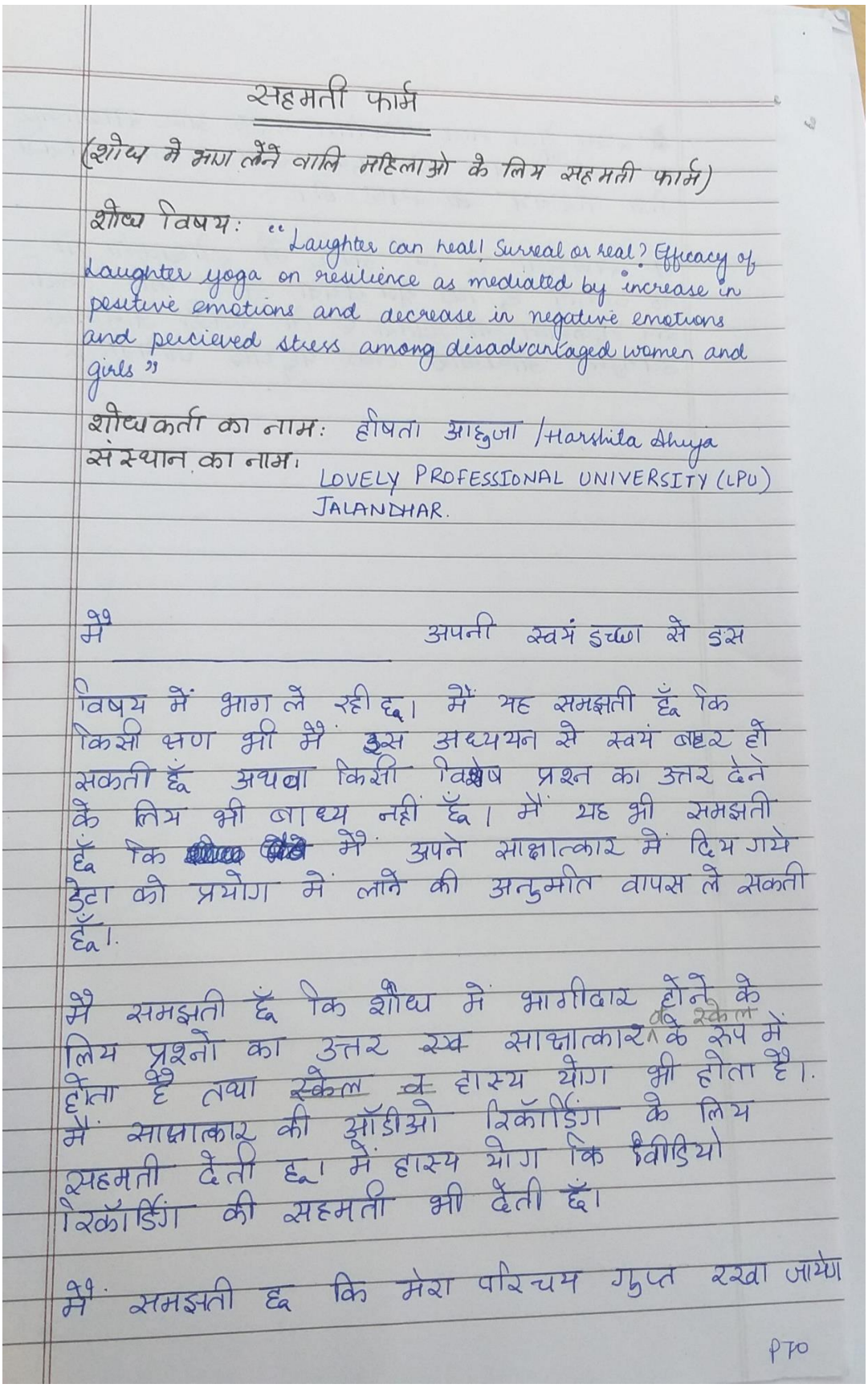
Dehradun, Uttarakhand

Consent letter for research study on **"Efficacy of Laughter yoga on Resilience as mediated by change in Emotions and Perceived Stress among disadvantaged females"**

I_____hereby confirm the consent from my organization to extend our support in research study which involves collection of data in the form of interviews, observation and rating scales along with conduction of laughter yoga for the purpose of PhD research by Ms. Harshita Ahuja (Lovely Professional University)

Name: Designation: Signature: Date: Location:

b) CONSENT FORM FOR PARTICIPANTS



सहमती फार्म

(शोध में भाग लेने वाली महिलाओ के लिय सहमती फार्म)

शोध विषय: "Laughter can heal! Surreal or real? Efficacy of laughter yoga on resilience as mediated by increase in positive emotions and decrease in negative emotions and perceived stress among disadvantaged women and girls"

शोधकर्ता का नाम: हर्षिता आहुजा / Harshita Ahuja
संस्थान का नाम: LOVELY PROFESSIONAL UNIVERSITY (LPU) JALANDHAR.

मैं _____ अपनी स्वयं इच्छा से इस विषय में भाग ले रही हूं। मैं यह समझती हूँ कि किसी क्षण भी मैं इस अध्ययन से स्वयं बाहर हो सकती हूँ अथवा किसी विशेष प्रश्न का उत्तर देने के लिय भी बाध्य नहीं हूँ। मैं यह भी समझती हूँ कि ~~शोध कर्ता~~ मैं अपने साक्षात्कार में दिय गये डेटा को प्रयोग में लाने की अनुमति वापस ले सकती हूँ।

मैं समझती हूँ कि शोध में भागीदार होने के लिय प्रश्नो का उत्तर ~~स्व~~ साक्षात्कार के रूप में देना है तथा ~~स्केल व~~ हास्य योग भी होता है। मैं साक्षात्कार की ऑडीओ रिकॉर्डिंग के लिय सहमती देती हू। मे हास्य योग कि वीडियो रिकॉर्डिंग की सहमती भी देती हूँ।

मैं समझती हू कि मेरा परिचय गुप्त रखा जायेगा

PTO

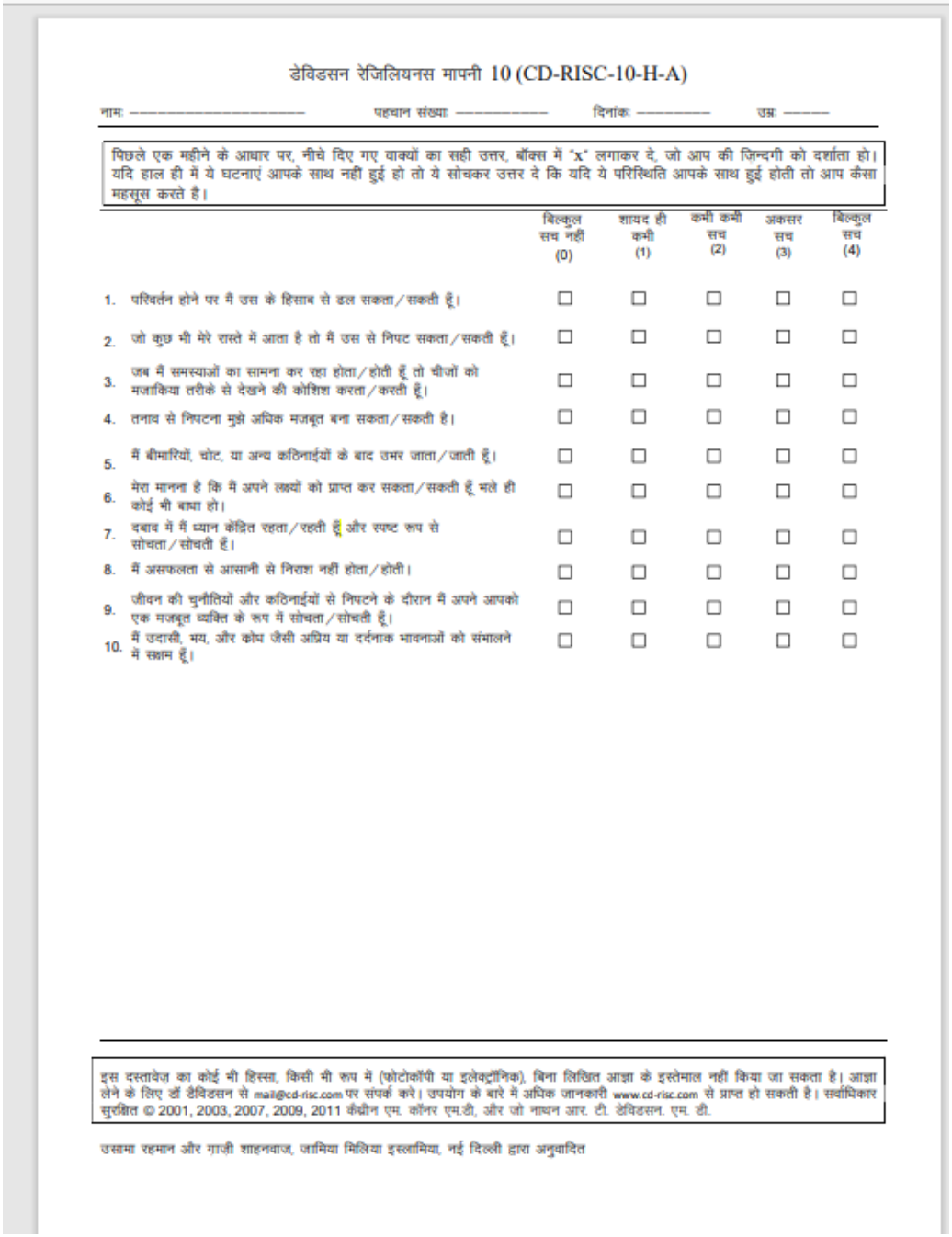
इस्सा मेरा नाम परिवर्तन करके और साक्षात्कार का सभी उनी विषय को गुप्त रखा जायेगा जिससे मेरा परिचय स्पष्ट हो।

