

INITIAL INVESTIGATION OF THE EFFECTIVENESS OF YOGA ON PSYCHOLOGICAL,
BEHAVIORAL, AND PHYSICAL HEALTH OUTCOMES AMONG JUVENILE
DELINQUENTS

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This work is dedicated to my loving partner, friends, and family
for their consistent encouragement and support throughout my graduate education.
Thank you for believing in me.

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ABSTRACT

INITIAL INVESTIGATION OF THE EFFECTIVENESS OF YOGA ON PSYCHOLOGICAL, BEHAVIORAL, AND PHYSICAL HEALTH OUTCOMES AMONG JUVENILE DELINQUENTS

by Erin M. Hawks

Millions of adolescents become involved in juvenile delinquency each year, perpetuating a complex and difficult social problem. An equally momentous societal challenge is how best to treat juvenile offenders once they have entered the juvenile justice system. A myriad of treatment interventions have been employed among juvenile delinquents over the last century, though most have shown little success. Thus, there is an unmistakable need to identify and deliver innovative methods of intervention to incarcerated juvenile delinquents that produce constructive change. The objective of the current study was to examine the effectiveness of yoga practice on psychological, behavioral, and physical health outcomes among adjudicated youth. Fourteen adolescents were randomly assigned to attend either yoga or recreation two nights per week for eight consecutive weeks. It was predicted that adolescents who participated in eight weeks of yoga would evidence statistically significant improvement in psychological, behavioral, and physical health outcomes compared to those who participated in recreation. Results indicated those who participated in yoga showed statistically significant improvement in pro-social behaviors compared to those who participated in recreation. Those who participated in yoga also showed statistically significant improvement on parent-reported internalizing symptoms when compared to those who participated in recreation. Unexpectedly, those who participated in yoga self-reported higher levels of anger than those who participated in recreation. Future research is needed to examine the long-term effects of yoga practice among delinquent youth.

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CHAPTER I

INTRODUCTION

Brief History of Juvenile Justice System

Throughout the late 18th century, children below the age of 7 years were presumed to be incapable of criminal intent and were therefore exempt from prosecution and punishment. However, older children could stand trial in criminal court for offenses they committed and, if found guilty, were sentenced to prison or even death (United States Department of Justice, 2009).

The 19th-century movement that led to the establishment of the juvenile court in the United States (US) had its roots in 16th-century European educational reform movements. As early as 1825, the Society for the Prevention of Juvenile Delinquency was advocating the separation of juvenile and adult offenders. Soon, facilities exclusively for juveniles were established in most major cities. By mid-century, these privately operated youth prisons were under criticism for various abuses. Subsequently, the state took on the responsibility of operating many of the juvenile facilities (US Department of Justice, 2007).

In 1899, the first juvenile court in the US was established in Illinois. The British doctrine of *parens patriae* (the state as parent) allowed each state to take responsibility for the protection of children whose natural parents were not providing appropriate care or supervision. This represented a shift in the focus of the juvenile justice system away from children as “miniature adults” who should be punished according to their crime, equivalent to adults, and toward the idea that children are developmentally immature and should be protected by society and its laws (US Department of Justice, 2007).

By 1925, all but two states had established juvenile courts and/or probation services. Rather than punishing delinquents for their crimes, juvenile courts sought to turn delinquents into productive citizens through treatment. The mission to help children in trouble was stated clearly in the laws that established juvenile courts. The benevolent mission led to procedural and substantive differences between the juvenile and criminal justice systems (US Department of Justice, 2009).

During the next 50 years, most juvenile courts had exclusive original jurisdiction over all youth under the age of eighteen who were charged with violating criminal laws. A child could be transferred to criminal court and tried as an adult only if the juvenile court waived its jurisdiction in the case. Transfer decisions were made on a case-by-case basis using a “best interests of the child and the public” standard and, thus, fell within the realm of individualized justice (US Department of Justice, 2007).

Characteristics of the Juvenile Delinquent

Juvenile crime is a prevalent social and public health problem. According to the Office of Juvenile Justice and Delinquency Prevention (OJJDP), over 1.5 million juveniles were arrested in the US in 2009 for delinquency offenses (Puzzanchera, Adams, & Hockenberry, 2012). Over 60% of these arrests pertained to violent crimes (e.g., murder, rape, robbery) and property crimes (e.g., burglary, larceny-theft, motor-vehicle theft). According to the National Juvenile Court Data Archives, 72% of adjudicated youth in 2009 were male, while 28% were female (Puzzanchera et al., 2012). The ethnicity breakdown for delinquent youth in 2009 consisted of 78% Caucasian, 16% African American, 5% Asian American, and 1% Native American (Mallett, 2013). The racial disparity in delinquency cases varied across offense categories. For example, while African American youth accounted for a greater proportion of

violent crimes against people (41%), Caucasian youth accounted for a larger proportion of drug offense cases (75%). Asian American and Native American youth accounted for a very small proportion of cases across offense categories.

According to Michigan law, juveniles are individuals not yet 17 years of age who have been adjudicated for their participation in illegal behavior. The Michigan Incident Crime Reporting (MICR) Handbook (2011) indicated there were a total of 21,298 juvenile arrests in Michigan in 2009 with 70% of those arrested being male and 30% being female. According to the Juvenile Court Statistics from 2009 (Puzzanchera et al., 2012), over 6% of juvenile arrests in the state of Michigan involved violent crimes while over 38% involved property crimes.

Adverse Effects of Juvenile Delinquency on Adolescent Offender

The delinquent behavior of adolescents is associated with a broad range of negative outcomes for the adolescent including poor mental and physical health. In previous studies of juvenile offenders, roughly 65% of males and 75% of females met criteria for at least one mental health disorder, and one tenth also met criteria for a substance abuse disorder (Huizinga, Loeber, Thornberry, & Cothorn, 2000; Skowrya & Coccozza, 2007; Teplin, Abram, McClelland, Mericle, Dulcan et al., 2006; Wasserman, McReynolds, Lucas, Fisher, & Santos, 2002).

Several studies have found a high prevalence of debilitating mental health diagnoses among delinquent youth populations, including affective disorders (major depressive episode, dysthymia, and manic episode), psychotic disorders, anxiety disorders (panic, separation anxiety, generalized anxiety, and obsessive-compulsive disorder), attention-deficit/hyperactivity disorder (ADHD), disruptive behavior disorders (oppositional defiant disorder and conduct disorder), and substance use disorders (Grisso, 2008; Mallett, 2006; Teplin, Elkington, McClelland, Abram, Mericle, & Washburn, 2005, Frick, 1998a; Frick, 1998b; Kazdin, 1995; Pliszka, Sherman,

Barrow, & Irick, 2000). Within the juvenile court system, between 15% and 20% of offenders have been diagnosed with either depression or dysthymia (Weiss & Garber, 2003), 13% to 30% have been diagnosed with ADHD, and 3% to 7% have been diagnosed with bipolar disorder (Goldstein, Olubadewo, Redding, & Lexcen, 2005; Teplin, Abram, McClelland, Dulcan, & Mericle, 2002).

Although drug use among adolescents cuts across race, income, and gender; research consistently identifies a strong positive association between drug use and delinquency, indicating that each behavior may exacerbate the risk of expressing the other (e.g., Dembo, Schmeidler, Pacheco, Cooper, & Williams, 1997; Ellickson & McGuigan, 2000; Snyder & Sickmund, 1999; Tubman, Gil, & Wagner, 2004). Many justice-involved youth regularly use substances (Dembo et al., 1997; Feucht, Stephens, & Walker, 1994), and some of them have demonstrated heavy usage levels and substance use disorders (Teplin et al., 2002). This is particularly problematic, because involvement with drugs or alcohol may increase the likelihood of continued and serious contact with the juvenile justice system (Belenko & Sprott, 2002). In fact, higher levels of involvement with substance use may increase the rate of offending, the severity of the committed offense, and the duration of antisocial behavior (Greenwood, 1992; Lipsey & Wilson, 1998; Sealock, Gottfredson, & Gallagher, 1997).

A number of studies have examined physical health problems as an outcome of delinquent lifestyle. For example, Farrington (1995a) found that compared to non-delinquent youth, delinquent adolescents on average have more medical visits to treat illnesses, injuries, and accidents. Furthermore, Carey, Hegvik, and McDevitt (1988) found a higher occurrence of obesity, stress-related health problems ranging from minor illnesses (e.g., colds) to major

diseases (e.g., hypertension, coronary artery disease) increasing with age, and sleep disturbances (Jemerin, & Boyce, 1990) among delinquent populations.

A recent study conducted by Clinkinbeard, Simi, Evans, and Anderson (2011) evaluated the relationship between hours of sleep and self-reported delinquent behavior among 14,382 adolescents who participated in the National Longitudinal Study of Adolescent Health. Findings indicated that youth who slept an average of seven or fewer hours per night reported significantly increased occurrence of property delinquency. Those who slept five or fewer hours per night reported significantly more violent delinquency than youth who slept between eight and ten hours per night. These findings may suggest that lack of sleep may be an important factor contributing to delinquency. An inverse relationship is also possible, such that delinquents sleep less because they are out, late at night, committing crimes.

Adverse Effects of Juvenile Delinquency on Communities

The delinquent behavior of adolescents is also associated with negative outcomes for the societies in which they reside. Communities are affected both directly (e.g., victimization by these individuals) and indirectly (e.g., costs of rehabilitation, treatment, educational, placement) by juvenile delinquency (Fass & Chung-Ron, 2002). Because dilapidated neighborhoods often have politically apathetic residents, police and city officials sometimes ignore these neighborhoods. Over time, the conditions of the neighborhood continue to deteriorate (Skogan, 1990), which has shown to lead to more poverty, a depressed housing market, a lack of new businesses, racial segregation, social isolation, and less collective efficacy (Oh, 2005; South & Messner, 2000). In general, it is likely that crime and delinquency are reciprocally related with declining community conditions. When crime and delinquency increase, more social disorganization tends to result. This may be followed by conditions in a community, such as low

cohesion and less informal control, which foster an environment conducive to more crime and delinquency.

Conceptualizing the Problem of Delinquency

Approaches to understanding and managing juvenile delinquent behaviors have evolved over the years. Several predominant conceptualizations have played important roles in shaping contemporary perceptions of youthful offenders and influenced how the problem of juvenile delinquency is handled in society. These perspectives on delinquency include biological models of abnormal behavior, frameworks which emphasize the need to contain and constrain delinquent behavior as a threat to society, Freudian explanations invoking unconscious motivations, psychosocial formulations, and systems analysis.

Biological Basis of Juvenile Delinquency

Over the years there have been a variety of theories that regard criminal behavior as the result of physiological or genetically determined personal characteristics. Stemming from the longstanding “moral” model of criminality, which views criminals as deficient in their achievement of religious values and morality (Jensen & Rojek, 1980), biological models have focused phenotypes, chromosomes, and neurochemicals to explain criminality.

An early biologically based theory was proposed by the late 19th century Italian physician and scientist, Cesare Lombroso. Lombroso studied the physical features of criminals and noted that particularly large or small skulls, cleft palates, receding chins, and large jaws were identifiable characteristic of criminals (Wolfgang, 1972; Gibson, 2002). Influenced by Darwinian Theory, German Materialism, and his own experiences treating the mentally ill, he posited that criminals are an evolutionary throwback to a more primitive form of humans, and

that these types of people were born with an innate drive toward criminal behavior including excessive anger, cruelty, and impulsivity (Hoffman, 2011). The early popularity of Lombroso's theories was dampened by the subsequent work of Charles Goring (1913) who found no identifiable differences between criminals and non-criminals, based on the evidence of over 3,000 criminals.

Subsequently, researchers examined other avenues through which biological make-up contributed to criminal tendencies. For example, Sanberg, Ishihara, Crosswhite, and Koeph, (1963) proposed that males born with an extra Y chromosome are prone toward heightened aggression and criminality. Hans Eysenck (1964/1983) suggested that a particular configuration of biologically based personality characteristics including extraversion, emotional instability, and psychotism, as measured by his Introversion-Extroversion Scale, were associated for heightened risk of criminality.

More recently the hormone cortisol has become a focus of interests with evidence of a link between cortisol and aggressive behaviors in children and adolescents (Kobak, Zajac, & Levine, 2009). Researchers hypothesized that low cortisol may contribute to criminal tendencies by decreasing responsivity to stress and lowering sensitivity to punishment and fear (Popma, Doreleijers, Jansen Van Goozen, Van Engeland, & Vermeiren, 2007).

The neurochemical serotonin has also been hypothesized to predispose youngsters to delinquent behavior through abnormal levels believed to increase impulsive behavior (Coccaro, 1992). Several studies have demonstrated a link between serotonin levels and impulsivity (Asberg, 1994; Zalsman & Apter, 2002; Evans, 2000), and one study found a relationship between serotonin and chronic juvenile offending (Vaughn, 2009).

Psychosocial Formulations of Juvenile Delinquency

Those who study personality and human behavior have long been interested in criminality and juvenile delinquency. Criminal offenders drew the attention of early psychoanalysts in the first part of the twentieth century. Sigmund Freud theorized that criminal behavior arose from a compulsive need for punishment which was connected to unconscious and incestuous Oedipal wishes (Freud, 1961), whereas others stressed the inability of the criminal to delay gratification (Alexander & Healy, 1935) or emphasized the role of maternal separation and parental rejection (Bowlby, 1949).

The field of cognitive behavior therapy has also contributed to the conceptualization of delinquency in youth. In a recent report, cognitive behavioral therapy was identified as one of the most widely used approaches to treatment in the criminal justice system (US Department of Justice, OJJDP, 2009). Cognitive behavioral formulations attribute the development of problematic repertoires to maladaptive ways of thinking and behaving that resulted from early learning. Chronic offenders have been found to exhibit cognitive distortions (Beck, 1999), and it has been noted that in particular, this population reveals schemas of dominance and entitlement, misinterpretation of social cues, self-justificatory thinking, and deficient moral reasoning (Lipsey, Landenberger, & Wilson, 2007). The goal of cognitive behavioral treatment is to correct the maladaptive behaviors and faulty thinking that are associated with criminal behavior through a variety of specific interventions ranging from moral recondition therapy to dialectic behavior therapy. These intervention strategies have been implemented in correctional systems and other venues that reach delinquent youth (Lipsey et al., 2007). Several programs such as Functional Family Therapy and Multisystemic Therapy incorporate cognitive behavioral interventions within a family context with juvenile offenders.

