

The Unique Stress Treatment of Martial Arts on the Adolescent Demographic

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ABSTRACT

In the 21st century, the phenomenon of stress and mental fatigue is ever so common in the age group of adolescents and teens. At a crucial time in their lives and in their transition to adults, the coping strategies and methodology in which these young adults deal with stress is largely unpatterned and inconsistent. With the unique hurdles that adolescents experience in dealing with their future and academic challenges, the need for alternate treatment or therapy in the adolescent demographic is crucial in securing their physical and mental wellbeing. Martial arts can be used to treat this unique stress. The effects of martial arts on the general stress levels and mental states of a small group of experimental adolescents was observed through an experiment of 14 participants before and after a martial arts session in order to evaluate the effectiveness of such treatment based on correlations drawn from subcategories organized by ordered levels of anger management, levels of stress frequency, levels of martial arts experience, and levels of exercise frequency. Main findings of the trial include a general reduction in stress levels across all participants of the martial arts experience and encouragement of martial arts as a stress reducing platform. Further subcategories of the trial revealed additional traits of anger management on mental states and stress levels. Limitations include the experimental nature of the trial, limited exposure to various martial arts, and limited pool of participants or the diversity of the demographic studied.

Introduction

Stress is in great abundance in modern day society. So common, in fact, it is a daily part of human life for better or for worse. Over the course of the COVID-19 pandemic, it is evident that psychological stress levels have risen significantly, even in adolescents and teens. As mental health becomes a rising concern, it is important to locate the source of such obstacles. “In particular, high school adolescents experience significant challenges in their lives, including feelings of uncertainty about their future and preparation for transition to higher levels of education (Scott et al.,2021)” Brought about by the COVID-19 pandemic, new levels of stress are experienced by adolescents in school.

Using statistics for levels of stress and statistics for how often these stressed adolescents experience stress in particular, the study suggests a unique observable phenomenon in school teens brought about by the COVID-19 pandemic. As such, “Efforts should focus on helping adolescents cultivate academic skills needed during school closures, providing mental/physical health resources and helping them navigate peer relationships” Being concluded as so, being proposed is the proposition of martial arts as a potential “mental/physical health resource” to be used for positive reinforcement and impact towards these teens.

Coincidentally, it is also important to identify and stop at the root of the problem the worsening stages of these mental conditions. As high-school students especially face great risk of experiencing mental health issues, the need to address these issues as a worsening new mental health pandemic in lieu of the pandemic is also a primary concern. “Anxiety, depression, and psychological stress were the most discussed mental health

problems among highschool adolescents during the COVID19 pandemic” identifying the need for intervention in “mental health problems early in high school adolescents”, preventative measures in a case. (Windarwati, 2013)

Over the period of COVID19 and what is considered the now waning stages of the pandemic, stress and mental health are still primary concerns of teenagers and high schoolers. Consequences of mental health can be anxiety, stress, loss of motivation, self-esteem issues, depression, even chronic diseases can stem from low mental health. Imagining mental state as a body, maintaining homeostasis can be an issue—cortisol, your body’s primary stress hormone, is released by the adrenal cortex producing organ damage over the long run. “Emotional reactions include worry, guilt, depression, insomnia, and fatigue.”(Charles D. Johnson, Jr. 2022)

As such, research shows that “There are many types of events and strains that generate stress, and serious stressors usually generate additional stress—a process referred to as "stress proliferation." In their responses to stress, individuals use the resources of coping, social support, and mastery. These 3 resources have all been given considerable research attention, and they have been found to mediate the effects of stress.”(Scott et al.,2021) With an abundance of new uncertainty can other methods help?

Martial arts could perhaps provide a different perspective to these woes. Conceptual/philosophical pillars that make martial arts contest such stress: “Given that MA requires expenditure of energy done with a high level of concentration, engagement in this form of exercise may provide an interesting and novel strategy for enhancing physical and mental benefits. The regular practice of MA could elevate MF levels of practitioners and thus influence positively on stress management and therefore quality of life and well-being.”(Naves-Bittencourt et al., 2015)

Martial arts are thought as for mental health and mindfulness for the spirit rather than for high performance athletes and personal achievement through performance, bettering yourself rather than trying to be faster or better than someone else. So what’s uniquely beneficial? Martial arts is to be proposed as a successful coping mechanism. Through previous studies of martial arts for mental health and the cultivation of psychological well-being, researcher Adam Croom (Croom 2014) introduces the unique system of PERMA - positive emotion, engagement, relationships, meaning, and accomplishment. The factors to positive mental health and therapy can begin with martial arts addressing these pillars of mental health.

