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The Effects of Yoga on Incarcerated Youth

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THE EFFECTS OF YOGA ON INCARCERATED YOUTH

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ABSTRACT

Prior research has shown that yoga and mindfulness-based practices have been used to reduce stress, depression, and anxiety (Chong et al., 2011; Riley et al., 2014). Additionally, there has been a push to introduce yoga into prison through the Prison Yoga Project (PYP). Yoga has been studied in adult prison and has had success in aiding inmates with improvements of stress and symptoms of depression and anxiety, as well as improvement of self-regulation (Auty et al., 2015). However, yoga and the PYP are unstudied in juvenile correctional facilities. The present study examined the usage of the PYP in one juvenile correctional facility. Across time, participants saw an average 38% reduction in stress from the beginning of a yoga session to the end of a yoga session. These finding provide valuable evidence that yoga and the PYP can provide effective benefits in juvenile correctional facilities. Furthermore, the PYP and yoga could be used in other setting involving juveniles, such as schools and other residential placements.

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CHAPTER I

INTRODUCTION

Yoga generally consists of low intensity flowing exercise with periods of mindfulness and meditation to help calm the yoga practitioner mentally as well as physically. Yoga originated in India, but contemporary Yoga practice draws from many schools of thought such as Jainism, Buddhism, and other assorted schools of Indian Philosophy (Ashok, 2016). Research suggests that yoga can be beneficial in a myriad of ways such as reducing symptoms of depression and anxiety as well as in lowering stress (Chong et al., 2011; Riley et al., 2014). Research also suggests that prison environments are among the most stressful (Berzofsk & Bronson, 2017). In recent years there has been a movement to introduce yoga to prisons to help inmates cope with the stress and effects of incarceration in the form of the Prison Yoga Project.

The goal of the Prison Yoga Project is to support incarcerated people through trauma-informed yoga and mindfulness practices to promote rehabilitation, reduce recidivism and improve public safety. Numerous studies have been done assessing the effects of yoga on inmates and the overall results have been positive. Meta-analytic findings have concluded that yoga conducted in prison environments has significant

beneficial effects such as reducing stress, reducing symptoms of depression and anxiety, and improving overall behavioral functioning by boosting attention span and self-control (Auty et al., 2015). Additionally, yoga aids in reducing recidivism rates as it encourages inmates to join rehabilitation programs (Auty et al., 2015). Many participants report continuing to practice yoga even after their release from prison as it aids mindfulness and self-reflection which may reduce reoffending. While yoga is beneficial for many people, it is also cost prohibitive. A single class can be cost between five and 20 dollars while monthly studio memberships can range between 100 or 200 dollars. The Prison Yoga Project is a great way to increase access to yoga for incarcerated individuals.

Incarcerated populations face unique challenges. Up to 37% of incarcerated adults in federal prison and 44% of those in jail have a diagnosed mental disorder (Bronson & Berzofsk, 2017). Among incarcerated youth, research suggests that the rates of psychological disorders are even higher. Up to two thirds of incarcerated youth have a diagnosed mental disorder (Meservey & Skowyra, 2015). These rates are much higher than the average 20% for mental disorders among adolescents in the general population (Merikangas et al., 2010). Furthermore, suicide risk for incarcerated youth is three times higher than the general population (Abram et al., 2014). Incarcerated youth face great psychological distress and yoga may have a beneficial impact on them. Although research on the effects of yoga show benefits, most prison-yoga research has been conducted with adult populations. Little research has been done with the juvenile incarcerated population. The purpose of this study is to fill this void and to explore the effects of yoga on incarcerated youth.

CHAPTER II

LITERATURE REVIEW

Yoga is expanding in the west as part of a holistic spirituality movement (Harris, 2013). The most practiced type in the western world is Hatha yoga. Hatha yoga is comprised of synchronized movements with specific postures, breathing exercises and meditation (Luu & Hall, 2016). Although mindfulness, meditation, and yoga often go hand in hand, there are some differences. Mindfulness is defined as a state of consciousness, whereas meditation is an action behind mindfulness (Wielgosz et al., 2018). Yoga simply borrows components from mindfulness and meditation and incorporates them. For example, after the poses and motions of yoga are conducted, a period of meditation often concludes a yoga session.