मैं समझती हूँ कि अगर मैं शोधकर्ता को यह बताती हू कि मुझे अथवा अन्य कोई किसी रूप नुकसान का खतरा है तो उसकी जानकारी उपयुक्त अधिकारि तक पहुचाई जायेगी।

हस्ताक्षर / Signature

Appendix 2 CONNOR DAVIDSON RESILIENCE SCALE CD-RISC

CONNOR DAVIDSON RESILIENCE SCALE CD-RISC



डेविडसन रेजिलियनस मापनी 10 (CD-RISC-10-H-A)

नाम: ———————— पहचान संख्या: ———— दिनांक: ———— उम्र: ———

पिछले एक महीने के आधार पर, नीचे दिए गए वाक्यों का सही उत्तर, बॉक्स में "x" लगाकर दे, जो आप की जिन्दगी को दर्शाता हो। यदि हाल ही में ये घटनाएं आपके साथ नहीं हुई हो तो ये सोचकर उत्तर दे कि यदि ये परिस्थिति आपके साथ हुई होती तो आप कैसा महसूस करते है।

		बिल्कुल सच नहीं (0)	शायद ही कभी (1)	कभी कभी सच (2)	अकसर सच (3)	बिल्कुल सच (4)
1.	परिवर्तन होने पर मैं उस के हिसाब से ढल सकता/सकती हूँ।	☐	☐	☐	☐	☐
2.	जो कुछ भी मेरे रास्ते में आता है तो मैं उस से निपट सकता/सकती हूँ।	☐	☐	☐	☐	☐
3.	जब मैं समस्याओं का सामना कर रहा होता/होती हूँ तो चीजों को मजाकिया तरीके से देखने की कोशिश करता/करती हूँ।	☐	☐	☐	☐	☐
4.	तनाव से निपटना मुझे अधिक मजबूत बना सकता/सकती है।	☐	☐	☐	☐	☐
5.	मैं बीमारियों, चोट, या अन्य कठिनाईयों के बाद उभर जाता/जाती हूँ।	☐	☐	☐	☐	☐
6.	मेरा मानना है कि मैं अपने लक्ष्यों को प्राप्त कर सकता/सकती हूँ भले ही कोई भी बाधा हो।	☐	☐	☐	☐	☐
7.	दबाव में मैं ध्यान केंद्रित रहता/रहती हूँ और स्पष्ट रूप से सोचता/सोचती हूँ।	☐	☐	☐	☐	☐
8.	मैं असफलता से आसानी से निराश नहीं होता/होती।	☐	☐	☐	☐	☐
9.	जीवन की चुनौतियों और कठिनाईयों से निपटने के दौरान मैं अपने आपको एक मजबूत व्यक्ति के रूप में सोचता/सोचती हूँ।	☐	☐	☐	☐	☐
10.	मैं उदासी, भय, और क्रोध जैसी अप्रिय या दर्दनाक भावनाओं को संभालने में सक्षम हूँ।	☐	☐	☐	☐	☐

उसामा रहमान और गाज़ी शाहनवाज, जामिया मिलिया इस्लामिया, नई दिल्ली द्वारा अनुवादित

Appendix 3 PERCEIVED STRESS SCALE PSS HINDI

PERCEIVED STRESS SCALE PSS HINDI

ONLINE SUPPLEMENTARY MATERIAL

Hindi translation of the Perceived Stress Scale – 10 item

इस सूचकांक के सभी प्रश्न इस बात से सम्बंधित हैं कि पिछले माह इस प्रकार के विचार तथा भावनाएं आप में कितनी बार उत्पन्न हुए

कृपया प्रत्येक परिस्थिति में गोला लगाके उचित उत्तर निर्देशित करें

नाम

तिथि

आयु

लिंग 1. पुरुष 2. स्त्री

0 कभी नहीं 1 लगभग नहीं के बराबर 2 कभी कभी 3 कई बार 4 अनेक बार

1. पिछले माह कितनी बार आप के साथ कुछ अप्रत्याशित घटना घट जाने से आप परेशान हुए?
2. पिछले माह, आपको कितनी बार लगा कि जीवन की आवश्यक चीज़ों को आप नियंत्रित नहीं कर पाएं?
3. पिछले माह, आपने कितनी बार घबराहट तथा तनाव महसूस किया?
4. पिछले माह, कितनी बार आप अपनी व्यक्तिगत समस्याओं से सामना करने के लिए आत्मविश्वास पूर्ण लगा?
5. पिछले माह, कितनी बार आपको लगा कि चीज़े आप के पक्ष में जा रही हैं?
6. पिछले माह, कितनी बार आपने यह पाया कि जो सारी चीज़ें आपको करनी पड़ रही है, उन्हें आप निपटा नहीं पा रहे हैं?
7. पिछले माह, कितनी बार आपको लगा कि आप अपने जीवन में चिढ़चिढ़ाहट को काबू कर पाए?
8. पिछले माह, आपको कितनी बार लगा कि सभी चीज़े आप के नियंत्रण में है?
9. पिछले माह, कितनी बार आपको इस बात पर गुस्सा आया कि चीज़े आपके नियंत्रण के बाहर है?
10. पिछले माह, कितनी बार आपको लगा कि मुसीबतों का अम्बार लगता जा रहा है, जिस पर आप जीत प्राप्त नहीं कर सकते है?

Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. J Health Soc Behav. 1983;24:386-96.