Furthermore, Martial arts provides better health(general health therapy), leading to higher overall mental states. Benefits in certain aspects(stress, self-esteem, exercise) and “Mindfulness-based practices and interventions are particularly effective in promoting health for clinical conditions involving chronic stress, anxiety and depressive symptoms”(Naves-Bittencourt et al., 2015).

Such correlation of these aspects to better mental health is therefore a plausible method for helping manage stress with unique benefits that separate it from general athletics stemming from the spiritual aspect of martial arts. Ideas of spiritual connections to the deeper self stems from common beliefs such as Japan like “Bushido” or pop culture like “the warrior mindset”. In fact, these ideas can say more about ourselves than others possibly can, possibly out of a desire for emotional fitness much like physical fitness.

Sociology asserts the idea of the “looking glass self”, as proposed by Charles Cooley, affects self esteem and self presentation, therefore possibly altering the effects of coping strategies or activities as done by the subjects of such studies. Thus, this possibly buttresses that first impressions or general impressions can greatly influence the mind/mental state of people. Applying such to martial arts and the influence/impressions it gathers, one can imagine how the uniqueness of martial arts can apply to a greater general audience and therefore gain even more plausibility in the effect for managing stress.

Along with the added effects of simulated stress coping and the physical and mental benefits, this study chooses to explore martial arts, specifically kendo/kumdo, a Japanese/Korean sword martial art, as an introduction into the plausibility and possible therapy or solution for stress coping adolescents of a post/mid pandemic phase of life.

Methodology

Utilizing a before and after survey of quantitative along with qualitative answers for each participant, a group of adolescents aged 14-21 of 14 participants volunteered for a 2 hour kendo trial. Main metrics used on a 1 to 5 ordinal scale were stress levels, mental state rating, exhaustion level, confidence level, enjoyability of the program, and eagerness to participate. Test surveys were provided before and after the trial from a multitude of experienced and inexperienced participants.

For stress levels, the severity of stress was measured on a 1 to 5 scale with 1 being lack of stress and 5 being debilitating stress. Furthermore, the frequency of this stress was measured before the trial with 1 indicating no stress and 5 indicating daily stress. Another metric was the mental state of the participants with measurements being taken before and after the trials. 5 indicated a lower mental state or lower mental disturbance while the opposite end of the score of 1 mental state indicated a more disturbed mental state. Exhaustion levels were similarly recorded with 1 indicating low fatigue and high energy while 5 indicated fatigued and lethargic nature. Confidence level also served on the 1 to 5 scale with 1 serving as low confidence and self esteem and 5 being very high self confidence. Enjoyability was rated as 1 to 5 scale as well with 1 being dislike and contempt for the program while 5 was extreme enjoyment. Eagerness was rated on a similar scale with 1 to 5, 1 being low eagerness and 5 being very enthusiastic. Given the parameters of average measurements, what do the scores actually indicate in terms of benchmarks? On a benchmark level for stress, anywhere from 4 to 5 suggested a stressed individual.

The survey was done in primarily 2 parts, a before and after section. The before section provided a benchmark/control for the changes after the trial to isolate what effects the kendo trial could possibly have. By making the participants outline their general demeanor and background. Whether the participant considered themselves a stressed individual or not was also provided through qualitative surveys of questions relating to mental health and routine coping strategies. These qualitative data pieces served to build a profile of the person the participant is. As stated earlier, the study outlines a small sample of adolescents ranging from 14-21. The participants' races were Asian and African American with mostly Asian demographic to reduce sample variation across various groups as well. Information outlining the age, stress, experience in martial arts, and general coping strategies of the participants were taken in the first half of the study as opposed to the latter half. Coping strategies included yoga, music, exercise, drawing, and so on.