In recent years there has been an increase in interests in the psychological effects of yoga. Research has shown numerous psychological benefits to practicing yoga. One study concluded that yoga had beneficial effects such as improvement with cognitions, attention, and stress reduction (Rocha et al., 2012). Participants reported less negative thinking and improved memory. The study was comprised of 36 men from the Brazilian army, and they were divided up into a yoga experimental group and control group. The

yoga experimental group found increased beneficial effects on cognition, attention, and stress reduction after attending yoga sessions twice weekly for six months over the control group that did other physical activity.

In recent years there has been a movement to expand yoga into prisons with the Prison Yoga Project (PYP). The PYP claimed its start in 2002 when James Fox began teaching it at San Quentin State Prison. In January of 2010, the book *Yoga: The Path for Healing and Recovery* by James Fox was published to raise awareness about the effectiveness of yoga among prisoners. By 2018 the book had become so popular among prisoners and their staff that it had shipped over 22,000 copies. The PYP is a program that seeks to integrate yoga into prisons to reform the justice system. If a facility agrees to permit the PYP, then yoga sessions are conducted by certified instructors who are trained to conduct yoga in a correctional facility with incarcerated people.

Numerous studies have investigated incarcerated adult populations documenting the beneficial effects of yoga. One study conducted over 10 weeks with 133 incarcerated men and 9 incarcerated women studied the effects of yoga and physical activity on psychological health (Sfendla et al., 2018). At the conclusion of the study, the participants completed self-report surveys to measure their psychological distress. The study's findings showed that yoga helped reduce psychological distress. Himmelstein (2011) reviewed various forms of mindfulness and meditation as components of yoga among incarcerated populations and found that all forms reduced stress, substance use, and recidivism. Both Brown et al. (2007) and Simpson et al. (2006) drew similar conclusions in that mindfulness and meditation helped reduced substance abuse and improved overall mood.

Yoga can also be used as a tool to help aid in the rehabilitation of offenders. Recidivism is a problem among corrections in the United States. For example, 83% of prisoners released in 2005 were arrested at least one more time during the following 9-year span (Alper & Markman, 2018). Lowering recidivism rates help an already burdened justice system. One study concluded that yoga helped inmates reduce their recidivism by improving self-regulation (Kerkes et al., 2017). Participants were found to have improvements in impulse control, reduction in aggression and anti-social behavior after doing 10 weeks of yoga comprised of one weekly session. Many individuals involved in the criminal justice system struggle with aggression and impulse control, yoga and mindfulness training could proof to be a useful tool to help manage these issues. It was found that mindfulness based cognitive therapy was effective at reducing physical aggression among youth in a correctional and rehabilitation facility (Atefeh et al., 2016). The study consisted of 22 participants divided into two groups, one that would receive the mindfulness based cognitive therapy and a control group. Each group took pre assessments and post assessments and it was found the experimental group endorsed reduced anger and aggression compared to the control group. Yoga and mindfulness can be valuable aids in rehabilitation so that criminals do not reoffend.

Another major issue is that prison is a detrimental environment. It deprives people of liberty, autonomy, family relationships and security (Crewe, 2007). Additionally, prison opens the most vulnerable populations to exploitation (Evans & Wallace, 2007). Hypermasculinity is also rigidly enforced as inmates are not expected to appear vulnerable or show emotion due to prison culture norms (Crewe, 2009). Living in such an environment can cause psychological distress such as increasing symptoms of

depression, anxiety, and post-traumatic stress disorder (PTSD; Haney, 2001). Yoga may help reduce the additional stress created from living in such an environment. For example, yoga may help foster positive connections between prisoners due to increased self-understanding and the ability to detach from the harsh reality of prison. Inmates who practice yoga improve their sense of their own emotions and of others (O'Donnell 2014; Parkes & Biby 2010; Rucker, 2005). This could lead to a better prison environment and decrease hostile and violent behavior from the inmates.