Appendix 4 POSITIVE AND NEGATIVE AFFECTS SCHEDULE HINDI PANAS H

POSITIVE AND NEGATIVE AFFECTS SCHEDULE HINDI PANAS H

The Positive and Negative Affect Schedule

विभिन्न प्रकार के भाव एवं संवेगों से संबंधित नीचे कुछ शब्द दिये गये हैं। आपको यहाँ यह दर्शाना है कि इन भावो और संवेगों को सामान्यतः आप अपने जीवन में किस सीमा तक अनुभव करते हैं। अपने उत्तर को अंकों में दर्शान के निम्न मापनी का प्रयोग करें–

1	2	3	4	5
अल्पमात्र में या लगभग कभी नहीं	थोड़ बहुत या कभी–कभी	मध्य श्रेणी का या औसत रूप से	पर्याप्त मात्रा में या प्रायः	बहुत अधिक मात्रा में या लगभग हमेशा

जीवन के मनोभावों व संवेगों को प्रकट करने वाल प्रत्येक शब्द को पढ़कर यह निर्णय लेने का प्रयास करें कि वह आपके जीवन को किस हद तक परिभाषित करता है अथवा आमतौर पर उस भाव या संवेग को आप अपने जीवन मे किस आवृत्ति या मात्रा में अनुभव करते हैं। उपर्युक्त उत्तर विकल्पों से जो विकल्प आप के जीवन के सांवेगिक स्थिति को सही–सही प्रकट करता हो उससे सम्बन्धित अंक को प्रत्येक शब्द के आगे दिये गये कोष्ठक में भरें।

1. Interested	रोचकता का अनुभव	
2. Distressed	दुःख या पीड़ा अनुभव	
3. Excited	उत्तेजना (हर्ष युक्त) का अनुभव	
4. Upset	मानसिक उद्विग्नता या परेशानी का अनुभव	
5. Strong	सबलता एवं बहादुरी का अनुभव	
6. Guilty	स्वयं को दोषी मानना, अपराधबोध की भावना	
7. Scared	भयग्रस्त रहना या अकारण डर का अनुभव करना	
8. Hostile	शत्रुता एवं विद्वेश की भावना	
9. Enthusiastic	उत्साह एवं उमंग का अनुभव	
10. Proud	गर्व का अनुभव	
11. Irritable	चिड़चिड़ापन का अनुभव	
12. Alert	सजगता एवं फुर्ति का अनुभव	
13. Ashamed	लज्जित होना या शर्मिन्दगी का अनुभव	
14. Nervous	घबड़ाहट एवं चिन्ता का अनुभव	
15. Determined	दृढ़ निश्चयी एवं संकल्पवान	
16. Attentive	स्चेत एवं एकाग्र	
17. Jittery	आशंकित एवं हैरान	
18. Active	सक्रिय /उर्जावान	
19. Afraid	भयभीत	
20. Inspired	आत्मप्रेरित या अन्तःप्रेरित	

Appendix 5 LAUGHTER QUOTIENT FORM

a) Original (English)

Laughter Quotient Form

Find Your Laughter Quotient

The following questionnaire has been formulated according to the concept and philosophy of Laughter Yoga and it will help to determine your ability to laugh for no reason, your ability to express emotions, your communication skills and if you incorporate the 4 elements of joy like singing, dancing, playing and laughing in your life and other such parameters necessary to make life more joyful and happy.

Rate each question/statement on a scale of 1 to 5:

1 = Not at all true
2 = Slightly True
3 = Moderately True
4 = Mostly True
5 = Absolutely True

1. I laugh a lot everyday [1] [2] [3] [4] [5]

2. My source of laughter is driven from my internal desire to laugh and have fun [1] [2] [3] [4] [5]

3. I use humor daily to perceive, express and experience a given situation in a humorous way [1] [2] [3] [4] [5]

4. I add physical playfulness and a playful mental attitude while interacting with others [1] [2] [3] [4] [5]

5. I sing for no reason everyday [1] [2] [3] [4] [5]

6. I dance for no reason everyday [1] [2] [3] [4] [5]

7. Every day, I express freely my positive and negative emotions [1] [2] [3] [4] [5]

8. Every day, I have a high percentage of positive thoughts [1] [2] [3] [4] [5]

9. I am peaceful and calm often [1] [2] [3] [4] [5]

10. Frequently I feel excited and passionate about life [1] [2] [3] [4] [5]

11. I express myself as an extrovert often [1] [2] [3] [4] [5]

12. I am satisfied and happy with life [1] [2] [3] [4] [5]

13. My physical, mental & emotional well-being is relaxed often [1] [2] [3] [4] [5]

14. I am able to communicate and interact with strangers easily [1] [2] [3] [4] [5]

15. I often feel refreshed and energetic [1] [2] [3] [4] [5]

16. I stay positive during chalienging times [1] [2] [3] [4] [5]

17. I am connected to a lot of friends [1] [2] [3] [4] [5]

18. It is easy for me to laugh for no reason [1] [2] [3] [4] [5]

19. I often perform random acts of kindness [1] [2] [3] [4] [5]

20. I have the ability to be silly in the presence of others [1] [2] [3] [4] [5]

Scoring section:

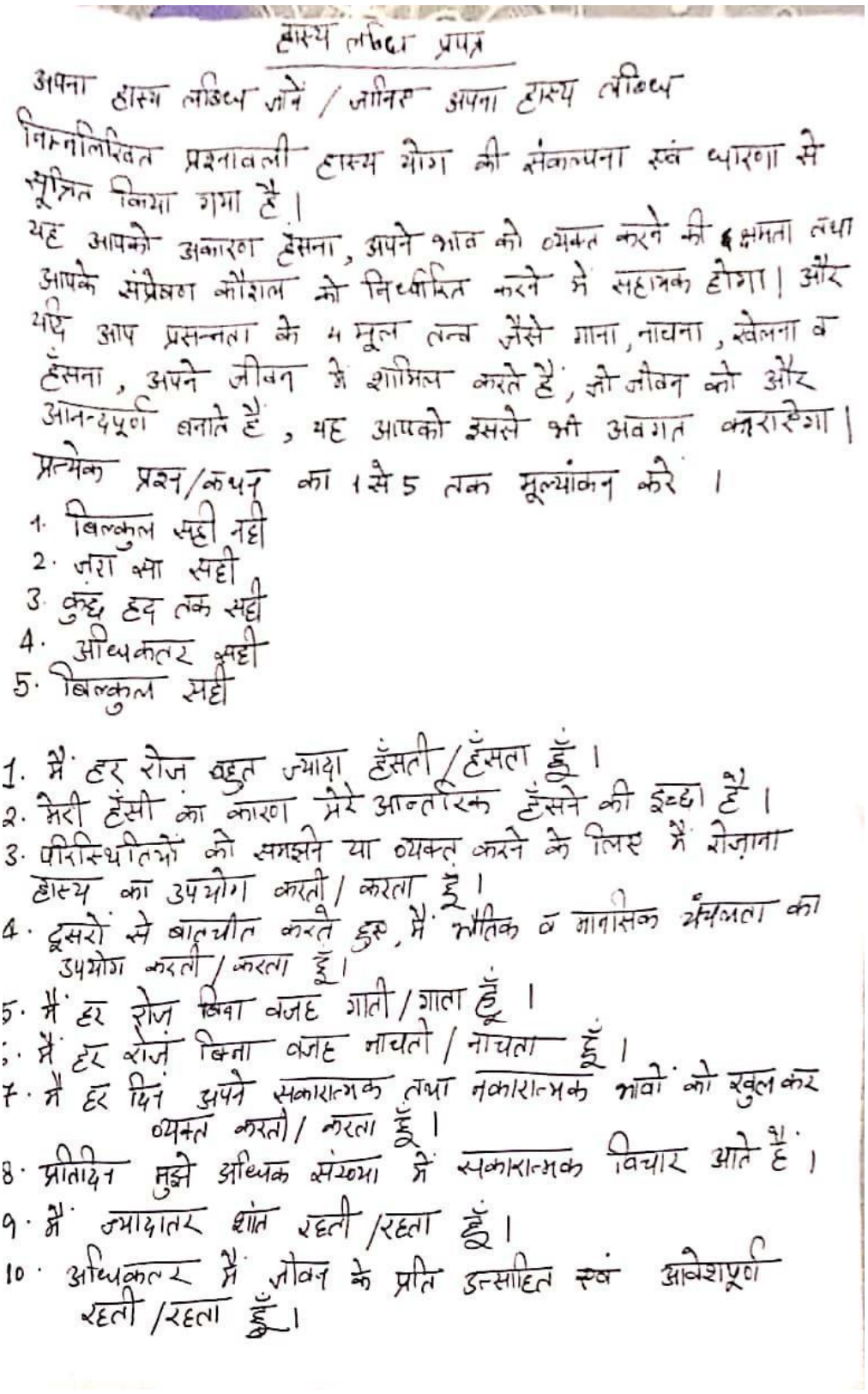
If your score is 80 - 100: You are a great laugher. Keep it up!!

If your score is 60 - 79: You are good at laughing, but can be better

If your score is 40 - 59: You laugh very little and need to laugh more.