After taking the survey, the participants were then asked to agree to safety policies and began the kendo trial. The trial was split into 2, 1 hour sessions and focused on 3 main objectives typical of martial arts: physical training, mental fortitude, and respect. 14 participants were divided across 3 days and were led by an experienced kendo practitioner versed in the teachings and rudiments of the martial art. Given such, the instructor then showed basic striking techniques, footwork, meditation, kiai, energy, and manners before moving onto the final section of sparring. In the final sparring section, students were asked to put on armor and practice clothes, consisting of a dogi and hakama, traditional Japanese attire, and to maintain a sparring session of contact with the instructor for 2 matches. 1 minute interval of the instructor being passive and a 1 minute interval of realistic sparring. After such, students were asked to take off the armor and conclude their session with a meditation session. Concluding the trial was the second half of the survey.

In the second half of the survey, main objectives of the questionnaire was to inquire about the experience, explore the observable effects of the trial and its immediate effects, and to answer more general questions on the validity of martial arts after the given experience on stress therapy and coping strategies as the latter half focused much more on qualitative data rather than the quantitative data, profile building former half/ beginning survey. Tables also served to visualize and divide/isolate the participants into different variable driven groups. Furthermore, anonymity was preserved by outlining and assigning participant numbers at the start of each session and instructors were instructed to not interfere with personal needs to exclude the possible factor of personal bias and preference towards any participant.

Results

The very first objective of these surveys was to isolate 4 categorical factors that could identify trends in stress and what patterns could reveal incitation of stress, confidence, or exhaustion. Given the unique status of martial arts, traits attributed to martial artists were chosen such as anger management, exercise, and martial arts experience as well as impulsivity.

The selection of these 4 categories served to address the following questions. Anger management was measured as to address the effectiveness of absorption of martial arts concepts such as meditation, composure, and ki(energy). It served to dictate whether the participants employed such strategies during their participation. Stress was measured to provide a general illustration of fluctuations from before to after the trial, giving a “big picture” as to what the general sentiments of the participants were and to narrow down which factors benefited a certain group the most. Exercise/ frequency of physical activity revealed the familiarity of certain participants to the effects of physical therapy as opposed to strictly mental therapy, the difference between an athlete versus the average person to deal with stress during situations could have affected the results, so to address such was a distinct differentiation to make. Lastly, the experience of the participants in martial arts was to determine trends or patterns within more experienced participants to differentiate their reaction to the test to reinforce or redetermine the findings that martial arts aids in certain aspects of coping or mental health strategies.

Given the following objectives, the test results reflect the following trends and patterns:

Table 1. Average of Subject Responses Cross-Tabulated with Anger Management Level Demographic

| Anger Management Level | N | Pre trial stress | Post trial stress | Pre trial-mental state | Post trial mental state | Pre trial level | Post trial exhaustion level | Pre trial confidence level | Post trial confidence level | Enjoyability of the program | Eagerness to participate |
|------------------------|---|------------------|-------------------|------------------------|-------------------------|-----------------|-----------------------------|----------------------------|-----------------------------|-----------------------------|--------------------------|
| 1 | 5 | 2.4 | 2.8 | 3.4 | 2.8 | 2.2 | 2.2 | 2.6 | 3 | 3.8 | 2.6 |
| 2 | 6 | 3.83 | 1.5 | 3 | 3.167 | 2.33 | 2.167 | 3.5 | 3.33 | 4 | 4 |
| 3 | 3 | 4.5 | 2 | 2 | 3 | 5 | 1.5 | 2.5 | 4.6 | 2 | 4 |
| 4 | 0 | - | - | - | - | - | - | - | - | - | - |
| 5 | 1 | 5 | 2 | 1 | 3 | 5 | 4 | 1 | 1 | 5 | 3 |

Anger management levels were categorized with 1 meaning very little impulse and good control with 5 being very little control over emotions and emotional outbursts common. Participants who noted that they had very good anger management noted an average increase in stress levels while participants who noted that they had just “good” anger management noted an average decrease of about 2.33 score on a scale of 1 to 5. This trend continues with participants noting less of an anger management level having more differences between before and after stress levels with level 3 participants noting a nearly 2.5 level difference of stress levels and last but not least a level 5 participant noting a change of 3 levels in average stress levels.

Furthermore, given the circumstances of mental states, a trend for people with better assigned anger management to undergo a deterioration in mental state versus people who assumed less anger management levels to experience an increase in mental state showed an inverse relationship. People with less anger management got a higher mental state score difference as shown.