Incarcerated youth face a myriad stressor. Additional stressors may be compounded for adjudicated youth, who may have also had adverse childhood experiences. Before youth are adjudicated and incarcerated, many have already face adverse experiences, such as abuse, neglect, unstable and unsafe living conditions, or parental or familial incarceration (Arditi, 2013; Wolf & Shi, 2012). For example, parental incarceration can have many adverse effects on a child, including child maladjustment, academic failure, and poverty (Arditi, 2013). Furthermore, children who have a parent incarcerated are at greater risk of committing delinquent acts and being incarcerated themselves (Mosley, 2008). The rate at which incarcerated youth have experienced trauma is much higher than the general population. For example, 62% of youth have traumatic experiences with in the first 5 years of life with 33% of youth continue to experience severe trauma through adolescence (Dierkhising et al, 2016) On top of potential trauma, many youths who experience trauma come from lower socioeconomic areas which may increase exposure to crime and violence (Lacovino et al., 2014). Research suggests that individuals from lower socio-economic status (SES) communities suffer more trauma but are less likely to seek therapeutic support than their

middle- and upper-class counter parts (Hodgkinson, 2016). Not seeking treatment and experiencing more traumatic events may overwhelm coping strategies needed to manage mental health issues adaptively. This is only exacerbated during incarceration. Not only are adjudicated youth separated from family, friends, and home, but they are also thrust alone into a violent, hostile environment that has been shown to increase symptoms of PTSD, depression, and anxiety (Facer-Irwin et al., 2019; Gonzales & Connell, 2014). Yoga can provide an adaptive coping mechanism to help with these issues.

In adult prisons, a large percentage of inmates who need mental health services do not get them (Gonzales & Connell, 2014). This issue also plagues youth facilities. Due to overcrowding and lack of funding, youth who are incarcerated often do not receive the mental health care they need (Desai et al., 2006). The lack of adequate mental health services further perpetuates poor coping strategies, especially in an environment that does not promote positive coping strategies. Without positive ways to deal with their mental health issues, many incarcerated youths turn to negative strategies such as aggression or shutting down (Howard & Medway 2004). Yoga in prison could provide one positive coping strategy.

1.1 Current Study

According to the Office of Juvenile Justice, in 2018 139,000 youth nationwide were placed on probation, 62,100 youth were placed in a residential facility, and 19,000 given some other sanction such as community service or diversion programs. For Ohio, the average daily population in a juvenile correctional facility is reported to be 530 youth (Matei & Harvell, 2020). Ohio Department of Youth Services (ODYS) runs residential facilities in Ohio. ODYS placements are mainly used for youth who have committed very

serious offenses or when community corrections have been unsuccessful. The largest portion of youth contained in ODYS facilities are housed for person crimes, such as robbery, aggravated robbery, and assault (Matei & Harvell, 2020). Being committed to ODYS is akin to being sentenced to prison in the adult justice system as all youth present in the facility have been adjudicated on charges and are sentenced for lengthy periods Currently, Ohio only has three such facilities. These ODYS facilities house youth 12-21 from all over the state of Ohio with 91% of committed youth identifying as male. Moreover, Black youth are incarcerated at a disproportion rate. Over 55% of incarcerated youth are Black despite only 15% of the population in Ohio identifying as Black (Matei & Harvell, 2020).

In the juvenile justice system, facilities are run at the state or municipal level. Because of this, all youth regardless of offense type are mixed which leads to a wide array of offenders being in the same facility. Often time this can create more violence and victimization within juvenile correctional facilities (Vivan et al., 2007). For the structure of juvenile incarceration in Ohio, youth are separated into different section or "houses". These houses are either number or color coded. Low level offenders and youth who behave well are housed in a section that has a wide array of privileges and nicer facilities than in other houses. Some of these privileges include access to tablets, single non-bunked beds, and more free time.

The study of yoga with incarcerated adult populations has been well documented; however, the study of yoga with incarcerated youth populations has been relatively untouched. The purpose of this study is to evaluate the effects of yoga on incarcerated youth by examining a downward extension of the Prison Yoga Project in one juvenile

correctional facility in ODYS. The goal of the study is to assess the pre yoga and post yoga stress of participants and track changes in stress over time. The first hypothesis is that youth participation in the PYP will result in reduced stress across time as they acquire new strategies to cope with stress. The second is that youth with higher levels of pre-assessment PTSD symptoms will show less stress reduction within sessions and across time.