Social Learning Theory (Bandura, 1977) introduced the idea that the social environment plays an important role in shaping behavioral repertoires. Sociological researchers reject that individual or personal variables are the most important factors in the development of criminal behavior; and instead they consider social, economic, and cultural context as the major contributors to delinquency (Zembroski, 2011). For example, Merton (1938) introduced the concept of social pathology whereby criminal behavior results when individuals have social goals imposed upon them while they are simultaneously blocked by society from achieving those goals. Similarly, others have examined social strain as the source of criminality. However, specific theories such as Reactance Theory (Cohen, 1955) and Differential Opportunity Theory (Cloward & Ohlin, 1960) have failed to resolve inconsistencies such as the weak relationship between social class and delinquency (Linden, 1978; Rutter & Giller, 1983). Nevertheless, the Strain Theory survives today not as an all-encompassing explanation of juvenile delinquency, but rather as one component of integrative theoretical views on delinquency that consider it to be complex behavior derived from multiple causes (Goldstein, 1990).

Labeling Theory is another sociological theory which has focused on the formal and informal societal reactions to delinquency that can influence the subsequent attitudes and behavior of delinquents. Thrasher's (1927) work on juvenile gangs in Chicago was one of the first instances in which the consequences of official labels of delinquency were recognized as potentially negative. A few years later, Tannenbaum (1938) introduced the term "dramatization of evil," in which he argued that officially labeling someone as a delinquent can result in the person becoming the very thing he is described as being. Lemert (1967) followed up on Tannenbaum's thinking and developed the concepts of primary and secondary deviance, which

became the central elements of the first systematic development of what has come to be known as Labeling Theory.

One of the basic assumptions of the Labeling Theory is that initial acts of delinquency are caused by a wide variety of factors. These factors, however, are relatively unimportant in the grand scheme of things, which leads to a second assumption. The primary factor in the repetition of delinquency is the fact of having been formally labeled as delinquent. This assertion is accompanied by another idea, which may be presented as a third assumption. Repeated acts of delinquency are influenced by formal labels because such labels eventually alter a person's self-image to the point where the person begins to identify as delinquent and act accordingly. A fourth assumption of the labeling approach is that the official application of the label, *delinquent*, is dependent on a host of criteria in addition to, or other than, the behavior itself, such as the offender's age, sex, race, and social class, as well as the organizational norms of official agencies and departments. Of course, one does not have to be officially labeled criminal or delinquent in order to label himself or herself as such. Moreover, an official label that calls one delinquent can be applied irrespective of any nonconformist act. For the most part, however, the advocates of the labeling approach to delinquency have maintained that usually some type of nonconformity precedes an official label and that most self-labeling occurs after official labeling (Shoemaker, 2000).

Sykes and Matza (1957) identified five general techniques believed to neutralize the criminal's conscience, including: denial of responsibility, denial of injury, denial of the victim, condemnation of the condemners, and the appeal to higher loyalties. Denial of responsibility involves the delinquent's assertion that his or her behaviors are due to external forces such as unloving parents or a "bad" neighborhood. They view themselves as helplessly propelled into

unlawful behaviors by outside sources. Denial of injury describes the offender's view that no harm has been caused by his or her actions. Denial of the victim is used as a way to distinguish people who are deserving targets of crime (e.g., unfair teacher). Condemnation of the condemners shifts the attention away from the adolescent toward others viewed as hypocrites (e.g., corrupt police officers). Finally, appeal to higher loyalties involves the imperative to sacrifice the rules of the larger society for the demands of the smaller group (e.g., gang).

The best known interpersonal theory of delinquency is the Theory of Differential Association, developed by Edwin H. Sutherland (1937). Interpersonal theories of delinquency are based on the belief that human behavior, including delinquent behavior, is flexible and not fixed. Behavioral inclinations change according to circumstances or situations. A second assumption of interpersonal theory is that neither the delinquent nor the society in which the delinquent lives is deviant or "bad." Delinquency arises from the same general social conditions as non-delinquent behavior, and the same person may be committing both kinds of acts at different times. A third assumption of these theories is that most delinquent behavior is committed in a group or gang context. While the particular situation in which delinquent behavior appears may fluctuate, the general setting will most typically include group norms and behavioral patterns (Shoemaker, 2000).

Systems Approaches to Juvenile Delinquency

Radical theory, sometimes termed the "new criminology" by its proponents, is a sociopolitical perspective on crime and delinquency. These theories focus on power anchored in the political and economic structure of society. In particular, these theories generally explain both crime and criminal justice as by-products of capitalism and explore alternative systems that might generate more harmonious social relations. Radical theories tend to view criminal law as

an instrument by which the powerful and affluent coerce the poor into patterns of behavior that preserve the status quo. One such view, the so-called “peacemaking” theory, is based on the premise that violence creates violence. Advocates of this theory argue that criminal justice policies constitute state-sanctioned violence that generates rather than suppresses criminal violence (Goldstein, 1990).

The most effective programs use behavioral intervention techniques within the youth’s natural environment (Henggeler & Schoenwald, 2011). Although successful intervention programs generally target multiple risk factors by providing a variety of treatment services, research has shown that cognitive-behavioral programs, behavioral programs, parent management training, and family therapy are generally the most effective in maintaining the positive effects of rehabilitation (Lipsey & Wilson, 1998; Redding, 2003).

In 1996, the Center for the Study and Prevention of Violence (CSPV; Alexander, Barton, Gordon, Grotper, Hansson, et al., 1998) designed and launched a national youth prevention initiative to identify and replicate violence, delinquency, and drug prevention programs that have been demonstrated as effective (Alexander et al., 1998). The project, initially called *Blueprints for Violence Prevention*,¹ identifies prevention and intervention programs that meet a strict scientific standard of program effectiveness based on their ability to effectively improve developmental outcomes in the areas of behavior, education, emotional well-being, health and positive relationships. Examples of social rehabilitation interventions that meet the strict criteria of the CSPV include, Functional Family Therapy (FFT; Alexander & Parsons, 1982), Multi-

¹ The Center for the Study and Prevention of Violence (CSPV), at the Institute of Behavioral Science, University of Colorado Boulder, funded by the Annie E. Casey Foundation, identifies prevention and intervention programs that meet a strict scientific standard of program effectiveness to decrease problem behavior, while increasing education, emotional well-being, physical health, and positive relationships. Blueprints has also been rebranded as Blueprints for Healthy Youth Development. More than 1,100 programs have been reviewed, but only a small portion of them have been designated as model or promising programs based on their ability to effectively improve developmental outcomes in the areas of behavior, education, emotional well-being, health and positive relationships. Blueprints continues to look for programs which meet the selection criteria.

systemic Therapy (MST; Henggeler, Schoenwald, Borduin, Rowland, & Cunningham, 2009), and Multi-dimensional Treatment Foster Care (MTFC; Chamberlain & Mihalic, 1998).

Functional Family Therapy is a treatment that falls within the Behavioral Model because it was designed to engage and motivate youth and families to change their communication, interaction, and problem-solving patterns. FFT has been applied successfully to a variety of problem youth with problems ranging from conduct disorder to serious criminal offenses such as theft or aggravated assault. Six published FFT outcome studies have demonstrated favorable decreases in antisocial behaviors among youth in the FFT conditions (Henggeler & Shiedow, 2011).

During the past decade, FFT has become the most widely used evidence-based family therapy, with 270 programs worldwide, treating more than 17,500 youth and their families annually (Alexander, 2010). In FFT, the presenting problem is viewed as a symptom of dysfunctional family relations. Interventions, therefore, aim to establish and maintain new patterns of family behavior to replace the dysfunctional behaviors. FFT integrates behavioral (e.g., communication training) and cognitive-behavioral (e.g., anger management) techniques into treatment protocols.

Multi-systemic Therapy (MST) is an intensive family- and community-based treatment that addresses the multiple determinants of serious antisocial behavior in juvenile offenders. The MST approach views individuals as being nested within a complex network of interconnected systems that encompass individual, family, and extrafamilial (peer, school, neighborhood) factors. Intervention may be necessary in any one or a combination of these systems. MST addresses the multiple factors known to be related to delinquency across the key settings, or systems, within which youth are embedded. MST strives to promote behavior change in the

youth's natural environment, using the strengths of each system (e.g., family, peers, school, neighborhood, indigenous support network) to facilitate change.

The major goal of MST is to empower parents with the skills and resources needed to independently address the difficulties that arise in raising teenagers and to empower youth to cope with family, peer, school, and neighborhood problems. Within a context of support and skill building, the therapist places developmentally appropriate demands on the adolescent and family for responsible behavior. Intervention strategies are integrated into a social ecological context and include strategic family therapy, structural family therapy, behavioral parent training, and cognitive behavior therapies. Evaluations of MST have demonstrated reductions of 25 to 70% in long-term rates of recidivism, reductions of 47 to 64% in out-of-home placements, extensive improvements in family functioning, and decreased mental health problems for serious juvenile offenders (Henggeler, Mihalic, Rone, Thomas, & Timmons-Mitchell, 1998).

Multidimensional Treatment Foster Care is a cost effective alternative to group or residential treatment, incarceration, and hospitalization for adolescents who have problems with chronic antisocial behavior, emotional disturbance, and delinquency. Community families are recruited, trained, and closely supervised to provide MTFC-placed adolescents with treatment and intensive supervision at home, at school, and within the community; clear and consistent limits with follow-through on consequences; positive reinforcement for appropriate behavior; a relationship with a mentoring adult; and separation from delinquent peers.

MTFC training emphasizes behavior management methods to provide youth with a structured and therapeutic living environment. After completing a pre-service training and placement of the youth, MTFC parents attend a weekly group meeting run by a program supervisor where ongoing support and supervision are provided. Foster parents are contacted

daily during telephone calls to check on youth progress and problems. Services to the youth's family occurs throughout the placement. Family therapy is provided for the biological (or adoptive) family, with the goal of returning the youth back to the home. The parents are supported and taught to use behavior management methods that are used in the MTFC home. Closely supervised home visits are conducted throughout the youth's placement in MTFC.

Evaluations of MTFC have demonstrated that program youth compared to control group youth spent 60% fewer days incarcerated at 12 month follow-up; had significantly fewer subsequent arrests; ran away from their programs, on average, three time less often; had significantly less drug use in the follow-up period; had quicker community placement from more restrictive settings (e.g., hospital, detention); and had better school attendance and homework completion at 24 months follow-up (Chamberlain, Leve, & DeGarmo, 2007).

Juvenile Delinquency as a Threat

The punitive model of juvenile delinquency is aligned with the adult criminal justice system and emphasizes the need to protect society over addressing the needs of children who commit crimes. This approach to juvenile justice attempts to prevent future offenses by punishing youth, removing them from society, and holding them accountable. Punishment intervention strategies include official processing, transfer to adult court, probation, shock incarceration, and residential placement.

A number of studies have investigated the impact of criminal punishment on deterring crime in juvenile delinquents. Following arrest, juvenile justice stakeholders (e.g., judge, district attorney) decide whether delinquent youth will be officially processed through the court system or diverted from the system to a variety of community-based services. A recent meta-analysis of 29 studies comparing these two options found increases in criminal behavior among the

adolescents who were officially processed by the court over those who were diverted to community services (Petrosino, Turpin-Petrosino, & Finckenauer, 2000).

Transferring juveniles for trial and sentencing in adult criminal court is another punitive strategy that has been used to decrease future criminal acts. Despite some anecdotal evidence that transfer laws deter crime, Bortner (1986) found that automatic transfer laws have no deterrent effect on juvenile crime in the relative short term (up to 8 years after such laws were enacted). Jensen and Metsger (1994) conducted a time-series analysis for five years after the 1981 Idaho automatic transfer statute was passed and found a 13% increase in arrest rates for violent juvenile crime. A similar time-series analysis found no deterrent effect following the New York state law that automatically sent violent juvenile offenders to adult court in the six year period after the law was passed, even though the law was widely used and the state had made significant efforts through the news media to inform juveniles of the new law (Singer, 1996; Singer & McDowall, 1988). Thus, the practice of transferring juvenile offenders to criminal court does not appear to deter juvenile crime.

Placing the juvenile on probation is another tactic that has been used to deter future criminal behavior. In addition to the punishing effects of court-ordered restriction, behavior can be closely monitored. With this form of surveillance, probation officers can routinely monitor the adolescent's compliance with court-ordered sanctions and services. Overall, current evidence is mixed with regard to the effectiveness of probation on future criminal acts. For example, Lipsey (2009) conducted a meta-analysis on probation as a deterrent to future criminal acts by analyzing the results of 548 studies from 1958 to 2002 that assessed intervention policies, practices, and programs. The evaluations were grouped into seven categories: counseling, deterrence, discipline, multiple coordinated services, restorative programs, skill building, and

surveillance. When the effects of these interventions were combined and compared, Lipsey (2009) found that those based on punishment and deterrence appeared to increase criminal recidivism.

Shock incarceration interventions have also been used as an attempt to scare delinquent youth out of criminal behavior. Programs like 'Scared Straight' involve organized visits to prison facilities by juvenile delinquents or children at risk for becoming delinquent. The programs are designed to deter participants from future offending by providing first-hand observations of prison life and interaction with adult inmates. Results of this review indicate that not only does it fail to deter crime, but it actually leads to more offending behavior (Petrosino, Turpin-Petrosino, & Buehler, 2002; Drake, 2009).

More than 160,000 youth are placed annually in residential treatment facilities, such as boot camps, group homes, detention centers, and wilderness camps (Henggeler et al., 2011). The idea is that by removing adolescents from their homes and society, they can be punished for their criminal behavior and the community can be protected from them. Reporting from a large-scale survey of youth in residential placements, Sedlak and McPhersen (2010) concluded that despite a great need, mental health, substance abuse, educational services, and treatment, are deficient for many youth. Across comprehensive reviews, Henggeler and Schoenwald (2011) concluded that a wide variety of placement services for juvenile offenders ultimately increases future criminal activity. Furthermore, placement in these correctional facilities often cost the community and families a great deal of money to operate.