As an aspect of martial arts teachings, how does anger management impact results? Some notable results when looking into the results of this experiment, the anger management levels affected results in that participants with less anger management levels were associated with less pre-trial stress, yet experienced less of an effect in minimizing their stress as observed from before and after stress. As for their mental states, the

effects of anger management level 1 participants in their mental states resulted in a decrease in mental state, suggesting negative outcomes, but as the anger management went from 1 to 5, a trend formed in that they started with less of a mental state, but built up even greater mental states from pre to post trial. Overall, participants with good control on their anger observed less of an effect on their stress and mental states than participants with little control.

Table 2. Average of Subject Responses Cross-Tabulated with Stress Frequency Demographic Levels

| Stress Frequency Level | N | Pre trial stress | Post trial stress | Pre trial-mental state | Post trial mental state | Pre trial level | Post trial exhaustion level | Pre trial confidence level | Post trial confidence level | Enjoyability of the program | Eagerness to participate |
|------------------------|---|------------------|-------------------|------------------------|-------------------------|-----------------|-----------------------------|----------------------------|-----------------------------|-----------------------------|--------------------------|
| 1 | 2 | 3 | 1.5 | 1.5 | 3 | 4 | 3.5 | 1 | 2 | 5 | 3.5 |
| 2 | 3 | 3.5 | 2 | 2.66 | 3.33 | 3.33 | 2 | 4 | 3.33 | 3.67 | 3.67 |
| 3 | 3 | 4.33 | 1.33 | 3 | 2.67 | 1.67 | 2 | 3.33 | 3.33 | 4 | 3.33 |
| 4 | 3 | 2 | 2 | 4 | 2.67 | 3 | 1.67 | 3 | 4.33 | 3 | 3 |
| 5 | 3 | 4.33 | 3.33 | 2.67 | 3.33 | 2.67 | 2.33 | 2.33 | 2.33 | 3.33 | 3.67 |

Stress levels 1 through 5 indicated the frequency of stress with 1 indicating no stress and 5 indicating daily stress. Across the board, there was a general decrease of stress levels with stress level 1 participants' scores decreasing by a score of 1.5, stress level 2 participants' scores decreasing by 1.5, level 3 participants' scores increasing by 3, level 4 participants' scores staying the same, and level 5 participants' scores decreasing by 1. For this case, it seems as though participants of moderate stress levels(level 3 and 4) experienced a deterioration of mental state calling into question the balance between a stress-filled lifestyle versus a stress-aided lifestyle. What can be seen as a balance or individually, who thrives in stress vs who doesn't?

People with the least amount of stress enjoyed the program the most compared to people with the highest levels of stress: stress levels 4 and 5, the two highest spectrums for stress, enjoyed it at 3 and 3.33 respectively. Stress also seems to have an effect on the average confidence one experiences as the starting confidence scores of stress level 1 participants started at a scale 1 as compared to the rest of the participants which started at a number higher than such, the second lowest starting at 2.33.

Table 3. Average of Subject Responses Cross-Tabulated with Exercise Frequency Demographic Levels

| Exercise Frequency Level | N | Pre trial stress | Post trial stress | Pre trial-mental state | Post trial mental state | Pre trial level | Post trial exhaustion level | Pre trial confidence level | Post trial confidence level | Enjoyability of the program | Eagerness to participate |
|--------------------------|---|------------------|-------------------|------------------------|-------------------------|-----------------|-----------------------------|----------------------------|-----------------------------|-----------------------------|--------------------------|
| 1 | 2 | 4.5 | 3 | 2.5 | 3.5 | 3 | 3 | 1 | 1 | 4 | 2.5 |
| 2 | 1 | 1 | 2 | 5 | 1 | 2 | 2 | 4 | 5 | 3 | 2 |
| 3 | 3 | 4.33 | 1.67 | 3 | 2.67 | 4 | 2 | 3.33 | 3.67 | 3.33 | 4.67 |
| 4 | 4 | 3 | 1.67 | 3 | 3.5 | 2.5 | 2.25 | 3 | 3.25 | 4.25 | 4 |
| 5 | 4 | 3.33 | 2.33 | 2.25 | 3 | 2.5 | 2 | 3 | 3.25 | 3.5 | 2.75 |

In terms of exercise, every single group except for group 2(only 1 person) experienced an average loss of stress levels or lowering of stress levels. With the level 3(once a week) group experiencing the most change of stress across the board. As for exhaustion levels, Groups with more exercise experience tended to lose exhaustion, however group 3 once again experiences the most amount of exhaustion level loss. Possibly, this

could suggest the effectiveness of weekly classes/ exercises as being the most beneficial? Exercise Frequency level of 1 indicated a non-exerciser while an exercise frequency level of 5 indicated a daily exerciser.