CHAPTER III

METHOD

3.1 Procedure

All incarcerated youth in two housing units in one juvenile correctional facility within the ODYS were invited to participate in a juvenile adaptation of the Prison Yoga Project (PYP). Participants were recruited for the research study on a voluntary basis. Parental consent for the research project was required for those youth under 18. Youth assent was also required. Youth 18 or older consented for themselves. The consent procedure for youth under 18 consisted of a phone call to gather interest from the youth's guardian. If agreeable, a consent form was mailed to the guardian. Youth with consent and assent were then asked to complete preassessment measures evaluating behavioral and emotional functioning, self-regulation, coping, and PTSD symptoms.

After the pre assessments, yoga sessions were conducted twice weekly by a certified yoga instructor over a 5-month period. Yoga was conducted with 4 teachers in one-hour sessions. The teachers were registered yoga teachers who had completed a 200-hour teacher training with a Yoga Alliance Registered Yoga School and trauma training with the Prison Yoga Project. A curriculum, entitled Yoga F.L.A.M.E, including a daily

class protocol, was created by a clinical psychologist, Dr. Lynn Williams, in collaboration with the Prison Yoga Project. The standardized protocol was created to target the specific needs of juvenile offenders. Yoga F.L.A.M.E. borrows from the trauma informed treatment guidelines to target the core skill-building. F.L.A.M.E stands for focus, letting go, anger management, mindfulness, and exhaling negativity. The goals of the Yoga F.L.A.M.E. program are to promote stress management, decrease behavioral infractions, and improve mental health symptoms, including depression, anxiety, and trauma-related stress. A typical session is comprised of six elements with supplementing sub elements. These are described in Table 1.

Table 1. *Yoga F.L.A.M.E. Program Elements, Sub-Elements, and Time Duration.*

Element	Sub Element	Duration in minutes
1. Greeting	1.1. Attendance noted. 1.2. Participants complete entry stress measure (visual analogue scale, VAS) 1.3. Teacher greets each student	5*
2. Mindfulness: Centering Body and Breath Awareness	2.1. Centering body and breath awareness	5
3. Home practice and themes	3.1. Interactive discussion of home practice and previous theme 3.2. Introduction of theme for this class	15
4. Warm-up poses	4.1. Gentle body awareness poses	5
5. Active Poses	5.1. Trauma sensitive yoga	20
6. Closing Practices	6.1. Guided Relaxation 6.2. Check in, discussion of home practice, and provide home practice handout 6.3 Student completes exit VAS	10

Note: * occurs prior to class

Multimedia YouTube elements were also incorporated into the protocol, such as videos of Kobe Bryant and Lebron James promoting yoga, the Power of Sleep, and Meditation. Skill building worksheets and homework (e.g., journal exercises) were provided for homework between yoga sessions. Before and after each session, a brief

measure of stress using a visual analogue scale was completed. This measure is described in greater detail below. The Yoga F.L.A.M.E. program started in October 2019 and intended to end in May 2020. Due to the COVID-19 outbreak in March of 2020, the project was prematurely halted as the facility was closed to all visitors as a measure for COVID- 19 safety. As a result, the yoga program ended early and post-assessment measures were not collected.

3.2 Measures

Post-Traumatic Stress and Trauma

To assess symptoms of PTSD, the participants were asked to complete the PTSD Check List, Civilian Version (PCL-C; Weather et al., 1995). The initial prompt asks the participant to rate the list of problems or complaints based on how much they have been bothered by any of the problems described on the PCL-C in the last month. Example test items include complaints and problems such as, "repeating disturbing memories, thoughts or images, of a stressful experience in the past?", "suddenly acting for feeling as if a stressful experience were happening again? (as if you were reliving it?)", and "avoid activities or situations because they remind you of a stressful experience from the past." The participant then rates each of the 17 items on a scale of one to five, with 1 being *not at all*, 2 being *a little bit*, 3 being *moderately*, 4 being *quite a bit*, and 5 being *extremely*.

A recent study to assess the reliability and validity of the PCL-C overall concluded that the PCL-C was a reliable and valid way to measure PTSD with civilians (Conybare et al., 2012). The study reported an alpha of .94 on the initial administration among undergraduate students. Test - retest reliability was acceptable with $r = .66$. Furthermore, the study reported favorable convergent and discriminant validity. The

PCL-C correlated low with unrelated measures such as the Social Phobia and Anxiety inventory, $r = .28$, and correlated highly with other measures related to PSTD, such as the Civilian Mississippi Scale which measures various symptoms of PTSD, $r = .60$. (Measure presented in Appendix I.)