If your score is under 40: You have a serious problem and need to do something to bring more laughter in your life.

b) Hindi (translated by



हास्य लब्धि प्रपत्र

अपना हास्य लब्धि जानें / जानिए अपना हास्य लब्धि

निम्नलिखित प्रश्नावली हास्य योग की संकल्पना एवं धारणा से सूचित किया गया है।

यह आपको अकारण हँसना, अपने भाव को व्यक्त करने की क्षमता तथा आपके संप्रेषण कौशल को निर्धारित करने में सहायक होगा। और यदि आप प्रसन्नता के 4 मूल तत्व जैसे गाना, नाचना, खेलना व हँसना, अपने जीवन में शामिल करते हैं, तो जीवन को और आनन्दपूर्ण बनाते हैं, यह आपको इससे भी अवगत कराएगा।

प्रत्येक प्रश्न/कथन का 1 से 5 तक मूल्यांकन करें।

1. बिलकुल सही नहीं
2. ज़रा सा सही
3. कुछ हद तक सही
4. अधिकतर सही
5. बिलकुल सही

1. मैं हर रोज बहुत ज्यादा हँसती/हँसता हूँ।
2. मेरी हँसी का कारण मेरे आन्तरिक हँसने की इच्छा है।
3. परिस्थितियों को समझने या व्यक्त करने के लिए मैं रोज़ाना हास्य का उपयोग करती/करता हूँ।
4. दूसरों से बातचीत करते हुए, मैं मौखिक व मानसिक चंचलता का उपयोग करती/करता हूँ।
5. मैं हर रोज बिना वजह गाती/गाता हूँ।
6. मैं हर रोज बिना वजह नाचती/नाचता हूँ।
7. मैं हर दिन अपने सकारात्मक तथा नकारात्मक भावों को खुलकर व्यक्त करती/करता हूँ।
8. प्रतिदिन मुझे अधिक संख्या में सकारात्मक विचार आते हैं।
9. मैं ज्यादातर शांत रहती/रहता हूँ।
10. अधिकतर मैं जीवन के प्रति उत्साहित एवं आवेशपूर्ण रहती/रहता हूँ।

expert)

11. मैं अधिकतर स्वयं को बहिर्मुखी व्यक्ति के रूप में व्यक्त करती / करता हूँ ।

12. मैं अपने जीवन से संतुष्ट हूँ ।

13. मैं शारीरिक, मानसिक एवं भावात्मक रूप से अधिकतम विचलित रहती / रहता हूँ ।

14. मैं अन्जान व्यक्तियों से आसानी से बातचीत करने में समर्थ रहती / रहता हूँ ।

15. मैं अक्सर तरोताज़ा और कमठ महसूस करती / करता हूँ ।

16. मैं चुनौतीपूर्ण समय में सकारात्मक रहती / रहता हूँ ।

17. मैं बहुत सारे मित्रों से जुड़ी हुई / जुड़ा हुआ हूँ ।

18. बिना कारण हँसना मेरे लिए आसान है ।

19. मैं अक्सर अनियमित दयालुता के कार्य करती / करता हूँ ।

20. मुझमें दूसरों की उपस्थिति में मूर्खतापूर्ण बोलापन वाले करतूतों करने की क्षमता है ।

Mugdha 20/02/20
Dr. Mugdha Pandey
Modern Foreign Languages
The DOON SCHOOL

c)**Backward Translations to English**

Laughter Yield / Quotient Form

Know your laughter yield/Quotient

The following questionnaire has been formulated according to assumption and philosophy of laughter yoga This will be helpful in determining your ability for causeless laughter, your ability in expressing your emotions, your skills of communication. It will apprise you of the 4 basic elements which if you incorporate in your life i.e. singing, dancing, playing and laughing it will make life more joyful.

Please rate every question / statement between1 to 5

1. Not true at all
2. Bit true
3. True to some extent
4. Almost true
5. Absolutely true

1. Everyday I laugh a lot
2. My cause of laughter is my internal desire to laugh

3. I use humor everyday to understand and express the situation / circumstances

4. I use physical and mental playfulness while talking with others.

5. Everyday I sing without any reason

6. Everyday I dance without any reason

7. Everyday I express my positive and negative emotions

8. Everyday I have more numbers of positive thoughts

9. I remain peaceful maximum

10. I am more excited and passionate towards life

11. I often express myself all rounder person

12. I am satisfied from my life

13. I often remain physically, mentally and emotionally relaxed

14. I am able to interact with unknown persons

15. I often feel refresh and energetic

16. I remain positive in challenging phases

17. I am connected to lot of friends

18. It is easy for me to laugh without any reason

19. I often perform random acts of kindness

20. I have the ability of performing innocent and silly acts in the presence of others

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Appendix 6 HOW DO YOU FEEL FORM

a) English (Original)

How Do You Feel Form?

To measure immediate effects of Laughter Yoga

BEFORE	<Worst CIRCLE Best>	AFTER	<Worst CIRCLE Best>
Enthusiasm	1 2 3 4 5 6 7 8 9 10	Enthusiasm	1 2 3 4 5 6 7 8 9 10
Energy Level	1 2 3 4 5 6 7 8 9 10	Energy Level	1 2 3 4 5 6 7 8 9 10
Mood	1 2 3 4 5 6 7 8 9 10	Mood	1 2 3 4 5 6 7 8 9 10
Optimism	1 2 3 4 5 6 7 8 9 10	Optimism	1 2 3 4 5 6 7 8 9 10
Stress Level	1 2 3 4 5 6 7 8 9 10	Stress Level	1 2 3 4 5 6 7 8 9 10
Level of friendship with group members	1 2 3 4 5 6 7 8 9 10	Level of friendship with group members	1 2 3 4 5 6 7 8 9 10
*Level of awareness about your Breathing	1 2 3 4 5 6 7 8 9 10	*Level of awareness about your Breathing	1 2 3 4 5 6 7 8 9 10
Level of muscle relaxation	1 2 3 4 5 6 7 8 9 10	Level of muscle relaxation	1 2 3 4 5 6 7 8 9 10
Level of mental relaxation	1 2 3 4 5 6 7 8 9 10	Level of mental relaxation	1 2 3 4 5 6 7 8 9 10
Ability to laugh without a reason	1 2 3 4 5 6 7 8 9 10	Ability to laugh without a reason	1 2 3 4 5 6 7 8 9 10

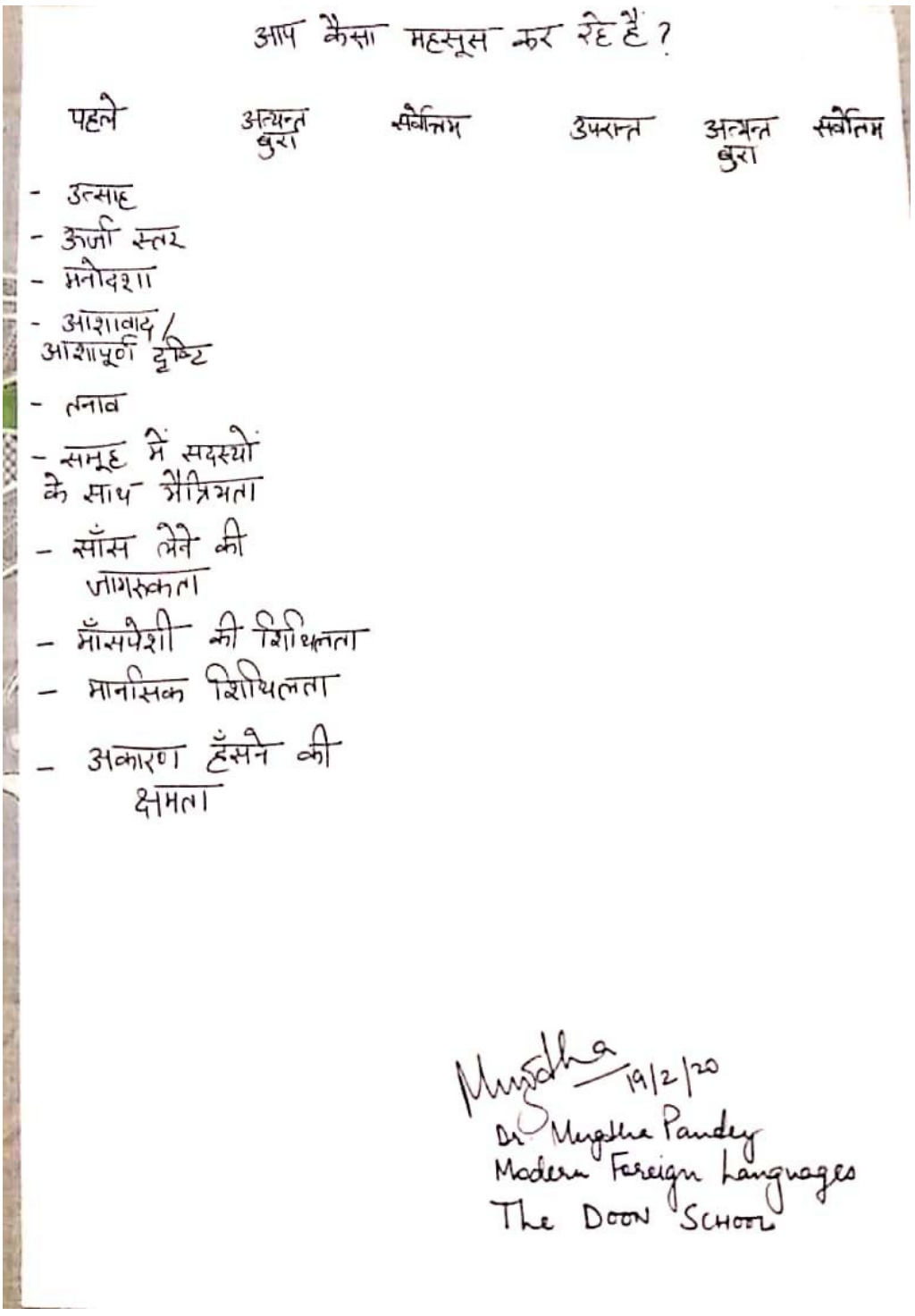
General Comments:	General Comments:
Name:	Name:

Important Guidelines:

- This form should be filled after the session
- This is to evaluate the immediate effects of one particular session of Laughter Yoga

- Breath awareness: Normally we are not aware of our breathing. After LY exercises you may feel you're breathing more freely and easily and you become aware of breathing more deeply into your lungs.

b) Hindi (by expert)



आप कैसा महसूस कर रहे हैं?

पहले	अत्यन्त बुरा	सर्वोत्तम	उपरान्त	अत्यन्त बुरा	सर्वोत्तम

- उत्साह
- ऊर्जा स्तर
- मनोदशा
- आशावाद / आशापूर्ण दृष्टि
- तनाव
- समूह में सदस्यों के साथ मैत्रिभता
- साँस लेने की जागरूकता
- माँसपेशी की शिथिलता
- मानसिक शिथिलता
- अकारण हँसने की क्षमता

Mugdha 19/2/20
Dr Mugdha Pandey
Modern Foreign Languages
The Doon School

c) Backward translation to English

How Do You Feel Form

Before	**Worst**	**Best**	**After**	**Worst**	**Best**

- Enthusiasm
- Energy level
- Mood
- Optimism
- Stress
- Friendship level with group members
- Awareness of breathing
- Muscle laxity / relaxation
- Mental laxity / relaxation
- Ability to laugh without any reason

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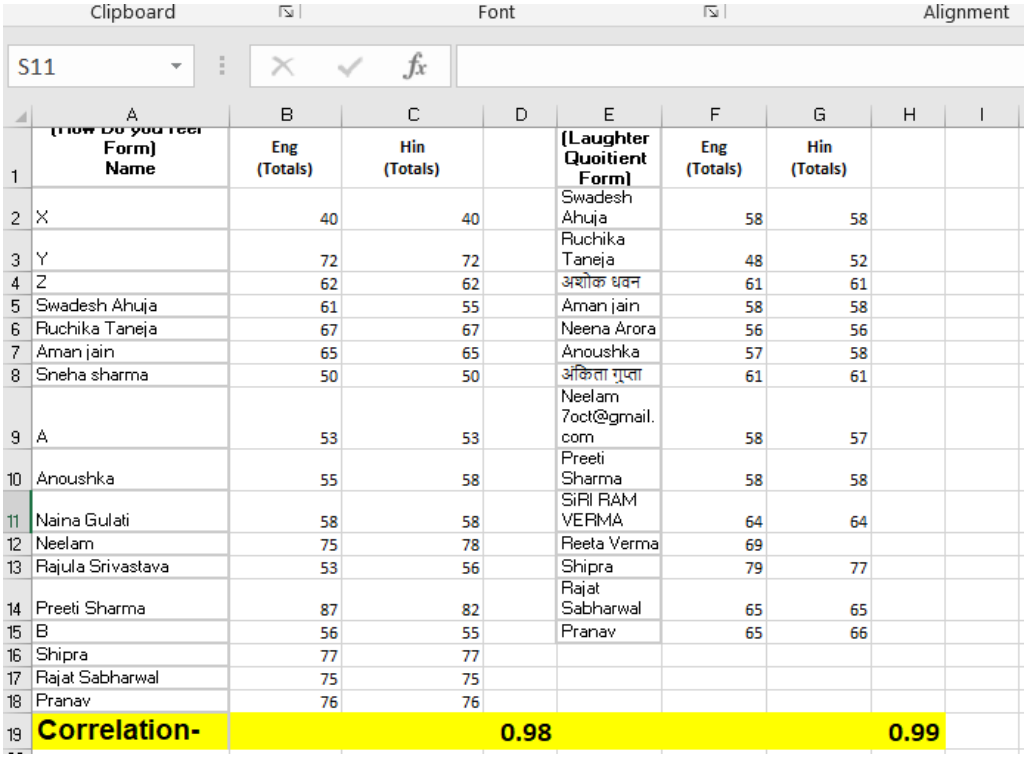
Showing Correlations between Hindi and English(original) versions of tools-