This also extends to confidence level. While level 4 and 5 exercisers experienced a change of 0.25 confidence levels, the level 3 and level 2 group (possibly an outlier) experienced an increase greater than these daily and more than once a week exercisers. At a change of 1 score for level 2 and a change of 0.33 score for the level 3 group, but an overall increase in confidence level for all exercisers, it's safe to assume that exercise experience does help with gaining confidence in oneself after classes to find the best results. Possibly correlates to how exercise may help with self esteem and how martial arts can also aid in such, just like how staying healthy and active can also help teens.

Discussion

A global health crisis, COVID-19's effects sent shocks throughout society, one of the notable groups being the students of the COVID era. With socio-psychological factors affecting adolescents in general, the pandemic was expected to magnify these negative effects such as social isolation and correlate to higher stress levels given the adverse risk of sickness and unfamiliarity of COVID protocols such as social distancing and mask wearing. Initially, a strong correlation between frequency of physical activity in adolescents and mental benefits (along with physical) was expected. The main objective of the study was to answer which factors affected which developments in adolescents and to observe immediate impacts of such activity. The study was aimed towards a target audience of students and the effects of school work and workload of students was also taken into account as school was noted as one of the main stressors of the participants' stress and furthermore, generally, a rising pandemic of stress that coincides with the COVID 19 pandemic. Seen from the perspective of biology, the idea of homeostasis or bodily functions to insure a balance of functions is applied to the phenomenon of stress. Hans Seyle's study into this phenomenon recognized stress as a possible threat to physical functions as well.

Stress is also proven to cause, not just mental harm, but physical harm as well. "He was able to demonstrate that stress caused physical changes in organs of the body. Not only does stress damage the body, but many times, behaviors are inappropriate. For teenagers becoming adults, developing unhealthy patterns to manage stress early in life will later certainly produce devastating results." (Charles D. Johnson, Jr. 2022)

Serving to explain the modern phenomenon of stress and stress culture in teenagers of the 21st century, this study demonstrates the failure of managing stress that is most commonly seen and seeks to relay 3 objectives: benefits of improving stress, identifying stress, and coping effectively. Given the benefits of martial arts through a study into psychological well being along with the results of this study, a system of "PERMA" can also be utilized to express the capabilities of martial arts into the modern phenomenon of stress in the 21st century and to serve as a possible therapy, conditional (Croom, A. 2014). Various approaches to the results from the study could be derived; however, given the smaller sample size, implications of strong effects to stress levels were indicated throughout the study and relayed as such, even verbally.

First an insight into the reasoning behind the data gathering. By highlighting the core factors of martial arts effectiveness such as anger management, general stress levels, martial arts experience, and frequency of general exercise, a general landscape can be illustrated to reveal the findings of the study. Anger management is a focal point of martial art. Although anger is a natural emotion and occurs naturally, learning to manage such anger is appropriate for young adults and adults. Martial arts, especially with martial arts that are permeated with the teachings of Confucius beliefs contain the Confucian view of anger which paints the concept in a dangerous manner, a more "think before you act". Confucius writes that, "When anger rises, think of the consequences." and core martial arts beliefs of staying composed under pressure and not falling victim to your own emotions reinforces Confucian beliefs. This is ever so present especially in combat/sparring sports such as kendo, MMA, boxing, etc. Overcoming the gap between your opponent can only be achieved with mastering

oneself and the basis of success in such martial arts allows not just a more calm mind adept for sparring situations, but also the basis of success in life. To elaborate, when learning the skills for such anger management to step into the “ring” or the “octagon” or the sparring grounds of such sports, one learns that success does not come from brute forcing situations. One must adapt, learn quickly, think clearly. This translates into other aspects of life such as academics, business, work, family life, and so on. The possibilities for application are numerous and possibly endless. Application into one's life allows for cultivation of compassion in a seemingly compassionless sport.