Stress

To measure stress, participants completed the Visual Analogue Scale (VAS) before and after each yoga session (see Appendix II). The VAS appeared as a ruler. Participants were asked to place a mark ("X") on the ruler to indicate how stressed they felt before a yoga session. They then placed a mark ('dot') indicating their level of stress post yoga session. To measure levels of stress, the participant marks towards the zero or left side of the ruler for no or lower stress and to the right for more stress. The VAS was scored using a ruler to measure how many millimeters each response (i.e., pre, post) represented. Specifically, the VAS was scored by taking a ruler and measuring where the marks (i.e., X, dot) were placed on the scale. For example, if the mark was measured to be 35 millimeters away from zero, that mark's value would be 35.

3.3 Participants

Participants (n = 14) were adjudicated male youth at a juvenile correctional facility that houses male youth ages 12- 21. The youth in the facility have been incarcerated for varying offenses and amounts of time; however, this data was not available to the research team. Participants were recruited based on their willingness to engage in the PYP as well as complete the required pre assessments.

3.4 Data Cleaning and Statistical Analysis

The PCL-C data was double entered into an SPSS data set. Discrepancies were solved by comparing the entries and double checking any entries that did not match. Reliability of PCL-C data was checked using Cronbach's alpha. The data's mean, standard deviation, skewness, and kurtosis were examined. VAS data was double entered into an excel spread sheet and discrepancies were double checked. Pre session scores and post session scores were then converted to percentages by dividing the marked millimeters by the total number of millimeters. Furthermore, the difference between the pre- and post-percentages were calculated to attain the change in felt stress.

Latent curve modeling (LCM) was used to examine patterns of changes in stress levels in each participant before and after yoga sessions. Specifically, LCM was used to analyze change in stress levels over time. First an unconditional latent curve analysis was used to assess changes in stress levels from before and after yoga sessions. This method involved fitting models of escalating complexity (i.e., intercept only, linear slope) to the repeated measures of stress levels. Models were compared across of a variety of fit indices including the Comparative Fit Index (CFI), Tucker Lewis index (TLI), and root mean square error of approximation (RMSEA), as well as the chi square difference test. The second hypothesis is to determine whether a history of trauma impacts the intercept and slope of the change in stress using conditional latent curve analysis. The main of the goal of analysis was to measure if past trauma experience impacts the level of change in stress from yoga participation within session and across time.

CHAPTER IV

RESULTS

First descriptive statistics were analyzed for change in pre- to post-yoga stress levels. Across participants, there was minimum average of 9% reduction in stress with a high average of 62%. On average across all sessions, participants reported a 38% reduction in stress. A graph representing the lines of the mean change in stress scores for each session as well as the minimum and maximum scores for each session is presented in Figure 1.