The punitive model of juvenile delinquency offers suggestions to protect society and to punish the delinquent adolescent. However, research looking at juvenile justice intervention based on the punitive model has actually shown increases in criminal acts among delinquent

youth. It is possible that interventions within the punitive model fail because they do not address the risk factors promoting the delinquent behaviors, such as lack of supervision in the home, family stressors, academic problems, and peer groups. Regardless, it is clear that severe punishment alone does not deter future criminal acts (Henggeler et al., 2011).

Another explanation for failed interventions within this model is the continued association with other delinquent youth. Many studies have shown that a risk factor for recidivism is ongoing association with other delinquent youth (Moffitt, 1993). In fact, it has been estimated that adolescents who maintain friendships with delinquent youth are ten times more likely to engage in criminal acts than adolescents without delinquent peers (Bilchik, 1999). For example, Dodge, Dishion, and Lansford (2006) found that by aggregating antisocial youth together for extended periods of time (e.g., jail, detention, or within a home shared with other delinquent siblings), juveniles are inadvertently provided with ample opportunity for peer contagion and deviancy training (e.g., modeling; rewarding of deviant behavior by peers) thus increasing recidivism rates.

Summary of Theories on Delinquency

A number of models and frameworks exist for understanding and managing juvenile delinquency. Each provides a different perspective on how to best address problems of juvenile delinquency. Biological theories suggest that a medical intervention designed to treat physiological abnormalities will be most effective in addressing delinquency. Psychosocial formulations posit that modifications of personal psychological and social factors will result in changes in the socially undesired criminal behavior. Systems based theories focus on the context, family or society, in which delinquency takes place as the point of intervention. Finally,

punitive techniques attempt to prevent future offenses by punishing youth and removing them from society.

Delinquent Youth and Stress

Knowledge of the ways in which children and adolescents respond to stress is important in understanding normative development and health as well as in understanding the development of psychopathology and physical illness. Stress responses include involuntary or automatic reactions (reflecting individual differences in temperament and conditioned patterns of stress reactivity) and voluntary attempts to cope with stress. Involuntary stress responses and voluntary coping efforts are related to internalizing and externalizing emotional-behavioral problems, suggesting that the effects of stress may be influenced by individual differences in stress responses and coping (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2011).

While most interventions for delinquent youth are designed to decrease maladaptive externalizing behaviors directly, recognizing and regulating internalizing symptoms (e.g., emotion regulation) may help chronically stressed adolescents to regulate their thoughts and emotions, thus addressing and decreasing the externalizing behaviors indirectly. For example, teaching breathing and relaxation techniques may enable an adolescent who has a history of reacting impulsively when feeling angry to manage his or her thoughts and feelings prior to the manifestation into a habituated and inappropriate reaction.

Meditation-Based Therapeutic Interventions with Prison Populations

Research indicates a number of meditation-based programs have shown rehabilitative effects for incarcerated populations (Chandiramani, Verma, & Dahr, 1995; Samuelson, Carmody, Kabat-Zinn, & Bratt, 2007) and reduced recidivism among prison populations

(Alexander, Rainforth, Frank, Grant, Von Stade, et al., 2003; Rainforth, Alexander, & Cavanaugh, 2003). Meditation-based interventions including Transcendental Meditation, Mindfulness-Based Stress Reduction, and Vipassana represent the majority of empirical research in this area.

Transcendental Meditation

Transcendental Meditation (TM) involves reciting a given mantra and returning to the mantra any time the mind begins to wander. Typically, TM practice is encouraged for 15-20 minutes twice daily, with the goal of transcending duality and suffering (Goleman, 1988). TM was popularized in the US in the 1960s and is one of the most researched meditative practices (Walsh, 1996).

Orme-Johnson and Moore (2003) recruited 17 inmates from a narcotics rehabilitation program at the La Tuna Federal Penitentiary near El Paso, Texas. Participants were instructed to practice TM for two 20-min sessions every day for two months. Participants who practiced the TM technique at least 60 of the optimal 120 times during the 2-month study were considered regular meditators, whereas those practicing TM less than 60 times were considered irregular meditators. Analysis of pre- and post-treatment MMPI scores in all three groups indicated the largest reduction on the psychasthenia scale for the regular meditators group. This finding suggests that the steady practice of TM may reduce obsessive–compulsive behaviors. Furthermore, regular meditators also evidenced decreases in the social introversion scale, suggesting less social discomfort, compared to the control group. This implies that practicing TM may increase positive social relations.

In 1978, Abrams and Seigel implemented a three month TM program in a California State Prison. The authors divided 150 participants into three groups: two experimental and one

control group. Participants were administered pre- and post-test measurements about anxiety, hostility, personality, and sleeping habits. Results indicated statistically significant decreases on anxiety at post-test. Significant reductions in negativism, hostility, and suspiciousness were also observed. Finally, decreases in post-test sleep pattern scores revealed a dramatic improvement in sleep habits within the TM group. Participants in the TM group also reported falling asleep more quickly and achieving more restful sleep during the night.

Programs implementing TM practices within prisons have also been shown to decrease recidivism. Bleick and Abrams (1987) collected recidivism data from the California Justice Department between the years of 1975 and 1982. The authors followed 259 prisoners who participated in TM practice and 259 prisoners who had not participated in TM practice while incarcerated. Results indicated that those who participated in TM practice while incarcerated were 40% less likely to return to prison one year following their release date. Further analyses revealed that those who participated in TM were 30% less likely to recidivate up to 6 years after their release date over those who had not participated in TM.

Alexander and colleagues (2003) collected four prison samples from 1975 to the mid 1980's. The study included 152 inmates who participated in TM while in prison, 81 inmates who chose not to participate in TM, a random sample of 225 inmates in the same prison, and 690 inmates who had participated in counseling, drug rehabilitation, and religious activities while incarcerated. Results indicated those who participated in TM were 33% less likely to recidivate than members of the control groups, and 47% less likely to return to prison than all others who had not practiced TM while incarcerated.

Finally, recidivism data was collected between 1975 and 1982 on 248 inmates. One hundred and twenty inmates had participated in TM while incarcerated while the other 128 had

not. Results indicated that the inmates who had practiced TM while incarcerated were 43.5% less likely to recidivate than the control participants.

Vipassana Retreats in Prisons

Along with TM techniques, researchers have also studied the effects of Vipassana meditation retreats on prison populations. Chandiramani and colleagues (1995) investigated the effects of Vipassana meditation on anxiety and depression with a sample of 120 participants. On average the participants experienced reductions in both anxiety and depression symptoms. These findings suggest that Vipassana meditation may alleviate depressive and anxious feelings.

Vipassana meditation has also been linked to significant decreases in substance use among prison populations. Bowen, Witkiewitz, Dillworth, Chalwa, Simpson, et al. (2006) conducted a Vipassana meditation study with 173 participants in a prison in Washington. Results indicated significant decreases in the use of alcohol, marijuana, and crack cocaine.

At the same facility, Simpson, Kaysen, Bowen, McPhersen, Chawla, et al. (2007) conducted a 10-day Vipassana meditation study using 88 inmates. Participants were assessed for daily drug and alcohol use. Results indicated significant decreases in alcohol and drug use three months after course completion in the Vipassana group over the control group. These findings are consistent with decreases in alcohol and drug use observed in past studies among those practicing Vipassana meditation over control groups.

Mindfulness-Based Stress Reduction in Prisons

Mindfulness-Based Stress Reduction (MBSR) programs have also been implemented with incarcerated populations. Samuelson et al. (2007) implemented the MBSR program in six Massachusetts prisons from 1992 to 1996. MBSR was administered to 1,350 inmates in groups

of 12 to 20 for 60 to 90 minutes per session for 6 to 8 weeks. All participants completed 3 personality measures related to hostility, self-esteem, and mood state. Results indicated significant decreases for both men (7%) and women (9.2%) in hostility, significant increases for both men (3.8%) and women (8.3%) in self-esteem, and significant decreases for both men (29%) and women (38%) in mood state. These findings suggest practicing MBSR may improve self-esteem and mood state, while decreasing symptoms of hostility for incarcerated men and women.

Meditation-based practices have also been employed among incarcerated youth. Flinton (1998) designed an 8-week study to assess the effects of mindfulness-based programs on anxiety and locus of control among 42 participants. While the experimental group engaged in mindfulness meditation, the wait-listed group watched educational videos. Statistically significant decreases in anxiety and external locus of control were observed in all treatment groups, whereas no differences were observed in the wait-listed control group. These findings may indicate that meditation-based treatment interventions are effective at reducing anxiety and external locus of control.

Taken together, meditation-based programs clearly have a wealth of research support for rehabilitative effects on male and female adult prison populations (Himmelstein, 2010). Significant increases in psychological well-being and decreases in negative psychological states have been consistently demonstrated across a number of studies. Hopefulness (Chandiramani et al., 1995), optimism (Bowen et al., 2006), and subjective mood states (Samuelson et al., 2007) are all positive psychological states that appear to increase as a result of meditation-based interventions. Obsessive-compulsive behavior (Orme-Johnson & Moore, 2003), anxiety (Abrams & Siegel, 1978; Chandiramani et al., 1995; Flinton, 1998), hostility (Chandiramani,

1995), and anger (Samuelson et al., 2007) are all negative psychological states that appear to show decreases following meditation-based programs.

Second, meditation-based programs have shown to significantly decrease self-reported substance use across a number of studies among both adult and adolescent prison populations (Bowen et al., 2006; Simpson et al., 2007). Given the number of drug offenders increased from approximately 75,000 in 2000 to more than 90,000 in 2006 (Sabol, Couture, & Harrison, 2007), meditation-based programs may assist in providing necessary treatment to drug offender populations, especially within correctional settings.

Finally, meditation-based programs have shown to decrease recidivism (Alexander et al. 2003; Rainforth et al., 2003). Given that one of the major evaluation components of rehabilitation programs is recidivism outcome, meditation-based interventions have clearly demonstrated consistent effectiveness as a treatment intervention strategy among prison populations.

Physical Activity as an Intervention Strategy

Physical activity is associated with a range of health benefits, while its absence can have harmful effects on health and well-being, such as increasing the risk for coronary heart disease, diabetes, certain cancers, obesity, hypertension and death (Center for Disease Control, 1996). Physical inactivity may also be associated with the development of mental health disorders, as multiple clinical and epidemiological studies have shown associations between physical activity and symptoms of depression and anxiety in cross-sectional and prospective longitudinal studies (Bhui & Flechter, 2000; Goodwin, 2003).

For example, in a cross-sectional (12-month) and prospective-longitudinal epidemiological study conducted over 4 years, Strohle, Hofler, Pfister, Muller, Hoyer, et al.

(2007) examined the association between physical activity and changes in mental health disorder symptoms among 2,548 adolescents. Results indicated that physical activity is associated with lower rates of mental health disorder symptoms for those who regularly participated in physical activity. In this study, significant associations were found for anxiety disorders such as agoraphobia, specific phobia and posttraumatic stress disorder, for somatoform disorders, dysthymia and substance dependence.

Salmon (2001) and Stich (1998) conducted a meta-analysis that explored physical exercise as a treatment for symptoms of anxiety and depression. These studies found that aerobic exercise has antidepressant and anxiety-reducing features, thereby protecting against harmful consequences of stress. This outcome offers a specific psychological treatment that may be particularly effective for patients for whom conventional psychological interventions are less acceptable.

Yoga as a Combined Treatment Approach

Yoga not only employs a meditation-based relaxation exercise, but also uses exercise techniques that increase balance, strength, and flexibility by holding poses. Although the concept of yoga as a therapeutic intervention may fall well outside the realm of traditional approaches, there are compelling reasons to consider its usefulness with this population. First, due to the generally non-compliant nature of delinquent youth, they may be more likely to participate in an intervention that is less “therapy like” in nature. While practicing yoga, individuals acquire new skills, which have immediate subjective rewards, such as increased feelings of relaxation and well-being (Peck, Kehle, Bray & Theodore, 2005), which may then serve to reinforce further participation. These are very important considerations as treatment

dropout among this population is especially high (40 to 60%) among aggressive and antisocial youth and their families (Kazdin, 1997) in standard treatment modalities.

Second, research has documented that yoga has positive effects on important risk factors such as attention (Peck et al., 2005), aggression (Schell, Allolio, & Schonecke, 1994), impulsivity (Jensen & Kelly, 2004) and arousal levels (Telles, Reddy & Nagendra, 2000). In addition, other risk factors such as lower intellectual and academic functioning, and deficits in verbal expression, which are commonly associated with poorer outcomes in more cognitively oriented approaches, do not appear to be associated with yoga.

Third, research has demonstrated that practicing yoga improves symptoms of depression (Pilkington, Kirkwood, Rampes & Richardson, 2005) and anxiety (Kirkwood, Rampes, Tuffrey, Richardson, & Pilkington, 2005) disorders that commonly co-occur among delinquent youth. Yoga also targets important elements of disruptive behavior symptoms without the significant side effects and cost commonly associated with pharmacotherapy.

Finally, both physical exercise and yoga have been linked to a variety of neurophysiological effects including β -endorphin release and altered brain neurotransmitter levels, especially dopamine and serotonin, which have emotion enhancing effects (Buckworth & Dishman, 2002). Yoga is commonly practiced in a focused, yet relaxed manner. It shares in common with meditative/contemplative practices, an emphasis on focused attention, reduced extraneous external stimulation, controlled breathing, and relaxation. Thus, yoga has much in common with stress reduction practices eliciting the relaxation response.

History of Yoga

Yoga's evolution from its beginnings in the East to its current practice in the West is noteworthy. The word yoga originated from the Sanskrit root *yuj*, meaning union, yoke, or to

join (Iyengar, 1976). Essentially, this union is the connection of the body and mind through the use of systematic postures, meditation, and breathing and relaxation techniques. The goal of practicing yoga is to increase awareness and relieve suffering (Iyengar, 1976; Weintraub, 2004). Hatha yoga is the most common type of yoga and the umbrella term used to describe the type of yoga practiced in the west. The history of yoga has three main distinctions: pre-classical, classical, and post-classical. These classifications reflect the different uses of yoga indicative of the specific spiritual and religious practices employed across these time periods (Feuerstein, 1996).

Pre-classical yoga is believed to have originated during the Indus-Sarasvati civilization in South Asia, approximately 3000 B.C.E. (Feuerstein, 1996). During this time period, yoga was primarily used in ritualistic ceremonies and the Vedas –a collection of hymns that include the oldest recorded yogic teachings– were produced. The Vedas are also the primal source for Hinduism. The Bhagavad-Gita, which includes teachings on yoga, was written approximately between 500-200 B.C.E., and considered to be the text on which Hindu culture and philosophy are based.