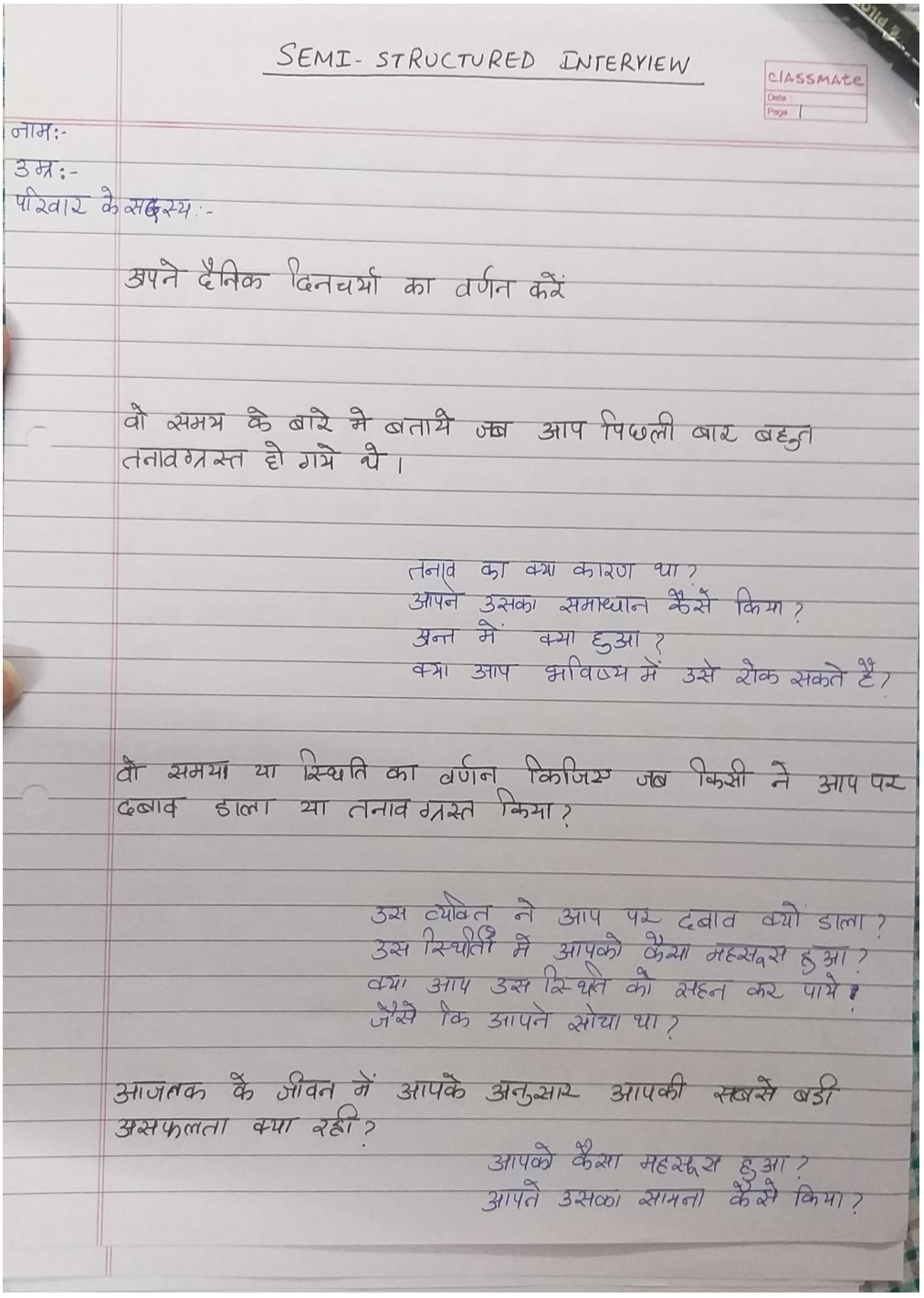
Clipboard | Font | Alignment

S11

	A	B	C	D	E	F	G	H	I
1	(How Do you feel Form) Name	Eng (Totals)	Hin (Totals)		(Laughter Quoitient Form)	Eng (Totals)	Hin (Totals)		
2	X	40	40		Swadesh Ahuja	58	58		
3	Y	72	72		Ruchika Taneja	48	52		
4	Z	62	62		अशोक धवन	61	61		
5	Swadesh Ahuja	61	55		Aman jain	58	58		
6	Ruchika Taneja	67	67		Neena Arora	56	56		
7	Aman jain	65	65		Anoushka	57	58		
8	Sneha sharma	50	50		अंकिता गुप्ता	61	61		
9	A	53	53		Neelam 7oct@gmail.com	58	57		
10	Anoushka	55	58		Preeti Sharma	58	58		
11	Naina Gulati	58	58		SiRI RAM VERMA	64	64		
12	Neelam	75	78		Reeta Verma	69			
13	Rajula Srivastava	53	56		Shipra	79	77		
14	Preeti Sharma	87	82		Rajat Sabharwal	65	65		
15	B	56	55		Pranav	65	66		
16	Shipra	77	77						
17	Rajat Sabharwal	75	75						
18	Pranav	76	76						
19	**Correlation-**			**0.98**				**0.99**	

Appendix 7 SEMI-STRUCTURED INTERVIEW

SEMI-STRUCTURED INTERVIEW



SEMI- STRUCTURED INTERVIEW

नाम:-
उम्र:-
परिवार के सदस्य:-

अपने दैनिक दिनचर्या का वर्णन करें

वो समय के बारे मे बताये जब आप पिछली बार बहुत तनावग्रस्त हो गये थे।

तनाव का क्या कारण था?
आपने उसका समाधान कैसे किया?
अन्त में क्या हुआ?
क्या आप भविष्य में उसे रोक सकते हैं?

वो समय या स्थिति का वर्णन किजिए जब किसी ने आप पर दबाव डाला या तनावग्रस्त किया?

उस व्यक्ति ने आप पर दबाव क्यो डाला?
उस स्थिति में आपको कैसा महसूस हुआ?
क्या आप उस स्थिति को सहन कर पाये?
जैसे कि आपने सोचा था?

आजतक के जीवन में आपके अनुसार आपकी सबसे बडी असफलता क्या रही?

आपको कैसा महसूस हुआ?
आपने उसका सामना कैसे किया?

आपके जीवन में कितने ऐसे लोग (मित्र/परिवार सदस्य/अन्य) है जो आपको बहुत महत्वपूर्ण समझते है। आपका बहुत ध्यान रखते है?

ऐसा कोई व्यक्ति जो बिना शर्त आपको स्वीकार करता है और आपके साथ खड़ा रहता है?

अपने भविष्य को लेकर आप कितना आश्वस्त हो? (0 से 10 के पैमाने पर) जहाँ 0 का अर्थ है बिलकुल भी नहीं और 10 का अर्थ है पूरी तरह से आश्वस्त।

आप लगभग प्रतिदिन कितना हँसते है? कब और किसके साथ?

लगभग एक सप्ताह में आप कितना प्रेम, स्नेह व आभार व्यक्त करते है?

क्या आप समस्याओं का हँस कर सामना कर पाते है?

आपके परिवार में लड़कियों के साथ कैसा व्यवहार किया जाता है?

आपके परिवार में वित्त संबंधी निर्णय कौन लेता है?

आपके परिवार में धार्मिक निर्णय कौन लेता है?

परिवार में शैक्षिक निर्णय कौन लेता है?

P.10

CLASSMATE
Date :
Page : 3.

परिवार में क्या सत्ता पदानुक्रम है 1.
2.
3.
4.

क्या सब निर्णय आपके हित के लिए होते हैं? और नहीं होते तो क्या आपको परेशानी/तनाव होता?

Appendix 8 RAW DATA

Experimental Group

	BEFORE						AFTER						
	S. NO	**RESILIENCE**	**Perceived Stress Scale (PSS)**	**POSITIVE AFFECT (PA)**	**NEGATIV E AFFECT (NA)**	**LAUGHTER QUOTIENT(LQ)**	**RESILIENCE**	**Perceived Stress Scale PSS**	**POSITIVE AFFECT (PA)**	**NEGATIVE AFFECT (NA)**	**HOW DO YOU FEEL IMMEDIATE LY BEFORE SINGLE LY TRIAL**	**HOW DO YOU FEEL IMMEDIATELY AFTER SINGLELY**	**LAUGHTER QUOTIENT (LQ)**
E	1	19	13	35	20	49	37	16	40	18	84	100	57
X	2	36	16	37	19	52	30	17	38	17	43	88	60
P	3	26	12	37	19	53	30	18	39	15	64	98	66
E	4	27	27	30	22	50	31	11	40	15	49	89	69
R	5	30	27	30	25	39	32	11	40	15	50	80	59
I	6	30	27	29	31	35	32	11	39	20	54	80	50
M	7	38	19	36	20	50	25	12	40	20	36	81	67
E	8	30	24	30	21	52	35	19	39	15	44	81	68
N	9	28	19	35	21	51	28	15	42	14	81	91	70
T	10	30	12	39	22	49	31	18	45	14	44	90	69
A	11	29	14	38	19	60	23	18	42	15	36	77	86
L	12	34	16	38	20	58	40	10	43	16	55	94	79

GROUP													
	13	35	20	31	20	55	36	10	40	13	55	74	80
	14	34	20	30	21	57	35	17	38	13	53	79	81
	15	30	25	29	28	40	26	16	39	15	55	96	90
	16	32	13	39	19	62	35	18	43	12	47	84	80
	17	38	19	37	21	57	25	12	45	13	54	81	80
	18	36	16	38	20	55	30	17	45	16	56	88	80
	19	19	13	41	18	63	37	14	49	12	78	100	90
	20	30	27	30	28	49	32	11	39	12	59	80	70
	21	35	20	29	30	37	36	10	39	15	45	74	57
	22	30	25	29	32	39	26	16	39	14	56	96	50
	23	30	27	31	30	31	32	11	41	18	70	80	59
	24	34	20	30	32	29	35	17	40	19	56	79	61
	25	26	12	42	26	40	30	18	48	17	70	98	39
	26	34	16	41	25	39	40	0	49	14	59	94	59
	27	27	27	29	31	41	31	11	39	18	49	89	51
	28	30	27	30	29	39	32	11	39	15	70	80	55
	29	29	14	41	23	40	23	18	47	17	59	77	50
	30	30	12	42	25	39	31	18	47	15	79	90	49
	31	28	19	42	26	42	28	15	46	14	70	91	55
	32	30	24	37	23	41	35	19	45	15	57	81	69
	33	30	27	30	28	49	32	11	39	12	59	80	70
	34	30	27	31	30	31	32	11	41	18	70	80	59
	35	29	11	40	21	49	30	18	44	15	44	91	68
	36	30	15	38	20	60	22	19	42	16	36	78	86
	37	35	17	39	21	58	39	11	44	17	56	93	79
	38	30	27	30	29	39	32	11	39	15	70	80	55
	39	29	16	39	20	60	21	19	41	17	35	77	86
	40	34	20	30	32	30	34	17	40	20	56	78	61
	41	25	12	41	27	40	30	18	48	17	70	98	39