Figure 1. *Variation Between Maximum and Minimum and Mean Scores.*

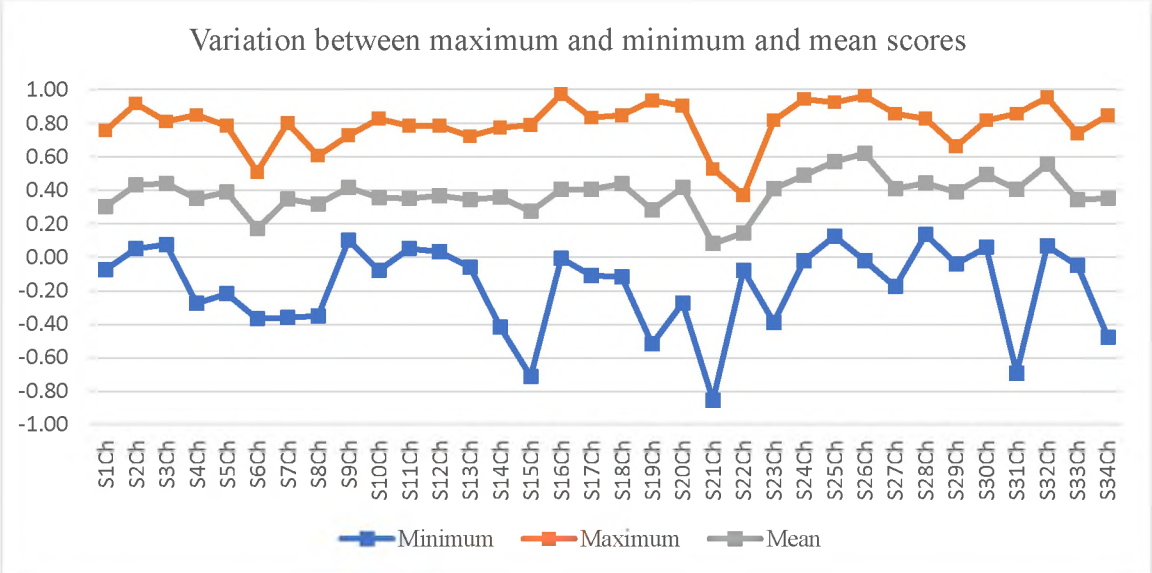

Figure 1. Mean, minimum, and maximum scores in change in stress measured with the Visual Analogue Scale across 34 yoga sessions with 14 participants

Descriptive data from the PLC-C were also examined. For the youth that participated in the yoga sessions, their mean score was 40.46 (range 17 to 62, α=.97). According to the Department of Veterans Affairs and National Center for PTSD (Department of Veterans Affairs, 2013) the cut point for a medical clinic are scores between 36 and 44 and the cut point for a specialized mental health clinic is between 45 and 50. The data shows that many participants experienced a large amount of trauma as 45% of the sample had a score above the cut point for a specialized mental health clinic.

Hypotheses

Hypothesis 1

After descriptive statistics were analyzed, hypothesis one was tested which consisted of estimating a latent growth curve model to examine the change in stress across time. As the sample size (n = 14) was smaller than the number of parameters (n = 34 sessions), a model estimating all five months concurrently could not be computed. Upon trying, the standard errors were reported as not trustworthy, and the model did not coverage or produce a chi square. To remedy this, the data was broken down into three chunks based off graphical analysis and external factors such as natural cut points in the data (e.g., winter break). The three chunks were a) the first 10 sessions, b) sessions 11 through 20 and c) sessions 21 through 34.

Sessions 1-10. Sessions one through ten were analyzed using an intercept only model. Initial analysis also showed that the model was not a good fit for sessions one through ten (χ^2 (df) = 34, p = .0002, CFI = .601, TLI = .672, RMSEA = .279). Further examination indicated that the full sample did not participate in sessions six and session eight. Therefore, these two sessions were removed, and analysis was rerun. After removal of sessions six and eight, the intercept-only model was still not a good fit (χ^2 (df) = 34, p

= .0002, CFI = .601, TLI = .672, RMSEA = .279). Thus, this model suggests the data cannot be represented by a flat line fit perfect with the intercept.

Next the data was analyzed using a linear slope and intercept model. Based on recommendations in Mplus, 20 random start points were used to ensure the solution was replicated. However, this model did not fit the data well (χ^2 (df) = 31, p = .000, CFI = .518, TLI = .564, RMSEA = .322). This indicates that a linear slope model does not fit the data well either.

Sessions 11 – 20. After analyzing sessions one through ten, sessions 11 through 20 were analyzed in the same manner. First an intercept only model was examined. This analysis indicated that for sessions 11 through 20, an intercept only model was not a good fit for the data ((χ^2 (df) = 53, p = .000, CFI = .543, TLI = .612, RMSEA = .745).

Subsequently analysis using a slope and intercept model was then conducted. Twenty random start points were used to replicate the solution. A linear slope intercept model for sessions 11 through 20 was not a good for the data (χ^2 (df) = 50, p = .0012, CFI = .708, TLI = .737, RMSEA = .227).

Sessions 20 – 34. These models were also unstable due to having more data points than participants. Furthermore, one participant's stress was not properly labeled, and another participant left the program, reducing the number of participants to 12, resulting in further model instability. As a result, these models did not converge, and the model fit indices could not be computed. Because the first two sets of models did not fit well, there was no indication that the final set would work either.

Hypothesis 2

Hypothesis two of past trauma history associating with change in stress was also unsupported. The original testing could not be completed as the models produced in hypothesis one were unstable. In lieu of the original analysis, the correlation between trauma scores and mean change in stress scores was calculated. There was no significant correlation between these two (r =.110, p = .720).