Secondly, the general stress levels served as a control to find a general consensus or general effects of the entire trial in the simplest of terms. Through numbers alone, without qualitative reasoning, one could denote that the trial succeeded in its initial and final findings of lowering stress through martial arts activity.

The perspective of sociology indicates the idea of a looking glass self/Self perception/connotation and other perception linked to first impressions under the unique impression of martial arts has an effect on stress during martial arts participation. This was first proposed by Charles Horton Cooley and the view that “(self perception was largely based on impressions and social expectation)” was to be explored through this study as an additional point through qualitatively acquired data. Perpetuation of pop culture and martial arts as a system of meditation and physical betterment was relayed and reflected in participants and effects of such statements of social interactions contributing towards mental action and physical action even served to reinforce such ideologies.

Can the unique mental aspects of martial arts serve to combat long-term and short-term stress in teens? Although a brief introduction into the introduction of Martial arts as a coping strategy for long term and short term stress in teens, what has already been established is the foundation of physical activity as the core for mental reprieve as even schools now mandate physical education and at least an hour of physical activity allocated towards schools for every school day. The CDC asserts that “Physical education provides cognitive content and instruction designed to develop motor skills, knowledge, and behaviors for physical activity and physical fitness. Supporting schools to establish physical education daily can provide students with the ability and confidence to be physically active for a lifetime.” and “There are many benefits of physical education in schools. When students get physical education, they can: Increase their level of physical activity. Improve their grades and standardized test scores. Stay on-task in the classroom. Increased time spent in physical education does not negatively affect students’ academic achievement.” Especially for students and the relevance of academics and stress from work affecting participants of the age range presented, the addition of furthering physical activity alongside the mental workload of academics can only prove to further students’ academic achievement as “Increased time spent in Physical education does not negatively affect students’ academic achievement” meaning that spending more time on such activity can only serve to benefit or stay neutral. How does exercise in martial arts vs. exercise in a gym provide distinct differences? Popular fitness website fitroots.co.uk explains some of the main differences between people it sees in its distinctness. Qualitative data of the trial dealing with the question of, “Will you continue to incorporate the teachings in this course throughout your daily life?”, notable answers of 11 out of 14 of the participants answered with a direct “yes” statement. In general, the entire participant pool unanimously answered the question of, “Do you think kendo can be used for mental health issues?” with “yes”. Although sentiments of mental health may be high, do the results reflect that? The average change of stress levels suggests so.

If taken or considered as a modern meditation method, how valid are martial arts as coping methods in dealing with stress in teens? Although only an introduction and small window into the actual benefits of martial arts, the extent to which it can truly benefit tends to stay on a qualitative/ subjective basis. Another look into this question can be the how valuable the participants saw martial arts as for dealing with stress, in which the previous statement for “Do you think kendo can be used for mental health issues?” was answered unanimously with “yes”.

How much of a difference does self-esteem/confidence actually make on both our physical and mental exhaustion? Exhaustion, the term that refers to overexertion of energy or overstrain, refers to the mental fatigue one experiences. This can also be an umbrella term for the sleepiness or lethargy nature of falling asleep. In terms of mental exhaustion, teens can find themselves at the receiving end of this notion. In a study conducted by the National Library of Medicine, “Up to 40% of healthy teens experience regular sleepiness, defined as an increased tendency to fall asleep. Fatigue is the perception of low energy following normal activity and is reported by up to 30% of well teens.” Ways suggested to counteract such fatigue was stated in a table conducting guidelines on fatigue with one instance including the statement: “Be active every day, but avoid vigorous exercise in the evening” (Findlay, 2008). Alongside such statements, guidelines such as, “The first goal is to improve function through increased activity and fitness, in spite of the symptoms, which often are slower to resolve.” and “Graded exercise therapy, coordinated by a physical therapist, can be very helpful.” (Findlay, 2008) both were addressed as well. Given such, the exhaustion levels in average of all participants reflected a net loss of -0.6428 score, indicating sentiments of increased focus no matter the differences. Given such, one could expect a benefit in the possible return of energy levels or even less fatigue. Even so, these results are not definitive enough to prove the benefits of martial arts activity in a certain demographic. The most time was spent studying changes in quantitative stress data rather than qualitative responses or interviews of verbal agreement and sentiments. Although numerically, such values can indicate a future of furthering studies into such a field, these results are suggesting future research and resources of martial arts as a successful coping strategy for stress and mental fortitude.