The Yoga Sutras, written by Patanjali in the second century, are considered the first systematized documentation of yoga and mark the distinction of what is considered classical yoga (Feuerstein, 1996; Iyengar, 1976). The Yoga Sutras described the eight limbs of yoga and consist of the following: Yama (restraint and rules for successful living); Niyama (tolerance and purification); Asana (physical exercise and mental balance); Pranayama (breathing techniques); Pratyahara (preparation for meditation); Dharana (concentration); Dhyana (meditation); and Samadhi (universal consciousness) (Feuerstein, 1996; Weintraub, 2004).

In The Yoga Sutras, Patanjali outlined nine obstacles to self-awareness, including: disease, dullness, doubt, carelessness, laziness, addiction, false perception, failure to reach firm ground, and instability (Weintraub, 2004). He described four pathological states that are the results of the preceding obstacles, including: depression, anxiety, trembling in the limbs, and unsteady breath (Weintraub, 2004). Within the yogic philosophy there are three basic gunas (psychological states), including: Tamasic (state of lethargy or depression); Rajasic (an aggressive mood, containing too much energy, or feeling manic); and Sattvic (mental, emotional, and physical balance). The goal of yoga is to achieve Sattvic in order to increase overall self-awareness.

Post-classical yoga or hatha yoga began around the ninth and tenth century. This signifies the emergence of physical exercises (Asanas) and breathing techniques (Pranayama) as the central components of yoga, which is reflective of yoga practice today. Modern yoga arrived in the US in the late 1800's, with a large rise in popularity in the 1960's and 1970's.

Background on Yoga

The practice of yoga consists of 84 different postures (Feuerstein, 1996; Iyengar, 1988). The postures vary in degree of difficulty. While holding a pose, the practitioner concentrates on the body, observes internal processes, and focuses on their breath (inhaling and exhaling through the nose). Yoga practice typically begins and ends with a period of relaxation and meditation.

The practice of yoga in Western society is quite diverse. Although many yoga instructors include some spiritual aspects, such as a religious or spiritually-based meditations, many do not. Yoga is feasible for most individuals and can be practiced independently once adequate experience is gained. Excellent physical condition or previous meditation experience is not needed.

Past Yoga Studies

Iyengar (1988), a prominent figure in the international yoga community, reported that applying yoga practice to children has long been established in India and other countries. In November 1994, members of Research on Yoga in Education attended an international convention in Paris to discuss how to improve education (Bhushan, 2003). Many European countries were represented and there was unanimous agreement to include yogic practices in the education system. In 1986, efforts were made to include yoga practice as part of the curriculum in Indian schools for children of all ages. Yoga with children appears to be increasing in the US as well. Many studios across the US are offering yoga classes for children and specific teacher trainings for youth yoga.

Mendelson, Greenberg, Dariotis, Feagans Gould, et al. (2010) examined the effectiveness of a combination intervention consisting of mindfulness and yoga strategies among 97 fourth and fifth graders in an underserved urban community. Participants attended the program for 12 weeks for 45 minutes. Components of the combination intervention were taught breathing techniques, yoga-inspired postures, and movement series, including bending, stretching, and fluid movement. Seventy-three percent of the students completed 75% of the classes. Results indicated statistically significant decreases in rumination, intrusive thoughts, and emotional arousal. The combination intervention suggests that mindfulness-based practices combining breathing techniques and physical exercise via yoga practice were effective in helping youth self-regulate their emotions and to reduce their worrisome thoughts.

Kannappan and Bai (2008) randomly assigned 120 adolescent boys to one of three conditions; Yoga-Cognitive Training (YCT), a Human Relation Training (HRT), and a control group. Participants in the YCT and HRT groups received their respective treatment twice a week

for one year, while participants in the control group received no treatment. Both YCT and HRT were designed to improve maladjusted and antisocial behavior. The researchers compared pre-test, post-test, and follow-up scores on the Behavior Deviance Checklist, Maladjustment Inventory, and Antisocial Behavior Scale. Results indicated no differences between the three groups at pre-test. Both YCT and HRT experimental groups evidenced statistically significant decreases on the maladjustment inventory and antisocial behavior scale scores, suggesting both treatments are effective in reducing conduct disordered symptoms. Furthermore, there were no statistically significant differences between the post-test and follow-up scores, indicating the maintenance of treatment effects over time.

Two studies investigated the use of yoga as a lifestyle program. Gupta, Khera, Vempati, Sharma, and Bijlani (2006) developed an integrated yoga lifestyle program attended by 175 outpatient participants. The aim of the study was to investigate the impact of a comprehensive lifestyle intervention based on yoga on anxiety levels in clinical populations. The participants consisted of individuals suffering from a variety of physiological complaints, psychiatric disorders, or both. Participants attended the 8-day program spread over 10 days where they practiced physical postures, breathing exercises, and relaxation techniques. Also available were group support, yoga-related lectures, and information on didactics, nutrition, stress management, and their particular illness. Each participant practiced for one hour a day. Participants answered the State-Trait Anxiety Inventory (STAI) on the first and final day of the program. A control group was established by asking 50 males and females, who did not attend the program, to fill out the STAI twice during a 10-day span. Pre- and post-test data using the STAI revealed that anxiety scores decreased significantly among the yoga participants while no significant changes occurred in the anxiety scores of the controls after the 10 day interval.

Jadhav and Havalappannavar (2008) assessed the impact of yoga on self-concept among 100 college students between the ages of 19 and 23 years. A self-concept scale was administered to 50 students who had already been practicing yoga as part of their college program and compared their scores to 50 college students in another program who did not practice yoga. Those who had already been practicing yoga for more than one year showed a higher mean score than the control group when comparing total self-concept.

In a similar study, Jadhav and Havalappannavar (2008) examined the effects of yoga on state and trait anxiety and subjective well-being among a sample of 50 freshman college students (25 female). Measures were administered at the beginning of the students' first year and again at the end of the year in order to evaluate whether there were significant changes in following participation in yoga classes for one year. Results indicated significant mean differences between pre-treatment and mid-treatment scores for state and trait anxiety. Therefore, one year of yoga practice led to significant alleviation of state anxiety and decreases in trait anxiety. Also, a significant difference was found between pre- and post-treatment scores for subjective well-being. Thus, the practice of yoga may also be useful in enhancing the practitioner's well-being.

Telles, Patra, Montesoo, and Naveen (2008) conducted a study in which they recruited 156 of 800 students who were attending a one-week yoga camp to evaluate the effectiveness of yoga in decreasing somatization of stress. Participants were administered a symptom checklist before and after the yoga camp. Results indicated a significant decrease (27%) in somatization of symptoms from day 1 to day 7.

Yoga and Psychology

Currently, yoga practice is increasing in the US with an estimated 10-15 million people participating in yoga classes (Corliss, 2001). In 1997, more than 40% of people living in the US

had practiced at least one type of complementary or alternative therapy such as yoga (Eisenberg, 2001). It has been estimated that 65% of people receiving mental health services have engaged in one type of modality of alternative or adjunctive therapy (Bassman & Uellendahl, 2003). Walsh (2001) suggested that within the field of psychology there is a new focus on positive psychology, which emphasizes an individual's strengths rather than pathology and thus appears to be more inclusive of Eastern psychology.

Current Study

Millions of adolescents become involved in juvenile delinquency each year (Howell, 2003), perpetuating a complex and difficult social problem. Delinquent behavior is associated with a broad range of negative outcomes for the adolescent, including poor mental and physical health, as well as communities, including the costs of rehabilitation, treatment, and educational placement. An equally momentous societal challenge is how best to treat juvenile offenders once they have entered the juvenile justice system. A myriad of treatment interventions have been applied to juvenile delinquents over the last century, though most have shown little success (Howell, 2003; McGuire, 1995). Thus there is an unmistakable need to identify and deliver innovative methods of intervention to incarcerated juvenile delinquents that produce constructive attitudinal and behavior change.

A number of recent studies employing meditation-based therapeutic interventions have shown some successful outcomes among a wide range of prison populations. When considering the significant benefits found in past studies, the negative long-term prognosis of delinquent adolescents, and the limitations of current treatment approaches, the overarching goal of the present research was to examine the effectiveness of a combination of meditation-based therapy and physical exercise through yoga practice on psychological (e.g., anxiety; depression; anger;

self-concept), behavioral (e.g., pro-social behaviors), and physical health (e.g., weight; sleep quality) symptoms.

Hypotheses

Hypothesis 1

For the overall sample, participants in the day treatment program will improve on psychological, physical, and behavioral outcomes from Pre-treatment to Post-treatment.

Hypothesis 1a. All participants will show a statistically significant improvement in self-reported anxiety, depression, anger, disruptive behaviors, and self-concept from Pre-treatment to Post-treatment.

Hypothesis 1b. All participants will show a statistically significant improvement in externalizing and internalizing behaviors from Pre-treatment to Post-treatment.

Hypothesis 1c. All participants will show a statistically significant improvement in self-reported sleep problems and weight from Pre-treatment to Post-treatment.

Hypothesis 1d. All participants will show a statistically significant improvement in the percentage of points earned of those possible from Week 1 to Week 16.

Hypothesis 2

It was hypothesized that participants in the Yoga Treatment would show greater improvement across all measures following Phase I compared to participants in the Recreation Treatment.

Hypothesis 2a. All participants will show a statistically significant improvement in self-reported anxiety, depression, anger, disruptive behaviors, and self-concept from Pre-treatment to Mid-treatment.

Hypothesis 2b. All participants will show a statistically significant improvement in externalizing and internalizing behaviors from Pre-treatment to Mid-treatment.

Hypothesis 2c. All participants will show a statistically significant improvement in self-reported sleep problems and weight from Pre-treatment to Mid-treatment.

Hypothesis 2d. All participants will show a statistically significant improvement in the percentage of points earned of those possible from Week 1 to Week 8.

Hypothesis 3

It was hypothesized that participants in the Yoga Treatment would show greater improvement across all measures following Phase II compared to participants in the Recreation Treatment.

Hypothesis 3a. All participants will show a statistically significant improvement in self-reported anxiety, depression, anger, disruptive behaviors, and self-concept from Mid-treatment to Post-treatment.

Hypothesis 3b. All participants will show a statistically significant improvement in externalizing and internalizing behaviors from Mid-treatment to Post-treatment.

Hypothesis 3c. All participants will show a statistically significant improvement in self-reported sleep problems and weight from Mid-treatment to Post-treatment.

Hypothesis 3d. All participants will show a statistically significant improvement in the percentage of points earned of those possible from Week 9 to Week 16.

Hypothesis 4

It was hypothesized that Yoga participation would lead to statistically significant improvement on all dependent measures compared to Recreation participation, regardless of phase of participation.

Hypothesis 4a. All participants will show a statistically significant improvement in self-reported anxiety, depression, anger, disruptive behaviors, and self-concept following participation in Yoga compared to Recreation.

Hypothesis 4b. All participants will show a statistically significant improvement in externalizing and internalizing behaviors following participation in Yoga compared to Recreation.

Hypothesis 4c. All participants will show a statistically significant improvement in self-reported sleep problems and weight following participation in Yoga compared to Recreation.

Hypothesis 4d. All participants will show a statistically significant improvement in the percentage of points earned of those possible following participation in Yoga compared to Recreation.

CHAPTER II

METHOD

The study included the administration of parent-report questionnaires, self-report questionnaires, and record review. Permission to conduct the study was obtained from the Central Michigan University Institutional Review Board and from the board of directors at the detention facility. Youth were not compensated directly for participation in the study. However, a donation was made to the facility to pay for the licensed yoga instructor by the College of Graduate Studies at Central Michigan University.

Participants

Fourteen participants were recruited from the day treatment program at the Juvenile Care Center (JCC), a detention in rural Mid-Michigan that consists of both an on-site day treatment program and incarceration facility for juvenile delinquents. The JCC is a moderate risk, staff-secured, residential incarceration facility equipped with classrooms, a courtroom, counseling offices, a library, a medical room, an indoor and outdoor recreation area, a dining room, and a computer lab. Adjudicated adolescents are generally court-ordered to this program due to repeated drug and alcohol use, severe property offenses, and frequent and repeated law violations.

The JCC's curriculum provides rehabilitation and treatment services for juvenile delinquents in areas such as hygiene, health, employability skills, vocational skills, educational planning, interpersonal skills, and knowledge of community resources. In addition, mental health and substance abuse counseling are provided when needed. The day treatment program typically runs in six-month blocks. Discharge from the program is contingent upon meeting

general performance goals, as well as individual goals developed by the adolescent and the detention center staff.

The day treatment program at the JCC utilizes a Token Economy system that rewards each adolescent's consistent positive behavior by awarding points in three areas, including: Interaction; Participation; and Demonstration, during each scheduled activity, such as school; meals; recess; and groups. Each adolescent has the ability to earn up to six points for each activity, though the number of activities varies day-to-day. At the end of each day, their individual scores for all activities are summed and divided by the number of points possible for the day. This calculation yields the percentage of points earned of those possible. This method allows the detention center staff to evaluate each adolescent individually for the activities in which they had the opportunity to participate, without penalizing them for a missed activity due to an unexpected illness, meeting conflict, or other reasons outside of the adolescent's control. The adolescents were allowed to use their earned points to purchase privileges, such as time to play cards, ping pong, and board games, as well as items, such as stationary, drawing paper, and pencils.

Measures

Demographic Questionnaire

A demographic questionnaire (Appendix C) was used to survey the background of each participant. Information about age, gender, race, grade, sexual orientation, family and religious background, household income level, sleep habits, drug and alcohol use, past psychotherapy, current medication use, weight (in pounds), and past yoga experience was obtained.

Daily Token Economy Record Form

The detention program was based on a point system, otherwise known as a Token Economy (Appendix D), which allows the youth to earn points daily during scheduled activities (e.g., school; meal; recess; group) for engaging in appropriate, pro-social behaviors as they progressed through the day treatment program. All detention staff had previously participated in extensive training on rating daily behaviors prior to the program start date. Interrator reliabilities were calculated to ensure agreeability across raters following the training. The researcher recorded points earned and points possible for each adolescent daily and weekly during Phase I and Phase II of the study.