CHAPTER V

DISCUSSION

This pilot study examined the effectiveness in the reduction of stress of the Prison Yoga Project (PYP) in a juvenile correctional facility. The study attempted to answer the question as to whether yoga reduces stress across time and if past trauma would affect this change. However, models estimating change in a static or linear fashion were not supported. There were more data points than participants leading to model instability. However, descriptive data showed that, on average, yoga helped in the reduction of stress. Analysis of the means for the reduction in stress indicated, on average and across all sessions, participants experienced a 38% reduction in stress.

The first hypothesis sought to analyze change in stress levels across time along a singular line. As this project was a pilot study, there were vastly more data points than participants, which lead to unstable models. Furthermore, there was a large amount of variability between participants (see Figure 1). Some participants saw large change in stress, whereas others saw relatively small changes in their reported stress levels. Additionally, there was a large amount of variance between sessions as demonstrated in Figure 1. Due to this, lines were extremely volatile and plotting the data on a single linear line was impossible. Some of this variance in stress scores could be attributed to factors

related to the prison environment. Unfortunately, extraneous records were not kept about the daily environment in the prison; however, fights, fire alarms and animosity between individuals are known to occur in such settings (Häufle & Wolter, 2014). These interruptions and daily changes may be reflected in this data. Furthermore, there could be variability in the stress that each participant brings to yoga. A participants could be stressed about outside factors such as problematic events occurring in their family or how their incarceration is effecting their family.

Prior literature examining the PYP provides results including pre assessment and post assessment data (Sfendla et al., 2018; Himmelstein 2011). This data allows for more stable analysis in overall change. Due to the premature termination of the project due to COVID-19, post assessment data could not be collected. This resulted in limitations to the types of analysis that could be conducted, as comparing pre and post assessment data was impossible. Additionally, because pre assessment data were not collected, attempting to measure the overall trajectory of change in stress using the data collected appeared to be the best option.

Further, regarding hypothesis one, there is a gap in the literature in using VAS data to analyze the effectiveness of yoga. As a result, no direct comparison between this study and another was possible. Most PYP studies have participants complete a battery of assessments, conduct yoga sessions over time, and then have participants takes post assessments. There were no prior studies found that used VAS data to represent stress, which was a unique factor in this study. VAS data can be a useful tool in initial analysis of stress levels (Lesage et al., 2012) and is a simple pre- and post-yoga check-in. Furthermore, it can be a valuable tool for the participants to see progress in real time.

However, its effectiveness may be reduced when used repeatedly, particularly for research purposes over time. For example, some research suggests that the VAS maybe more reliable among populations with higher literacy, despite being a pictorial measure (Joos et al., 1991). Due to social injustices, youth involved in the justice system are more likely to spend less time in school, and report lower reading levels (Balfanz et al., 2002; Hughes-Hassel & Pradnya, 2007). This could potentially reduce the effectiveness of using the VAS in such a setting.

Hypothesis two attempted to analyze the effect of trauma on stress reduction following yoga. However, due to the instability of the models presented by hypothesis one, a different analytic approach (i.e., correlation) was taken. These results showed that change in stress levels from before to after yoga and levels of initial trauma symptoms were unrelated. Notably, there was little variability among the levels of reported trauma within this sample as participants reported on average high levels of trauma-related distress. As noted, 45% of the sample reported trauma symptoms above the cut point for a specialized mental health clinic.

5.1 Limitations and Future Directions

As this study was a pilot study, there are several limitations. First, there is the small sample size. With only 14 participants, estimating stable models proved difficult. Future research should acquire a large sample size to remedy this issue. Another limitation was guardian consent. Although 20 youth completed pre assessments and showed interest in participating in the juvenile adaptation of the PYP program, only 14 participants had data that was useable for analyses. Although more youth participated in the yoga sessions, we did not receive consent to use their data. Parental consent proved

challenging for several reasons, including lack of parental or guardian involvement in the child's life and address or phone number changes of the parent or guardian. Furthermore, several participants left the system for a wide array of factors including early release, transfers to different housing units, or deciding to discontinue participation in the program. Lastly, due to the COVID-19 pandemic, the facility was put on lockdown and the program was halted early. As a result, post assessment data were not collected. Further research should attempt to replicate this study with both pre-assessment and post-assessment data to provide valuable insights into the true effectiveness of yoga with incarcerated juveniles.