	42	30	27	30	30	29	30	13	39	20	70	80	61
	43	30	23	29	20	52	36	19	40	15	43	80	69
	44	27	12	40	23	41	31	19	49	16	69	99	40
	45	33	16	40	46	40	40	20	48	14	59	94	57
	46	30	27	30	29	39	32	11	39	15	70	80	55
	47	30	27	30	29	39	32	11	39	15	70	80	55
	48	29	24	36	24	40	36	20	45	16	56	80	70
	49	29	28	31	27	50	31	11	39	13	59	80	71
	50	20	13	36	20	50	37	17	39	19	83	98	56
	51	30	24	30	21	52	35	19	39	15	44	81	68
	52	28	19	35	21	51	28	15	42	14	81	91	70
	53	26	27	31	21	51	31	12	41	15	48	89	69
	54	30	27	30	25	39	32	11	40	15	50	81	60
	55	32	17	41	27	41	41	20	48	15	60	93	61
	56	28	27	28	30	40	31	12	39	19	49	89	51
	57	36	20	31	30	31	33	18	41	21	55	77	60
		30.07 02	20.21 05	34.35 09	24.85 96	45.50 88	31.87 72	14.70 18	41.91 23	15.701 754	57.877 193	85.73 68	64.57 89
		3.945 43	5.740 63	4.692 29	5.187 34	9.169 29	4.543 72	3.963 97	3.397 9	2.2357 878	12.606 787	7.670 74	12.49 28

	High Stress				Low Stress			
	Before Intervention PA Score of High stress participants	After Intervention PA Score of High stress participant	Before Intervention NA Score of High stress participants	After Intervention NA Score of High stress participant	Before Intervention PA Score of Low stress participants	After Intervention PA Score of Low stress participants	Before Intervention NA Score of Low stress participants	After Intervention NA Score of Low stress participant
	30	40	22	15	35	40	20	18
	30	40	25	15	37	38	19	17
	29	39	31	20	37	39	19	15
	30	39	21	15	36	40	20	20
	29	39	28	15	35	42	21	14
	30	39	28	12	39	45	22	14
	29	39	32	14	38	42	19	15
	31	41	30	18	38	43	20	16
	29	39	31	18	31	40	20	13
	30	39	29	15	30	38	21	13
	37	45	23	15	39	43	19	12
	30	39	28	12	37	45	21	13
	31	41	30	18	38	45	20	16
	30	39	29	15	41	49	18	12
	30	39	30	20	29	39	30	15
	29	40	20	15	30	40	32	19
	30	39	29	15	42	48	26	17
	30	39	29	15	41	49	25	14
	36	45	24	16	41	47	23	17

	31	39	27	13	42	47	25	15
	30	39	21	15	42	46	26	14
	31	41	21	15	40	44	21	15
	30	40	25	15	38	42	20	16
	28	39	30	19	39	44	21	17
	30.4167	39.9167	26.7917	15.625	39	41	20	17
	2.01983	1.71735	3.76459	2.16318	30	40	32	20
					41	48	27	17
					40	49	23	16
					40	48	46	14
					36	39	20	19
					35	42	21	14
					41	48	27	15
					31	41	30	21
					37.2121	43.3636	23.4545	15.7576
					3.94301	3.59529	5.66288	2.31881

Control Group

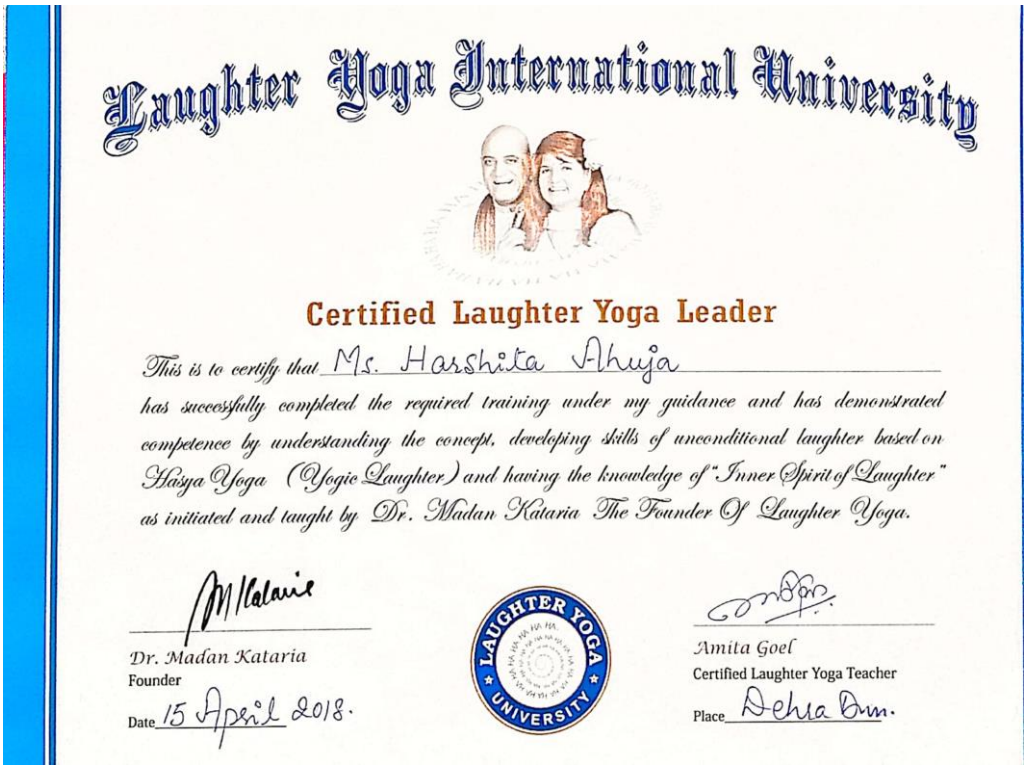
	BEFORE						AFTER					
	S. NO	**RESILIENCE**	**Perceived Stress Scale (PSS)**	**POSITIVE AFFECT (PA)**	**NEGATIVE AFFECT (NA)**	**LAUGHTER QUOTIENT (LQ)**	**RESILIENCE**	**Perceived Stress Scale (PSS)**	**POSITIVE AFFECT (PA)**	**NEGATIVE AFFECT (NA)**	**LAUGHTER QUOTIENT (LQ)**
CONTROL	1	25	24	35	20	49	27	20	34	21	50
	2	28	10	33	20	56	28	23	34	21	57
	3	26	20	35	18	50	26	13	36	20	49
	4	31	16	30	21	49	32	15	30	20	50
	5	27	14	30	25	38	26	15	30	26	39
	6	26	13	31	31	37	30	21	30	31	36
	7	26	19	35	21	50	30	17	35	20	51
	8	25	20	31	21	53	27	21	32	22	52
	9	22	15	32	22	53	22	15	34	22	53
	10	31	22	37	21	48	32	21	40	23	48
	11	26	13	40	20	60	27	12	37	18	61
	12	30	24	39	20	60	31	25	37	21	59
	13	32	25	31	20	59	26	18	32	20	60
	14	33	29	35	22	60	35	23	31	22	59
	15	30	34	30	29	40	29	38	28	29	41
	17	28	10	39	29	61	28	23	38	20	62
	18	26	13	36	22	56	30	21	38	20	55
	19	25	24	39	22	56	27	20	38	19	56
	20	26	20	40	25	68	26	13	40	20	67