Beck Youth Inventories – Second Edition (BYI-II; Beck, Beck, Jolly, & Steer, 2005)

The BYI-II consists of five brief assessments of common psychological problems for children and adolescents between the ages of 7 and 18 years. Specifically, the BYI-II measures distress in the areas of Anxiety (BAI-Y), Depression (BDI-Y), Disruptive Behavior (BDBI-Y), Anger (BANI-Y), and Self-Concept (BSCI-Y) through self-reported responses to 20 statements within each of these subscales. These 100 statements are based on the American Psychiatric Association's (APA, 2000) *Diagnostic and Statistical Manual of Mental Health Disorders*, Fourth Edition, Text Revision (*DSM-IV-TR*). The items are easy for most to read (written at the second grade level) and rated on a four point Likert-type scale ranging from 0 ("never") to 3 ("always"). Subscales are converted to *T*-scores for comparison to a normative group (Beck et al., 2005).

The BDI-Y is designed to assess the presence of symptoms related to the depression criteria of the *DSM-IV-TR* (APA, 2000). The BAI-Y includes items related to a variety of fears, worries, and psychological symptoms related to anxiety. In addition to feelings of anger, the

BANI measures beliefs about mistreatment, negative thoughts and attitudes toward others, and physiological arousal (Beck et al, 2005). The BANI-Y includes symptomology related to Conduct Disorder and Oppositional Defiant Disorder (Beck et al., 2005). The BSCI-Y allows for the examination of ideas about one's self as related to one's self-worth and feelings of competence.

The BYI-II (Beck et al., 2005) manual included the following information for the purpose of demonstrating technical adequacy. It was standardized using two non-clinical samples (800 children from 7 to 14 years and 200 adolescents from 15 to 18 years) and one clinical sample (178 adolescents from 15 to 18 years who had been diagnosed with disorders related to anxiety, depression, conduct disorder, bipolar disorder, and others that were not specified). The test authors reported that the two non-clinical samples closely matched US Census data for race/ethnicity, gender, and parent educational level. The samples were stratified to match 1999 and 2002 US Census data on race/ethnicity and parent education level across gender within three age groups (7 to 10 years, 11 to 14 years, and 15 to 18 years). Cronbach's alpha was computed for each subscale for each four-year age group using a sample of 1,000 youth between 7 and 18 years. The coefficients indicated adequate internal consistency reliability. The test-retest reliability correlation coefficients for children 15 to 18 years fell between .83 and .93. For children 11-14 years, these coefficients were .84 to .93. For children between 7 and 10 years, these coefficients ranged from .74 to .90. This indicates that the measures are more reliable with adolescents compared to younger children.

Construct validity was demonstrated by comparing the BYI-II subscales to other established measures, including the *Children's Depression Inventory (CDI; Kovacs, 1992)*, the *Piers-Harris Self-Concept Scale, Second Edition (Piers, 2002)*, and the *Revised Children's*

Manifest Anxiety Scale (RCMAS, Reynolds & Richmond, 1978). Most correlations were substantial and in the expected direction, although some may have reflected an overlap between symptoms of ADHD and depression, as well as comorbidity between depression and anxiety. Discriminant validity was demonstrated by testing a sample of adolescents with various clinical diagnoses and comparing their scores to a matched non-clinical sample. Children with different diagnostic labels scored as expected on the various scales, with elevations in the areas most related to their diagnoses.

Youth Self-Report (YSR; Achenbach & Edelbrock, 1983)

The YSR is a 112-item self-reported measure assessing behavior. Items are scored on a three point Likert-type scale ranging from 0 (“never”) to 2 (“always”) and can be grouped into eight syndrome scales, including: Withdrawn, Somatic Complaints, Anxious/Depressed, Social Problems, Thought Problems, Attention Problems, Delinquent Behavior, and Aggressive Behavior. These subscales may be grouped more broadly under categories of Internalizing and Externalizing problems (Achenbach & Edelbrock, 1983). According to Achenbach, the YSR has good 7-day test-retest reliability (e.g., problem scales $r = .65$ for ages 11 to 14 and $r = .83$ for ages 15 to 18). Raw scores can be converted into standardized T -scores ($M = 50$, $SD = 10$) in order to evaluate the sample in terms of where they stand clinically in relation to the adolescent clinical sample used for norming.

Achenbach & Edelbrock (1983) also reported extensive evidence for validity, including a multiple regression analysis indicating that the reason for referral accounted for 2 to 33% of the variance of scores on the syndrome scales. Construct validity was addressed by providing correlations with similar measures including the *Behavior Assessment System for Children*

(*BASC*, Reynolds & Kamphaus, 1992) and the *DSM-IV Checklist* (Hudziak, 1998). According to Achenbach (2001), the *YSR* is psychometrically sound, particularly for school-aged children.

Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1989)

The CBCL is a 112-item self-reported measure of problem behaviors typically completed by a parent, teacher, or legal guardian. Items are scored on a three point Likert-type scale ranging from 0 (“never”) to 2 (“always”) and can be grouped into eight syndrome scales, including: Withdrawn, Somatic Complaints, Anxious/Depressed, Social Problems, Thought Problems, Attention Problems, Delinquent Behavior, and Aggressive Behavior. These subscales may be grouped more broadly under categories of Internalizing and Externalizing problems (Achenbach, 2001). Raw scores can be converted into standardized *T*-scores ($M = 50$, $SD = 10$) in order to evaluate the sample in terms of where they stand clinically in relation to the adolescent clinical sample used for norming.

The normative sample was derived from a 1989 sample of 2,368 children without disabilities but nationally representative in terms of ethnicity, socioeconomic status, geographical region, urban-suburban-rural residence (Achenbach, 2001). It is noted that the normative sample compared children who were and were not referred for behavioral or emotional problems, which may have resulted in a failure to exclude some children with psychological problems (but no referrals). The CBCL has demonstrated excellent inter-interviewer and test-retest reliabilities, as well as content and construct validity. For all ages, the internal consistency reliability for the Total Problems and Externalizing scores range from .92 to .96, while the reliability for the Internalizing scores range from .88 to .92. The individual syndrome subscales vary in terms of internal consistency, with Aggression (.92), Anxious-Depressed (.86 to .88), and Attention (.83 to .84) scales being the most reliable. The CBCL is often the measure that other test developers

utilize as a comparison for validating their own measures. Achenbach (2001) noted that there are adequate concurrent correlations with similar measures, as well as evidence of strong discriminant validity for the Total Problems and Social Competence scores, both alone and in combination.

Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1989a)

The PSQI is a 19-item self-report measure of sleep quality and disturbances. The PSQI is a well-validated self-report instrument that comprehensively assesses current sleep impairment in the following seven domains: sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleeping medication, and daytime dysfunction (Buysse, Reynolds, Monk, & Berman, 1989). The PSQI has a sensitivity and specificity of 89.6% and 86.5% ($\kappa = .75$, $p < .001$), respectively, and an internal consistency $\alpha = .83$ (Buysse et al., 1989).

Procedure

All potential participants in the study and at least one of their legal guardians (e.g., parent, grandparent, foster parent) attended an *introduction to the study* meeting held at the JCC prior to the study implementation. At this meeting, the participants and their parental guardian(s) were informed that the purpose of the study was to learn about adolescent emotions, behavior, and health. The researcher obtained assent from the adolescent (Appendix A) and consent from the parent (Appendix B) in writing stating they (1) understood the study, (2) were aware of the possible risks involved, and (3) understood they had a right to discontinue participation at any time without penalty.

Study Design

Following completion of the consent and assent forms, participants completed the

demographics questionnaire and the pre-experimental measures (i.e., BYI-II; YSR, PSQI), while the parents/legal guardian(s) completed the CBCL and the Demographic Questionnaire.

During the first week, those who chose to participate in the study were randomly assigned to attend yoga classes or recreation twice a week for eight weeks (Phase I). Stratified Random Assignment was used to match the two groups for age and gender in order to reduce group difference effects. During the ninth week of the study, all of the participants filled out the BYI-II, YSR, and PSQI for a second time, while parents and/or legal guardians filled out the CBCL. During the second eight weeks of the study, those who attended yoga classes began engaging in recreation time, while those in the recreation treatment condition began taking yoga classes (Phase II). After eight weeks in Phase II, measures were administered a third time to participants and parents of both groups.

Treatments

Yoga Intervention. Two days per week for one hour, those in the yoga condition were led into the gymnasium for yoga practice. The participants were instructed by the licensed yoga instructor to sit quietly in a circle on their mats with their eyes closed and engage in meditational breathing for approximately ten minutes. Throughout this time period, the instructor provided additional instructional cues to help the adolescents breathe more deeply. During the breathing exercise, the yoga instructor read a brief meditational quote and asked each participant to identify an intention for their practice that pertains to a personal behavior they wish to improve or change (e.g., I need to be more patient; I will count to ten before I speak when I am angry) and to think about the intention while taking three more deep breaths in and out. Once the intention was set, the participants were instructed to open their eyes.

For the next forty minutes, the participants were provided verbal cues while transitioning through common poses used in yoga practice including sitting, standing, balancing, twisting, and inversion poses with increasing difficulty throughout the practice. The yoga instructor provided adjustments and corrections to the postures throughout the practice in order to provide the greatest benefit to the adolescents, while avoiding injuries from hyperextension.

For the last 10 minutes, the adolescents transitioned into a relaxation/meditation exercise state called, Shiva Sana, in which the adolescent lay flat on their backs with their eyes closed and participated in another breathing exercise. Just before the end of the class, each adolescent was instructed to sit upright without opening his or her eyes, while another short meditation quote was read (e.g., “You cannot always control what goes on outside, but you can always control what goes on inside”). This method was repeated twice weekly at the same time on Tuesdays and Thursdays for 60 minutes over eight consecutive weeks.

Throughout the hour, participants were able to earn six total points for participating in yoga; for interacting respectfully with detention staff, yoga instructor, and peers; and for demonstrating appropriate pro-social behaviors throughout the hour. The Token Economy forms indicated the most common reasons for losing points during yoga included talking during meditation times and making negative comments about their peers during the practice.

Recreation Intervention. Two days per week for one hour, those in the recreation condition were led into the common area of the detention facility where they were allowed to engage in free recreation time alone or in groups. The participants were allowed to play inside or outside the facility depending on the weather. A detention staff member was assigned outside and another inside during this free recreation hour. Activities available included ping pong,

board games, basketball, hacky sack, listening to music with headphones, and playing on the computer.

Throughout the unstructured hour, participants were able to earn six total points for participating in an activity either by themselves or in a group, interacting respectfully with staff and peers, and demonstrating appropriate pro-social behaviors throughout the hour. The Token Economy forms indicated the most common reasons for losing points during free recreation time included arguments with staff or peers and aggressive behavior with other adolescents during play.

CHAPTER III

RESULTS

Participant Characteristics

The sample consisted of 11 males and 3 females ranging in age from 14 to 16 with a mean age of 15 ($SD = .74$). Participants' self-reported ethnic membership was 92.9% ($n = 13$) Caucasian and 7.1% ($n = 1$) Native American. The average participant was a 10th grader ($M = 9.64$; $SD = .74$) residing in a household with an annual income ranging between less than \$15,000 to over \$95,000 (Median annual income range = \$25,000-\$35,000) per year (Table 1 below). With regard to physical health, Table 1 summarizes the sample's Body Mass Index percentile ranges. As can be observed, 78.6% of the sample ($N = 11$; 8 male and 3 female) fell within a normal, healthy weight range (between 5th and 84th percentile), while the other 21.4% of the sample ($N = 3$; 3 male) fell in the obese weight range (95th percentile) compared to other adolescents of the same age and gender. None of the adolescents fell in the underweight range (less than 5th percentile) or the overweight range (between 85th and 95th percentile).

Table 1. *Sample Demographic Characteristics*

Variable	Total N	% of Sample
Body Mass Index Percentiles		
Underweight (1 st - 4 th)	0	0.0
Healthy weight (5 th - 84 th)	11	78.6
Overweight (85 th - 94 th)	0	0.0
Obese (95 th - 100 th)	3	21.4
Household Income (per year)		
Less than \$15,000	4	28.6
\$15,000-25,000	1	7.1
\$25,000-35,000	3	21.4
\$35,000-45,000	4	28.6
\$45,000-55,000	1	7.1
More than \$95,000	1	7.1

Baseline Clinical Characteristics

Baseline *T*-scores for Anxiety, Depression, Anger, and Disruptive Behaviors were calculated for sample participants. *T*-scores below 55 fall in the “Average” range. *T*-scores between 55 and 59 fall in the “Mildly Elevated” range. *T*-scores between 60 and 69 fall in the “Moderately Elevated” range. Finally, *T*-scores above 70 fall in the “Extremely Elevated” range. For Self-Concept, *T*-scores greater than 55 fall in the “Above Average” range. *T*-scores between 45 and 55 fall in the “Average” range. *T*-scores between 40 and 44 fall in the “Lower than Average” range. Finally, *T*-scores below 40 fall in the “Much Lower than Average” range.

For the overall sample, *T*-scores above 55 were obtained by fewer than 9% of the sample ($N = 1$) on Anxiety, fewer than 17% ($N = 2$) on Depression and Anger, and fewer than 50% ($N = 6$) on Disruptive Behaviors. For Self-Concept, more than 66% of the sample self-reported *T*-scores above 45, which falls in the Average to Above Average range.

Treatment Integrity

A fidelity check was completed to evaluate the degree of participation in yoga and recreation. Specifically, each participant’s tokens earned of those possible during yoga and recreation were totaled. For those in the yoga treatment, 4 participants earned greater than 90% and 2 participants earned greater than 80% of tokens possible compared to those in the recreation treatment in which only 2 participants earned greater than 90% and 4 participants earned greater than 80% of tokens possible.

Correlations

Zero-order correlations among all study variables at Pre-treatment and Post-treatment were calculated to examine possible correlations that may account for covariance. Among the

demographic variables, statistically significant correlations were observed. As expected, age was significantly related to grade at Pre-treatment ($r = .80, p < .01$). There were also statistically significant correlations observed between demographic and dependent variables. For instance, age was significantly correlated to self-reported depression at Pre-treatment ($r = -.69, p < .01$) and Post-treatment ($r = -.79, p < .01$), disruptive behaviors at Pre-treatment ($r = -.65, p < .01$) and Post-treatment ($r = -.63, p < .01$), and self-concept at Pre-treatment ($r = .66, p < .01$) and Post-treatment ($r = .67, p < .01$). These results indicate that older adolescents in this study rated themselves significantly less depressed, less disruptive, and possessed higher levels of self-concept over the younger participants.