Future research would benefit from also examining a wider array of related behaviors and experiences. For example, research shows that self-regulation may be related to the benefit one can gain from yoga (Ishaq et al., 2021). Other research with this population suggested that higher initial levels of long-term self-regulation related to greater changes in stress across the yoga sessions (Williams et al., 2021). Perhaps participants with stronger self-regulation skills may have more discipline to pay attention during sessions and implement what they learn from yoga into their life and better manage stress. Further, lower levels of self-regulation can lead to difficulties in concentration and stress management. In this study, although it did not reach a level of statistical significance, initial analysis shows a strong trend that self-regulation and change in stress reduction are related (r =.51, p = .063). Further research should attempt to more deeply assess the relationship between levels of self-regulation and yoga.

5.2 Implications

This study provides valuable evidence of the effectiveness of yoga with incarcerated youth and could serve as springboard for future research and yoga implementation. Unfortunately, the attempted analysis did not produce reliable results. However, if our initial hypothesis was supported, we could examine the increase in benefit across time. Furthermore, it could be possible to see if the benefit one gained form yoga kept increasing or began to taper off or plateau. However, on average participants still reported a 38% reduction in stress across sessions and could still provide evidence that future research should prove fruitful. For example, this study suggests that trauma informed yoga programs could be implemented with other clinical populations, such as individuals in residential clinical placements or halfway houses. Additionally, this program could be modified for use in schools or other groups settings. These findings could also give merit to pop culture movements involving yoga as well as increase buy-in from populations that may not normally try Yoga. For example, Lebron James has become an advocate for practicing yoga (Windhorst, 2009). Using pop culture and sports icons such as Lebron James or Kobe Bryant could help increase buy-in from youth, particularly male youth who see sports icons as role models due to many aspiring to be pro athletes themselves (Stiles & Gibbons, 1999). Lastly this could justify exploring and borrowing from other eastern philosophical practices to help supplement yoga.

Conclusion

This pilot study sought to analyze effectiveness of the PYP in a juvenile correctional facility. Despite the limitations of the study, it showed promising evidence as a potential effective way to implement yoga among incarcerated youth. All in all, on

average, participants saw a sizeable reduction in stress. Further and more expansive research should be conducted to get a better sense of the effectiveness of yoga and what other factors limit or enhance its effectiveness.

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APPENDIX A

PTSD CHECKLIST – CIVILIAN VERSION (PCL-C)

Below is a list of problems and complaints that people sometimes have in response to stressful life experiences. Please read each one carefully, pick the answer that indicates how much you have been bothered by that problem *in the last month*.

No.	Response	Not at all (1)	A little bit (2)	Moderately (3)	Quite a bit (4)	Extremely (5)
1.	Repeated, disturbing *memories, thoughts, or images* of a stressful experience from the past?					
2.	Repeated, disturbing *dreams* of a stressful experience from the past?					
3.	Suddenly *acting* or *feeling* as if a stressful experience *were happening* again (as if you were reliving it)?					
4.	Feeling *very upset* when *something reminded* you of a stressful experience from the past?					
5.	Having *physical reactions* (e.g., heart pounding, trouble breathing, or sweating) when *something reminded* you of a stressful experience from the past?					
6.	Avoid *thinking about* or *talking about* a stressful experience from the past or avoid *having feelings* related to it?					
7.	Avoid *activities* or *situations* because they *remind you* of a stressful experience from the past?					
8.	Trouble *remembering important parts* of a stressful experience from the past?					
9.	Loss of *interest in things that you used to enjoy?*					
10.	Feeling *distant* or *cut* off from other people?					
11.	Feeling *emotionally numb* or being unable to have loving feelings for those close to you?					

12.	Feeling as if your *future* will somehow be *cut short*?					
13.	Trouble *falling* or *staying asleep*?					
14.	Feeling *irritable* or having *angry outbursts*?					
15.	Having *difficulty concentrating*?					
16.	Being *"super alert"* or watchful on guard?					
17.	Feeling *jumpy* or easily startled?					

APPENDIX B

VISUAL ANALOG SCALE

How is your stress? Draw an X the line below to show how stressed you feel <u>in this moment</u>.

Not stressed at all ——————————————————— **Extremely stressed**

VAS # _____ ID _____