Conclusion

To study the correlation or connection between martial arts and stress. Spanning categories from participants with martial arts experience to none, participants who exercise on a daily basis to non-exercisers, participants of varying stress levels and stress frequencies, and participants who deal with anger in different ways.

Research indicates that as a general discussion, an immediate decrease in stress levels before and after martial arts activity is to be expected. Although a brief introduction into the topic, it serves as a possible gateway for expansion into the discussion of employing martial arts or martial arts resembling activities into daily lifestyle. These include meditations, contact or sparring activity, general conditioning of the body, and instructor led discussion of a martial arts identity.

Firstly, the anger management table and data set sought out a correlation between the preexisting anger management of participants in general conditions and how such disciplines could aid in the effectiveness or reciprocity of martial arts principles, especially Asian martial arts that are deeply rooted in confucian beliefs.

For the anger management group, level 3 participants noted a nearly 2.5 level difference of stress levels and level 5 participants, the least anger management, noting a change of 3 levels in average stress levels. Although not conclusive, this data suggests that the less anger management one has, the teachings of martial arts may sway an even greater portion of the mental reciprocity of such individuals, leading to lower stress levels.

The overall enjoyability of levels 1,2,3, and 4 all experienced enjoyability of about 4(3.89 for level 1), but level 5, the highest spectrum experienced enjoyability at a level of 2.5, possibly an extension of the control stress or control enjoyability at which their minds operate at before the trial. Martial artists with more than 2 years of experience possibly experience less due to their familiarity with the program or to similar martial arts.

For the exercise group, findings included level 4 and 5 exercisers gaining 0.25 confidence ratings and the level 3 and level 2 exercisers experiencing more of an increase in confidence than the daily/more than once a week exercisers. With overall increases in confidence levels for all exercisers, the data suggests that exposure to exercise finds the best results in discovering confidence while performing martial arts. Just as how exercise helps with self esteem(CDC, 2022), martial arts falls under the same category for performing such benefits for participants.

For the frequency of stress levels, it served to enhance that the frequency of occurrence of stress affected how the degrees of stress one could experience and that it reflects into how that stress is dealt with. The results suggest that the less frequent one's stress occurs, the more drastic the change between initial and final stress levels there is. As supported by the second figure, differences in stress levels pre to post trial starting from frequency of stress level 1 started respectively at 1.5, 1.5, 3, 0, 1. Reaching a peak of change in level 3, participants who experienced stress occasionally presumably had the highest change in stress levels, suggesting that the optimal performance for people of stress should be people who experience stress occasionally or less often than that. Even so, since the data implies that there is no drop off in stress level or negatively correlated statistics, all levels of stress frequency have nothing to lose in terms of gaining stress. Outside of martial arts, this could have effects on how people deal with stress on a daily basis. Stress is a normal occurrence and for many, it is a tool to be harnessed. In the case in which it becomes debilitating or harmful, it is important to recognize such and to cope accordingly. While a small study into the effects of such activities, one qualitative question was asked to all participants in which an overwhelming answer was revealed: How important is it to have a break from work? With a scale of 1 through 5, the participants rated this at 4.4286 rating. As a general consensus, it's important to deal with turmoil and this reflects such sentiments. How can this be expanded on and what are the implications? For different groups of people, several recommendations or prescriptions for martial arts therapy can be made, and if performed on a greater scale, the stats would likely amplify the results in the initial trial. Given the sample size and demographic of study, there is indeed a correlation in several factors affecting the efficacy of martial arts therapy. The initial hypothesis of "Does martial arts deal with adolescent stress effectively?" and the secondary hypothesis of "Which sub demographic is most affected by martial arts therapy?" is buttressed and supported so that it is made clear that on top of the physical activity that drives schools to mandate physical education and activity in schools, the same can be applied to martial arts for the therapeutic qualities and safer coping strategies it suggests through its unique nature as a system rooted in spiritual and mental success for its participants and practitioners.

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