Primary Analyses

Hypothesis 1

It was hypothesized that the overall sample would show improvement across all measures from Pre-treatment to Post-treatment. For each dependent variable, a paired-samples *t*-test was completed to evaluate differences from Pre-treatment to Post-treatment for the overall sample.

Statistically significant improvement was found in parent-reported internalizing symptoms from Pre-treatment ($M = 9.75; SD = 5.55$) to Post-treatment ($M = 5.08; SD = 4.66$) in the overall sample ($t(11) = 3.30; p = .003$). Statistically significant improvements were also identified in parent-reported externalizing behaviors from Pre-treatment ($M = 20.25; SD = 6.90$) to Post-treatment ($M = 12.75; SD = 7.42$) for the overall sample ($t(11) = 3.14; p = .004$).

Unexpectedly, there was a statistically significant increase from Pre-treatment ($M = 12.67; SD = 10.38$) to Post-treatment ($M = 17.67; SD = 12.12$) in self-reported anger ($t(11) = -1.94; p = .039$). None of the other findings were statistically significant (Table 2).

Table 2. *Dependent Variables at Pre-treatment and Post-treatment for All Participants*

Variable	Pre-treatment		Post-treatment		<i>t</i>	<i>p</i>
	Mean	SD	Mean	SD		
Psychological						
Anxiety	6.75	(6.41)	7.75	(7.52)	-.67	.259
Depression	7.92	(10.45)	10.33	(10.16)	-1.25	.118
Anger	12.67	(10.38)	17.67	(12.12)	-1.94	.039
Disruptive B.	11.25	(7.93)	11.25	(12.45)	.00	.500
Self-Concept	38.50	(18.26)	40.42	(13.43)	-.43	.338
YSR Int.	8.42	(7.61)	10.92	(8.88)	-1.22	.124
YSR Ext.	23.08	(11.79)	20.00	(14.94)	.90	.193
CBCL Int.	9.75	(5.55)	5.08	(4.66)	3.30**	.003
CBCL Ext.	20.25	(6.90)	12.75	(7.42)	3.14**	.004
Physical						
Weight	158.38	(43.97)	160.92	(47.57)	-1.24	.120
Sleep	6.08	(5.62)	4.75	(5.17)	.71	.247
Behavioral						
Token (%)	87.16	(6.83)	84.59	(9.59)	.85	.207

df = 11. * *p* < .05. ** *p* < .01. *** *p* < .001.

Hypothesis 2

It was hypothesized that participants in the Yoga Treatment would show greater improvement across all measures following Phase I compared to participants in the Recreation Treatment. A two (Time: Pre-treatment; Mid-treatment) by two (Treatment Condition: Yoga; Recreation) repeated measures ANOVA was completed to evaluate this hypothesis.

Significant main effects for Time were found for anger symptoms, $F(1, 10) = 6.17$; $p = .032$. No other main effects were identified. There was a statistically significant interaction between Time and Treatment in parent-reported internalizing symptoms $F(1, 10) = 7.51$; $p = .021$ observed. While the Yoga treatment showed a decrease in parent-reported internalizing symptoms between Pre-treatment ($M = 12.17$, $SD = 6.94$) and Mid-treatment ($M = 7.67$, $SD = 3.27$), the Recreation treatment demonstrated an increase in parent-reported internalizing symptoms between Pre-treatment ($M = 7.33$, $SD = 2.34$) and Mid-treatment ($M = 13.17$, $SD = 7.47$).

There was also a statistically significant interaction between Time and Treatment in percent of pro-social behaviors (token economy behavior points earned/token economy behavior points possible), $F(1, 10) = 1.82; p = .037$. The Yoga treatment group showed an increase in percent of pro-social behaviors from Pre-treatment ($M = 87.39, SD = 6.44$) to Mid-treatment ($M = 90.51, SD = 6.10$), while the Recreation treatment group demonstrated a decrease in percent of pro-social behaviors from Pre-treatment ($M = 86.94, SD = 7.81$) to Mid-treatment ($M = 81.84, SD = 5.72$). There were no other statistically significant interaction effects between Time and Treatment during Phase I (Table 3). Therefore, Hypothesis Two was partially supported.

Table 3. *Changes in Dependent Variables by Group following Phase I*

Treatment	Yoga				Recreation				Time x Treatment	
	Pre-treatment		Mid-treatment		Pre-treatment		Mid-treatment		F	p
Variable	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Anxiety	6.17	(7.03)	9.33	(10.50)	7.33	(6.35)	6.33	(4.84)	0.86	.198
Depression	9.33	(13.62)	9.00	(13.30)	6.50	(7.06)	6.17	(5.91)	0.00	.500
Anger	8.50	(7.86)	17.50	(11.65)	16.83	(11.55)	20.67	(7.12)	1.00	.171
Disruptive B.	8.67	(8.41)	11.33	(7.12)	13.83	(7.19)	22.50	(12.28)	0.76	.201
Self-Concept	34.00	(23.86)	42.83	(18.23)	43.00	(10.75)	40.17	(10.13)	1.22	.147
YSR Int.	8.83	(10.23)	8.50	(9.75)	8.00	(4.73)	9.83	(4.54)	0.54	.239
YSR Ext.	15.83	(9.33)	11.17	(6.49)	30.33	(9.63)	28.67	(10.76)	0.19	.335
CBCL Int.	12.17	(6.94)	7.67	(3.27)	7.33	(2.34)	13.17	(7.47)	7.51*	.011
CBCL Ext.	19.00	(8.15)	19.50	(11.95)	21.50	(5.89)	28.83	(11.57)	1.02	.169
Weight	153.25	(41.13)	152.92	(40.16)	163.50	(50.00)	165.33	(49.30)	0.73	.206
Sleep	3.83	(4.22)	3.67	(4.76)	8.33	(6.28)	8.17	(3.31)	0.00	.500
Token (%)	87.39	(6.44)	90.51	(6.10)	86.94	(7.81)	81.84	(5.72)	5.78*	.019

* $p < .05$. ** $p < .01$. *** $p < .001$.

Hypothesis 3

It was hypothesized that participants in the Yoga treatment would show greater improvement across all measures during Phase II compared to participants in the Recreation treatment. A two (Time: Pre-treatment; Mid-treatment) by two (Treatment Condition: Yoga; Recreation) ANOVA was completed to evaluate this hypothesis.

Significant main effects for Time were found for parent-reported internalizing symptoms, $F(1, 10) = 6.42; p = .030$ and parent-reported externalizing symptoms, $F(1, 10) = 10.48; p = .009$. There was a statistically significant interaction between Time and Treatment for parent-reported internalizing symptoms, $F(1, 10) = 4.57; p = .029$ following Phase II. Unexpectedly, a statistically significant interaction was also found for self-reported anger $F(1, 10) = 8.78; p = .007$ following Phase II. While participants in the Yoga treatment self-reported decreased levels of anger between Mid-treatment ($M = 17.50, SD = 11.66$) and Post-treatment ($M = 10.67, SD = 9.69$), participants in the Recreation treatment self-reported increased levels of anger from Mid-treatment ($M = 20.67, SD = 7.12$) to Post-treatment ($M = 24.67, SD = 10.58$) following Phase II of the study. There were no other statistically significant interaction effects between Time and Treatment during Phase II (Table 4). Therefore, Hypothesis Three was partially supported.

Table 4. *Changes in Dependent Variables by Group following Phase II*

Treatment	Yoga				Recreation				Time x Treatment	
	Mid-treatment		Post-treatment		Mid-treatment		Post-treatment		<i>F</i>	<i>p</i>
Variable	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Anxiety	9.33	(10.50)	8.83	(9.58)	6.33	(4.84)	6.67	(5.47)	0.08	.395
Depression	9.00	(13.30)	9.50	(12.65)	6.17	(5.91)	11.17	(8.08)	1.11	.158
Anger	17.50	(11.66)	10.67	(9.69)	20.67	(7.12)	24.67	(10.58)	8.78**	.007
Disruptive B.	11.33	(7.12)	5.67	(6.71)	22.50	(12.28)	16.83	(14.86)	0.00	.500
Self-Concept	42.83	(18.23)	39.50	(15.16)	40.17	(10.13)	41.33	(12.83)	2.17	.086
YSR Int.	8.50	(9.75)	9.33	(11.20)	9.83	(4.54)	12.50	(6.47)	0.67	.346
YSR Ext.	11.17	(6.49)	9.50	(8.60)	28.67	(10.76)	30.50	(12.34)	0.73	.207
CBCL Int.	7.67	(3.27)	6.83	(4.79)	13.17	(7.47)	3.33	(4.18)	4.57*	.029
CBCL Ext.	19.50	(11.95)	14.00	(8.02)	28.83	(11.57)	11.50	(7.29)	2.81	.062
Weight	152.92	(40.16)	155.92	(45.67)	165.33	(49.30)	165.92	(53.22)	0.38	.275
Sleep	3.67	(4.76)	2.67	(3.88)	8.17	(3.31)	6.83	(5.78)	0.02	.453
Token (%)	90.51	(6.10)	81.77	(10.82)	81.84	(5.72)	87.42	(8.14)	1.46	.127

* $p < .05$. ** $p < .01$. *** $p < .001$.

Hypothesis 4

It was hypothesized that Yoga participation would lead to statistically significant improvement on the dependent measures compared to Recreation participation. All participants' scores prior to Yoga treatment and directly following Yoga treatment were recoded into two new variables, regardless of phase in which they were obtained. New variables were also created for all scores prior to and following Recreation treatment. Dependent samples *t*-tests were completed to evaluate the changes before and directly following each treatment condition using all twelve participants.

Change scores for each treatment condition were computed to evaluate the changes occurring for all participants before and after each treatment condition. Specifically, each participant's Pre-treatment scores were subtracted from each participant's Post-treatment score, which yielded a value representing the mean change. Improvement in anxiety, depression, anger, disruptive behavior, internalizing and externalizing symptoms, weight, and sleep problems was present when the mean change was a negative number. Conversely, positive mean change scores were indicative of improvement on measures in which the goal was to increase the variable such as self-concept and pro-social behaviors on the token economy.

Table 5 displays the mean changes and standard deviations for each of the measures considered in this study and results from *t*-test comparisons of scores obtained before and following each treatment condition. Consistent with Hypothesis Four, there were significant improvements following participation in Yoga treatment on parent-reported internalizing symptoms ($t [11] = -2.43, p < .05$) and pro-social behavior percentage points ($t [11] = 2.69, p < .05$) compared to the changes while participating in Recreation. Unexpectedly, there was a significant increase in self-reported anger symptoms during Yoga participation ($t [11] = 1.89, p <$

.05), compared to self-reported anger following Recreation participation (Table 5). Therefore, Hypothesis Four was partially supported.

Table 5. *Mean Changes in Dependent Variables between Treatment for all Participants*

Variable	Yoga		Recreation		<i>t</i>	<i>p</i>
	Mean Δ	(SD)	Mean Δ	(SD)		
Anxiety	1.75	(7.63)	-.75	(4.90)	.74	.238
Depression	2.33	(7.20)	.08	(5.53)	.72	.245
Anger	6.50	(7.88)	-1.50	(9.22)	1.89*	.043
Disruptive B.	-1.50	(12.61)	1.50	(13.32)	-.43	.338
Self-Concept	5.00	(17.90)	-3.08	(4.94)	1.32	.107
YSR Int.	1.17	(6.39)	1.33	(6.33)	-.06	.478
YSR Ext.	-1.42	(8.37)	-1.67	(10.77)	.06	.478
CBCL Int.	-7.17	(7.85)	2.50	(6.74)	-2.43*	.017
CBCL Ext.	-8.42	(15.05)	.92	(12.87)	-1.21	.126
Weight	.13	(4.93)	2.42	(5.95)	-.96	.180
Sleep	-.75	(3.84)	-.58	(4.34)	-.12	.454
Token (%)	4.35	(8.76)	-6.92	(9.15)	2.69*	.011

* $p < .05$. ** $p < .01$. *** $p < .001$.

CHAPTER IV

DISCUSSION

Primary Findings

A number of recent meditation-based intervention programs have shown effectiveness in reducing psychological outcomes (Chandiramani et al., 1995; Samuelson et al., 2007) and recidivism (Alexander et al., 2003; Bleick & Abrams, 1987; Rainforth et al., 2003) among incarcerated adult populations, though there is little information about the effects on incarcerated adolescents. Although other studies have examined the effects of yoga and mindfulness meditation approaches in reducing psychological, physical, and behavioral problems among children and adolescents, most of these studies have been done with non-incarcerated youth, limiting the information they can provide about the outcomes among a delinquent youth population.

The current study attempted to bridge this gap by evaluating the benefits of yoga participation on a delinquent adolescent population. After randomly assigning the adolescents to two treatment groups (yoga; recreation), it was expected that the adolescents participating in Yoga would self-report greater decreases in anxiety, depression, anger, disruptive behavior, internalizing, and externalizing problems, and greater increases in self-concept compared to those participating in Recreation during Phase I of the study. Similarly, it was predicted that the adolescents participating in Yoga during Phase II would self-report greater decreases in anxiety, depression, anger, disruptive behavior, internalizing, and externalizing behaviors, and greater increases in self-concept compared to those participating in Recreation during Phase II of the study).

Overall Sample

In order to evaluate Hypothesis 1, Pre-treatment scores were compared to Post-treatment scores on all dependent measures for the overall sample. Results showed statistically significant decreases in parent-reported internalizing and externalizing symptoms following Phase I and Phase II of the study. This result indicates that on average, parents observed less internalizing symptoms, such as somatic complaints, concentration problems, and depression, as well as, externalizing symptoms such as arguing and stealing, at Post-treatment among their children. This finding is particularly exciting because it indicates parents observed positive changes in their children following the study.