	21	25	20	31	27	48	27	21	32	27	49		
	22	27	14	31	29	37	26	15	30	27	36		
	23	31	16	32	32	39	32	15	31	31	40		
	24	26	13	32	30	32	27	12	30	29	32		
	25	22	15	33	33	29	22	15	31	31	30		
	26	31	22	40	26	35	32	21	41	27	34		
	27	30	33	39	26	41	29	37	40	25	40		
	28	32	25	29	31	48	26	18	30	31	49		
	29	30	24	34	30	39	31	25	31	28	40		
	30	33	29	40	24	40	35	23	40	24	39		
	31	25	13	42	25	39	31	21	41	23	40		
	32	30	34	43	24	40	29	37	41	28	41		
	33	33	29	38	25	43	36	23	39	24	42		
	34	27	19	27	29	45	31	17	30	31	46		
	35	31	34	42	24	42	30	40	40	29	41		
	36	34	26	32	21	60	27	19	31	21	61		
	37	32	17	32	32	43	31	16	30	31	42		
	38	27	19	36	22	50	31	17	36	21	51		
	39	23	25	31	21	53	26	21	33	22	51		
	40	33	26	30	30	51	27	19	31	32	50		
	41	26	14	32	29	35	25	16	29	26	36		
	42	32	30	39	24	38	35	23	29	25	38		
	43	35	27	32	21	61	27	18	31	20	61		
	44	31	34	39	27	41	30	37	41	25	40		
	45	31	25	29	31	48	26	18	30	31	49		
Group	**46**	33	30	40	25	39	35	24	40	25	40		
	47	26	19	35	23	49	30	18	35	22	50		
	48	26	15	32	30	36	26	17	30	27	35		
	49	29	17	29	21	50	32	16	30	21	51		
	50	22	16	33	32	32	22	16	30	31	31		

	51	30	22	39	26	31	31	21	41	27	32		
	52	30	24	39	20	60	31	25	37	21	59		
	53	26	20	31	22	52	27	22	32	21	53		
	54	21	16	33	21	53	21	16	34	22	54		
	55	29	24	39	21	60	31	26	36	20	58		
	56	33	16	32	32	30	21	16	30	30	29		
	57	31	22	39	25	33	32	20	41	26	34		
	58	26	14	30	30	38	31	21	29	30	37		
	59	27	20	34	20	49	33	16	35	21	50		
	60	22	16	32	21	54	23	16	33	21	54		
	61	30	21	37	20	49	31	21	39	23	49		
	62	30	33	40	23	38	30	39	41	30	39		
	63	33	26	31	21	62	26	19	31	20	61		
	64	29	11	32	21	58	29	22	33	22	58		
	Mean	28.460	21.111	34.603	24.698	46.873	20.777	34.269	24.507	46.936	46.936		
	Score	3175	1111	1746	4127	0159	7778	8413	9365	5079	5079		
		3.4492	6.6237	4.0621	4.2145	9.7194	3.5204	6.5708	4.2205	4.1304	9.6818		
		8883	8683	7677	4823	3856	7627	1633	5779	2611	3037		

Appendix 9 CERTIFICATES OF LAUGHTER YOGA TRAINING

a) Laughter Yoga Leader Training



Laughter Yoga International University

Certified Laughter Yoga Leader

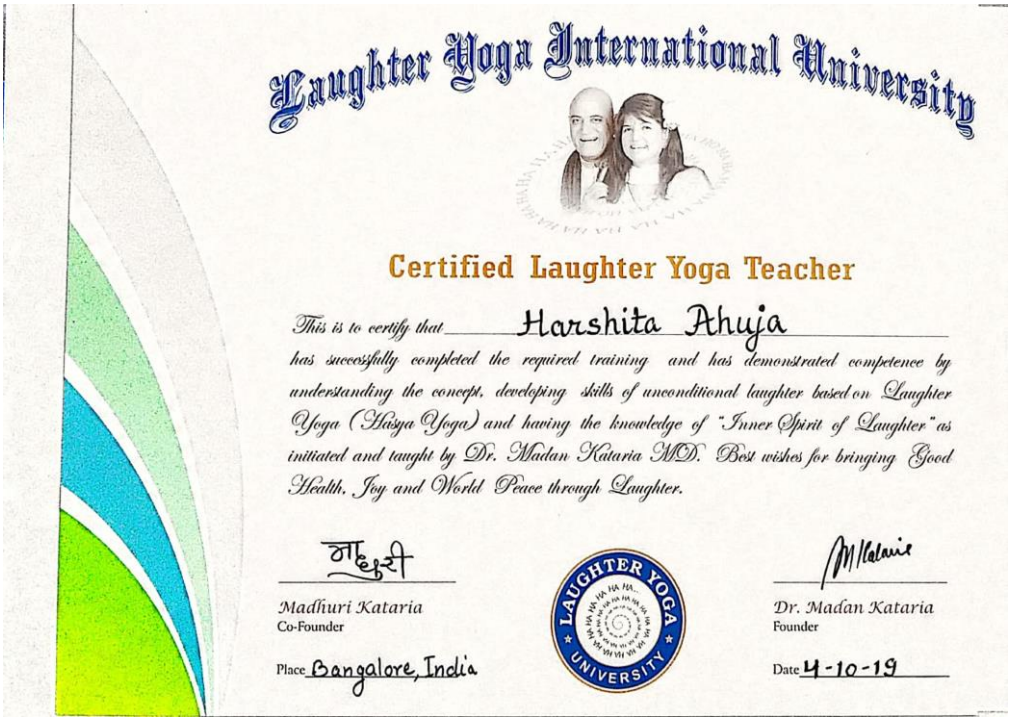
This is to certify that Ms. Harshita Ahuja has successfully completed the required training under my guidance and has demonstrated competence by understanding the concept, developing skills of unconditional laughter based on Hasya Yoga (Yogic Laughter) and having the knowledge of "Inner Spirit of Laughter" as initiated and taught by Dr. Madan Kataria The Founder Of Laughter Yoga.

Dr. Madan Kataria
Founder
Date 15 April 2018.

LAUGHTER YOGA UNIVERSITY

Amita Goel
Certified Laughter Yoga Teacher
Place Dehra Dun.

b) Laughter Yoga Teacher Training



Laughter Yoga International University

Certified Laughter Yoga Teacher

This is to certify that Harshita Ahuja has successfully completed the required training and has demonstrated competence by understanding the concept, developing skills of unconditional laughter based on Laughter Yoga (Hasya Yoga) and having the knowledge of "Inner Spirit of Laughter" as initiated and taught by Dr. Madan Kataria MD. Best wishes for bringing Good Health, Joy and World Peace through Laughter.

Madhuri Kataria
Co-Founder
Place Bangalore, India

LAUGHTER YOGA UNIVERSITY

Dr. Madan Kataria
Founder
Date 4-10-19

LIST OF PUBLICATIONS

The following are details of papers that have been published in journals (UGC Care listed)

1. Laughter is The Best Medicine! Laughing Stock or Worth A Talk? - Harshita Ahuja and Dr. Komal Rai-

- Journal- Journal of Emerging Technology and Innovative Research November 2018
- Vol 5, issue 11 UGC CARE

2. Laughter A Day Keeps Doctor Away! Is It? "Efficacy of Laughter-Yoga on Mind and Body" -Harshita Ahuja, Dr.Komal Rai & Dr.Sangeeta Khullar

- Journal- Our Heritage July-December 2019 Vol 67, Issue 2
- ISSN: 0474-9030 UGC CARE Following are the details of conferences

3. Laughing matter or laughing matters? : impact of laughter yoga on positive and negative emotions and stress among adolescents- a pilot study

YANTRA-International Conference-Yoga and Neurosciences: Traditions and Research Approaches organized by NIMHANS 9, 10, 16 and 17 October 2020

4. Laughter is The Best Medicine! Laughing Stock or Worth A Talk? - Harshita Ahuja and Dr. Komal Rai

56th National and 25th International Conference of Indian Academy of Applied Psychology (IAAP) organized by Department of Psychology Punjabi University

18-

20 February 2021 Following are book chapters

5. Book Chapter- SIMULATED LAUGHTER FOR A HELATHY EVER AFTER

***Harshita Ahuja and Komal Rai**

"The Interdisciplinary Hermeneutic: Reappraising the Socio-cultural Episteme" symposium held by School of Social Sciences and Languages at LPU.

M

arch 2020

6. "**The Emotional dynamic of Covid-19 Pandemic" Harshita Ahuja and Divya Kavadiya**

E-book "COVID-19: Biopsychosocial Perspectives" w 13th November 2020 ISBN No: 9788194159247.