Unexpectedly, the overall sample self-reported statistically significant increases in anger at Post-treatment. This finding may indicate that participating in yoga increases anger among delinquent youth. However, yoga involves a mindfulness component in which those practicing often become more centered and aware of their feelings. Thus, it is possible that participants did not actually become angrier as a result of practicing yoga, but rather became more aware of the anger already present, which increased their self-reported experience of the emotion. Furthermore, the self-reported increases in anger were not correlated to observed increases in negative behavior by detention staff or parents. In other words, even if the adolescents felt angrier, on average they were not displaying their anger in maladaptive ways.

Raw scores on the BYI-II were converted to T-scores in an effort to get a better understanding of the changes that occurred for the overall sample from Pre-treatment to Post-treatment.

Phase I

In order to evaluate Hypothesis 2, the Pre-treatment to Mid-treatment mean change scores were compared by group. When separated by group, the parents of those who participated in yoga during Phase I reported a statistically significant decrease in internalizing symptoms among their children. While the mean number of internalizing problems among those who participated in Yoga decreased by half following Phase I, the internalizing symptoms observed by the parents of those who participated in recreation, more than doubled by the end of Phase I. Furthermore, those who participated in yoga during Phase I showed a statistically significant increase in pro-social behaviors, while those who participated in recreation during Phase I showed decreases in pro-social behaviors, as measured by the Token Economy Record Form.

Unexpectedly, those who participated in yoga during Phase I self-reported a statistically significant increase in anger following the yoga condition at Mid-treatment. This finding is inconsistent with past research that has found yoga practice to be effective at decreasing symptoms of hostility among incarcerated populations (e.g., Samuelson et al., 2007). The trend demonstrated in the present study suggesting that delinquent youth who practice yoga self-report higher levels of anger, is inconsistent with previous research which has documented the benefits of yoga practice with non-delinquent youth (Telles et al., 2008; Mendelson et al., 2010; Kannappan & Bai, 2008). It is possible that delinquent youth all experience more anger during the first few weeks of the program and that their anger decreases as the program continues. It is also possible that yoga, which teaches mindfulness, allowed the participants more insight as to how they were feeling, thus representing an increase in the awareness of their anger rather than their anger itself. To address this, future studies could administer yoga practice for a longer

period of time to control for adjustment effects that may exist during the first few weeks of the program.

Phase II

To evaluate Hypothesis 3, the Mid-treatment to Post-treatment mean change scores were compared by group. Although significant increases in anger symptoms were self-reported by those practicing yoga following Phase I, their anger symptoms decreased following Phase II of the study. It is possible that the recreation condition was more effective than yoga at reducing anger, as past studies have shown physical activity to be associated with lower rates of internalizing symptoms, such as anxiety, depression, and anger (Strohle et al., 2007; Salmon, 2001; Stich, 1998). However, those who participated in recreation during Phase I self-reported an increase in anger following both Phase I and Phase II. This finding may be the result of delayed effects, recreation participation, or response bias. To address this uncertainty, future studies could include a third group that receives yoga followed by no other additional treatments to evaluate possible differences between those who were administered yoga alone and those who receive both treatments.

Yoga verses Recreation

To evaluate Hypothesis 4, scores from yoga participation from Phase I and II were summed and compared to recreation participation scores from Phase I and II for all participants. Results indicated that there was a statistically significant improvement in pro-social behaviors while participating in yoga compared to scores obtained during recreation participation. This finding suggests that practicing yoga significantly increases observable pro-social behaviors

among youth above and beyond the pro-social behaviors observed while participating in recreation time, regardless of whether they participated in yoga during the first or second phase.

There was also a statistically significant improvement in parent-reported internalizing symptoms following yoga participation compared to recreation participation regardless of phase. This finding further supports the presence of a significant observable change in behavior for those who participated in yoga compared to the observed behavior of the same individuals following their participation in recreation.

The results of this study contribute to the existing literature in two ways. First, it has tentatively extended current treatment outcome research by indicating that yoga practice may be related to improvement in multiple behavioral factors among delinquent youth. Second, results from this study demonstrate the feasibility of yoga as an intervention with this treatment resistant population. Although these are the findings of one small initial investigation, when considering the difficulty of engaging this population in general, the high drop-out rate/non-compliance rate of most current treatment modalities, and the negative long-term prognosis that is associated with delinquent youth, further investigation into the benefits and usefulness of yoga as an alternative or complementary therapy appear to be warranted.

Limitations

There were several limitations to this study. First, this study was an initial evaluation of the effects of yoga on a delinquent youth population and included a small sample size and underpowered results that limited generalizability. A larger numbers of participants would have increased statistical power and perhaps the ability to find greater differences between groups.

There were other limitations regarding participant sample characteristics. For instance, cultural diversity was small, limiting the generalizability of the findings to non-whites. There

were 11 males and only 3 females in the study, limiting the generalizability of the findings to delinquent females. Furthermore, all of the participants self-identified as heterosexual, limiting the generalizability to bi-sexual, transgender, lesbian, and gay delinquents. Finally, all of the participants were residents who lived within a 20-mile radius of the juvenile detention center, limiting the generalizability to other parts of the country.

Beyond the characteristics of the sample that limit the current study's findings, it must also be noted that this study relied almost exclusively on self- and parent-reported measures. Because these measures are particularly sensitive to social desirability biases (Jo, 2000), and because some of the participants may have been aware of the purpose of the program toward the end of the study, it is possible that these types of biases may have influenced results. The possible awareness that it is socially desirable to increase pro-social behaviors and decrease negative internalizing and externalizing symptoms, may have contributed to the item responses. Future research might benefit from a direct examination of the role of social desirability among delinquent youth, their caregivers, and detention staff, on treatment outcome. One specific way in which this could be accomplished is through the incorporation of an implicit attitude test toward delinquent behaviors, which are less likely to be contaminated by social desirability effects (Greenwald, McGhee & Schwartz, 1998). Second, the reliance on self-report measures is susceptible to response bias. Future studies should include multimodal/multi-informant assessment of psychological symptoms in addition to the observation of participant behaviors by the detention staff.

There are additional limitations associated with the research design. First, this study operationalizes change as the difference between scores obtained at Pre-treatment, Mid-treatment, and Post-treatment. As highlighted earlier in this discussion, there are other

mechanisms that might account for differences in these scores, such as social desirability. The collection of follow-up data (6 months; 12 months) following the day treatment program completion would have provided information regarding the lasting effects of the treatment.

All of the participants were taught the same yoga poses, postures, and breathing exercises, read the same meditation quotes during their practice, and attended eight weeks of yoga classes taught by the same instructor. However, due to several interferences with the schedule, the Phase II participants only received 13 yoga sessions and recreation periods over the second eight weeks compared to the Phase I participants who received 16 yoga sessions and recreation periods over the first eight weeks. This also may have contributed to differences observed between the groups.

Conclusion

These limitations notwithstanding, the present findings build upon and uniquely extend a growing body of work highlighting the positive effects of yoga practice on delinquent youth behavior. Although the results of the current study are preliminary, they are compelling. Future studies should include a larger sample of more ethnically diverse delinquent males and females. Additionally, future research might benefit from a direct examination of the role of social desirability by incorporating an implicit attitude test toward delinquent behaviors, which are less likely to be contaminated by social desirability effects. Future studies should also include multimodal/multi-informant assessment of psychological symptoms in addition to the observation of participant behaviors by the detention staff. The collection of follow-up data (6 months; 12 months) following the day treatment program completion would likely produce a clearer picture of the long term benefits of yoga practice on this population.

Figure 1 shows the trend in mean percentage points earned during the first 8 weeks separated by Treatment for all participants ($N = 12$).

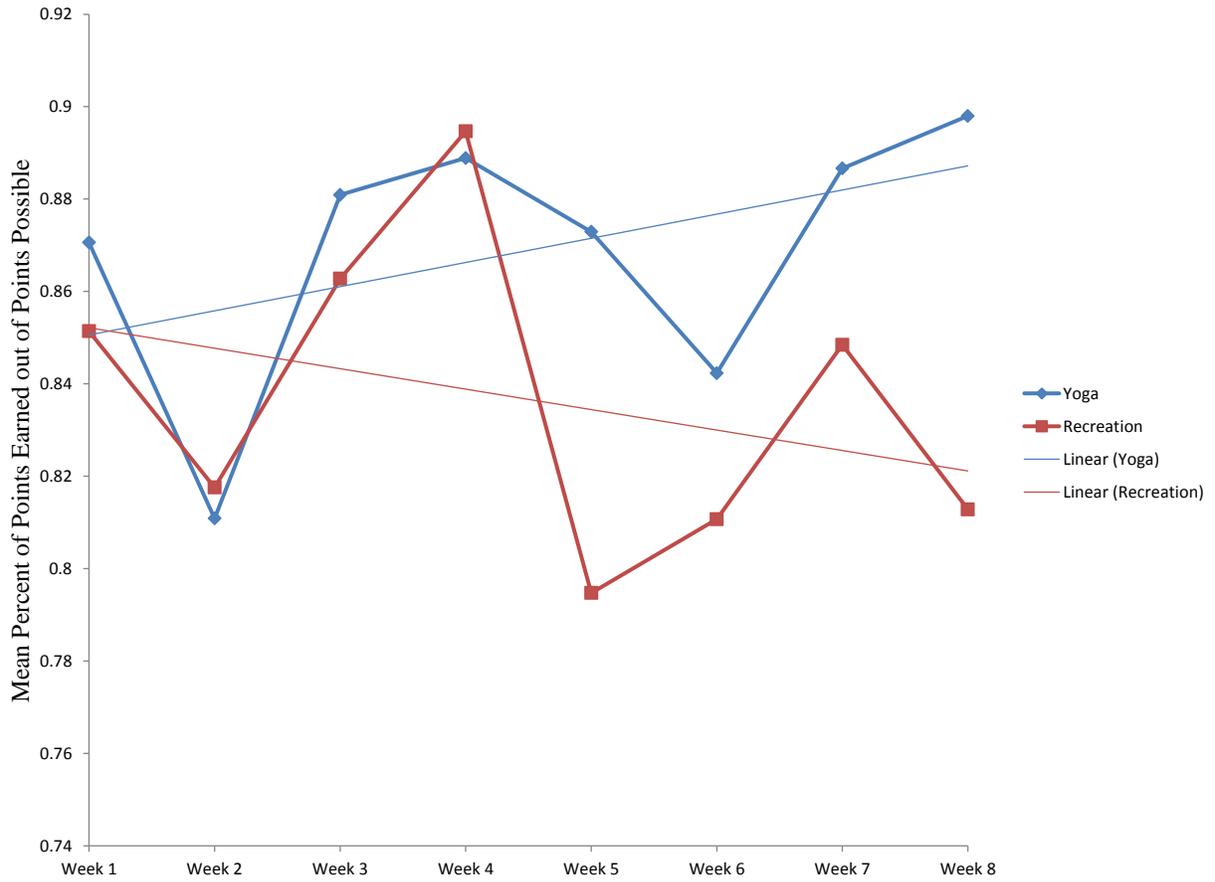


Figure 1. *Mean Percentage Points Earned on Daily Token Economy During Phase I*

Figure 2 shows the trend in mean percentage points earned during the second 8 weeks separated by Treatment for all participants ($N = 12$).

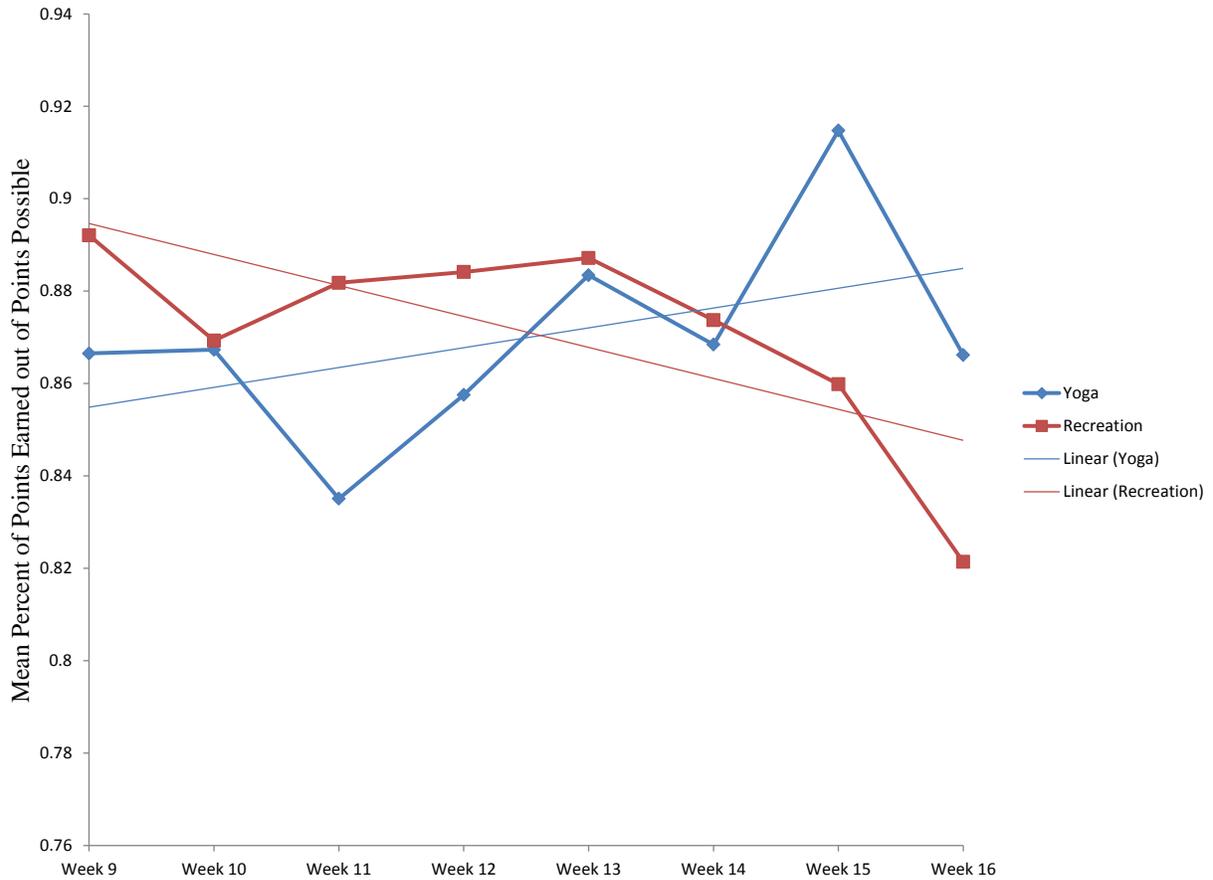


Figure 2. *Mean Percentage Points Earned on Daily Token Economy During Phase II*

Finally, Figure 3 combined the Token Economy percentage points earned during the first eight weeks of yoga for Phase I ($N = 6$) and the second 8 weeks of yoga for Phase II ($N = 6$) and compared these twelve participants' scores to the Token Economy percentage points earned during the first eight weeks of recreation for Phase I ($N = 6$) and the second 8 weeks of recreation for Phase II ($N = 6$). Results indicated that all participants ($N = 12$) earned significantly higher points while participating in yoga when compared to recreation.

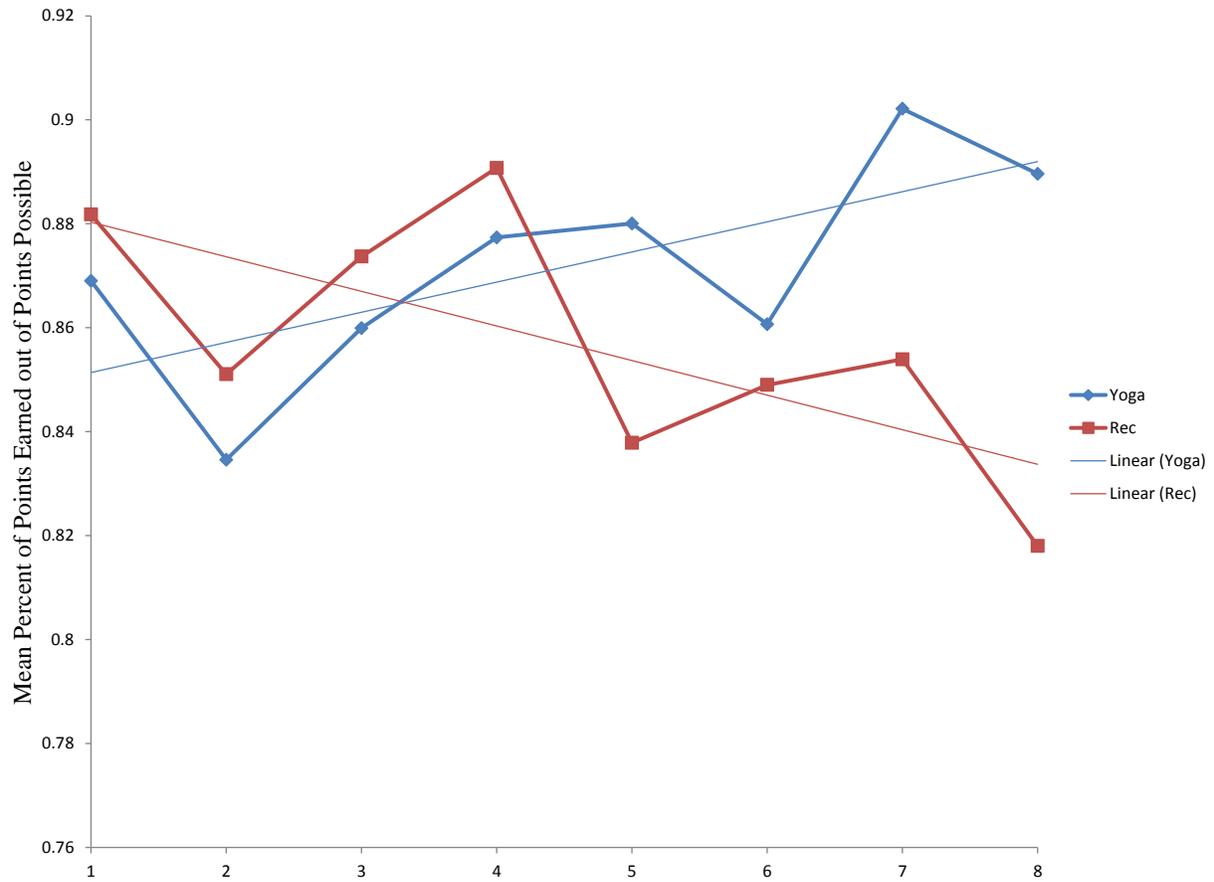


Figure 3. *Mean Percentage Points Earned on Daily Token Economy Combined by Treatment*

APPENDICES

APPENDIX A

ASSENT FOR STUDY PARTICIPATION



*Child Assent Form for
Minors Aged 13-17*

Study Title: Initial investigation of the effectiveness of yoga on psychological, behavioral, and physical health outcomes among juvenile delinquents

Research Investigators' Names and Departments:

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What is this research about?

This is a study about feelings many teenagers experience and the things they do to feel better. You will be asked to participate in both a yoga class and free recreation time over a sixteen week period. You will also fill out some questionnaires at different times throughout the study so that we can get to know you better. You may choose to stop participating in the study at any time you decide without getting into trouble. You may talk to your parents/guardian about this before deciding whether or not to participate. Your parents or legal guardian said that it is OK for you to be in this study, but we want to let you choose if you want to do this.

What will happen to me in this research?

There will be two parts to the sixteen week study. For eight weeks you will be allowed to choose a recreational activity from an approved list for 60 minutes twice a week. For the other eight weeks, you will participate in a yoga practice for 60 minutes twice a week. You will be randomly assigned to either the recreation or yoga group for the first eight weeks and then switch to the other group for the second eight weeks. If you choose to participate in this study, you will be asked to fill out a few questionnaires three times during the course of 16 weeks.

How long will it take me to be in your research?

The study will take a total of 16 weeks. For eight of these weeks, you will be allowed to choose a recreational activity from an approved list for 60 minutes twice a week. For the other eight weeks, you will participate in a yoga practice for 60 minutes twice a week.

Can anything bad happen to me?

No, this yoga class and free recreation time have been provided at the Juvenile Care Center to kids just like you for several years. If you experience any injury or pain during yoga or recreation, you should tell a staff member, the yoga instructor, or you parent/guardian immediately.

Can anything good happen to me?

There is a good chance these activities will improve your health and the way you feel about yourself.

Do I have other choices?

You may choose not to participate in the study. Instead of attending one of the 8-week yoga groups, you will be allowed free recreation time supervised by the JCC staff during the entire 16 weeks. While those who chose to participate are answering questionnaires, you will have quiet time.

Will anyone know I am in the research?

Your name and the fact that you are in this study will be kept secret from those people not involved in the study. Only the JCC staff, director, yoga instructor, and I will know who you are by name.

Will I be paid?

No. You will receive credit for participating in this class just as you receive points in all of your after school classes.

Who can I talk to about the research?

You may contact me, Erin Hawks, at 989 817-6275 or Dr. Ronan at 989-774-2284 at any time during or after the study if you have any questions.

What if I do not want to participate in this study?

You do not have to fill out the questionnaires or participate in the yoga class. You can say no at any time. No one will be upset with you if you do not want to participate. Instead, you will be given free recreation time throughout the study.

SIGNATURE CLAUSE

If you have any problems with this study, you may contact the Institutional Review Board by calling 989-774-6777, or addressing a letter to the Institutional Review Board, 251 Foust Hall Central Michigan University, Mt. Pleasant, MI 48859.

Do you want to be in the study?

Yes, I want to be in the study *No, I do not want to be in the study*

Name of Child (Print)

Signature of Child

Date

Signature of Person Explaining Assent

Date

A copy of this form has been given to me _____ Subject's Initials

APPENDIX B

CONSENT FOR STUDY PARTICIPATION



Parent/Guardian Consent Form

Study Title: Initial investigation of the effectiveness of yoga on psychological, behavioral, and physical health outcomes among juvenile delinquents

Research Investigators' Names and Departments:

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Introductory Statement

I am requesting permission to include your child in my research study. The study will investigate the impact of two commonly used methods of exercise on your child's overall well-being. The director of the Juvenile Care Center has given me permission to conduct this research project with the kids in the day treatment program, which will assist me in completing my doctoral degree in Clinical Psychology. The project will involve your child's participation in eight weeks of yoga classes taught by a certified yoga instructor and eight weeks of free recreation time. During the sixteen weeks, your child will be asked to fill out questionnaires about how they feel about themselves during each of these activities.

What is the purpose of this study? Although past studies have shown both types of exercise to be beneficial for similar groups, it is unclear as to whether one method is better than the other at

producing these improvements. This study will compare information obtained in the questionnaires within and between groups to evaluate the overall effectiveness.

What will my child/ward do in this study? There will be two parts to the sixteen week study. For eight weeks your child will be allowed to choose a recreational activity from an approved list for 60 minutes twice a week. For the other eight weeks, your child will participate in a yoga practice for 60 minutes twice a week. They will be randomly assigned to either the recreation or yoga group for the first eight weeks and then switch to the other group for the second eight weeks. If your child participates in this study, they will be asked to fill out a few questionnaires at three times during the course of 16 weeks.

How long will it take my child/ward to do this? The study will take a total of 16 weeks. For eight of these weeks, each child will be allowed to choose a recreational activity from an approved list for 60 minutes twice a week. For the other eight weeks, he or she will participate in a yoga practice for 60 minutes twice a week.

Are there any risks of participating in the study? No, this yoga class and free recreation time have been provided at the Juvenile Care Center to kids just like yours for several years. If he or she experiences any injury or pain during yoga or recreation, they have been instructed to tell a staff member, the yoga instructor, or you immediately.

What are the benefits of participating in the study? There is a good chance these activities will improve your child's physical health and self-esteem.

Will anyone know what my child/ward does or says in this study (Confidentiality)? Your child's name and the fact that they are participating in this study will be kept secret from those people uninvolved with the study. Only the JCC staff, director, yoga instructor, and I will know who you and your child is by name.

Will my child/ward receive any compensation for participation? No. Your child will receive credit for participating in this class just as he or she receives points in all after school classes.

Who can I contact for information about this study? You may contact me, Erin Hawks, at 989 817-6275 or Dr. Ronan at 989-774-2284 at any time during or after the study if you have any questions.

If you are not satisfied with the manner in which this study is being conducted, you may report (anonymously if you so choose) any complaints to the Institutional Review Board by calling 989-774-6777, or addressing a letter to the Institutional Review Board, 251 Foust Hall Central Michigan University, Mt. Pleasant, MI 48859.

My signature below indicates that all my questions have been answered. I agree to allow my child participate in the project as described above.

Signature of Parent/Guardian

Date Signed

Name of Child/Ward

A copy of this form has been given to me. _____ Parent/Guardian Initials

For the Research Investigator—I have discussed with this subject the procedure(s) described above and the risks involved; I believe he/she understands the contents of the consent document and is competent to give legally effective and informed consent.

Signature of Responsible Investigator

Date Signed

APPENDIX C

DEMOGRAPHIC QUESTIONNAIRE

DIRECTIONS: *Please complete the following questions as accurately and honestly as possible. All information obtained from this survey will be kept confidential. Please indicate the answer that best describes you.*

Age:

- 12 13
- 14 15
- 16 17

Current Grade Level in School

- 6th 7th
- 8th 9th
- 10th 11th

Gender:

- Male
- Female
- Other _____

Sexual Orientation

- Heterosexual (Straight)
- Bi-sexual
- Gay / Lesbian
- Other _____

Racial/Ethnic Background (check all that apply):

- Black / African American
- Asian American
- White / Caucasian
- Hispanic / Latino
- Native American
- Other _____

Religious Beliefs

- Christian (non-Catholic)
- Christian (Catholic)
- Muslim
- Jewish
- Buddhist
- Hindu
- Atheist / Agnostic / no religious beliefs
- Other _____

Total (household) Annual Income

- Less than \$15,000
- \$15,001 - \$25,000
- \$25,001 - \$35,000
- \$35,001 - \$45,000
- \$45,001 - \$55,000
- \$55,001 - \$65,000
- \$65,001 - \$75,000
- \$75,001 - \$85,000
- \$85,001 - \$95,000
- Over \$95,000

Have you ever had psychotherapy to reduce your anxiety?

- Yes If yes, how many sessions have you attended in the past? _____
 If yes, how old were you? _____
 If yes, did you find it helpful in reducing your anxiety? _____
- No

Have you ever had psychotherapy to reduce your depression?

- Yes If yes, how many sessions have you attended in the past? _____
 If yes, how old were you? _____
 If yes, did you find it helpful in reducing your depression? _____
- No

Have you ever had psychotherapy for any other reason(s)?

- Yes If yes, how many sessions have you attended in the past? _____
 If yes, how old were you? _____
 If yes, did you find it helpful? _____
- No

Are you currently taking any prescribed medications?

- Yes If yes, what medications are you taking? _____
- No

Do you practice yoga?

- Yes If yes, how many classes have you attended in the past? _____
- No

Do you exercise?

- Yes If yes, what kinds of exercise do you participate in? _____
 If yes, approximately for how many months/years? _____
 If yes, how many days a week? _____
- No

How often have you used the following in the last 6 months?

- Alcohol _____ times per _____
- Marijuana _____ times per _____
- Crystal Meth _____ times per _____
- Ecstasy _____ times per _____
- Cocaine / Crack _____ times per _____
- Other _____ _____ times per _____

APPENDIX D

TOKEN ECONOMY MEASURE

Adolescent's Name: _____ Date: _____
Staff Member's Name: _____

Van/Breakfast (0, 1, 2) Interaction: _____
Participation: _____
Demonstration: _____

Morning School (0, 1, 2) Interaction: _____
Participation: _____
Demonstration: _____

Lunch (0, 1, 2) Interaction: _____
Participation: _____
Demonstration: _____

Afternoon School (0, 1, 2) Interaction: _____
Participation: _____
Demonstration: _____

Group/Activity (0, 1, 2) Interaction: _____
Participation: _____
Demonstration: _____

Dinner (0, 1, 2) Interaction: _____
Participation: _____
Demonstration: _____

Group/Activity (0, 1, 2) Interaction: _____
Participation: _____
Demonstration: _____

TOTAL POINTS FOR DAY: _____

TOTAL POSSIBLE POINTS: _____

Definitions of Behavioral Subscales:

Interaction – appropriately with authority figures, guests, and/or peers (e.g., conversations)

Participation – appropriately in treatment, school, or activities (e.g., homework completion)

Demonstration – displays appropriate pro-social thinking and skills (e.g., being on time, prepared)

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