9-2015

Traumatic Brain Injuries among adolescent inmates in Rikers Island, NYC Jail: A mixed methods study

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by

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A dissertation submitted to the Graduate faculty in Criminal Justice in partial fulfillment of the requirement for the degree of Doctor of Philosophy

The City University of New York

2015

The manuscript has been read and accepted for the
Graduate Faculty in Criminal Justice in satisfaction of the
Dissertation requirement for the degree of Doctor of Philosophy.

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ABSTRACT

Traumatic Brain Injuries among adolescent inmates in Rikers Island, NYC Jail: A mixed methods study

by

Cassandra Ramdath

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There is a higher prevalance of traumatic brain injury (TBI) among incarcerated population than in the general population. It is possible that head injuries can lead to behavioral difficulties, increasing the risk of criminal justice involvement and custodial difficulties. Principles of bio-social criminology put forth that the interaction between people's environment and their biological makeup that can lead to maladaptive behaviors. One of the main domains within the bio-social criminology approach is neurocriminology; neurocriminology uses principles of neuroscience to better undersand delinquent and antisocial behaviours and suggests that brain injury can interact with environmental factors to produce seemingly aggressive and antisocial behaviors. Using this theoretical framework, the current study set out to investigate neurological anomalies related to TBIs and custodial challenges among adolescents in Rikers Island, New York City Jail. Goals of the study included establishing the prevalence of TBI in this population; exploring and characterizing TBI as a predictor of custodial arguments, fights, injuries, and sentences to punitive segregation; and examining TBI as a predictor of recidivism and perceived challenges with reentering the community. A mixed methods approach attained these goals through two major objectives: Quantitative analysis of survey, clinical, demographic and criminal history data collected from 262 detainees; and 2) Qualitative analysis of in depth semi-

structured interviews with 20 detainees. Subjects included 16-18 year old males. In the quantitative phase, secondary data analyses was conducted using an existing data set compiled by the New York City Department of Health and Mental Hygiene from participants (N=262) who were screened for TBI using the Traumatic Brain Injury Questionnaire (TBIQ). Binary logistic regressions and survival Cox regression analyses discovered that in this sample, TBI was not a predictor of injuries, punitive segregation terms or recidivism, while controlling for demographic, socioeconomic, and other risk factors. However, mental health service utilization was a strong predictor of all outcomes and was highly correlated with TBI. Structural equational modelling suggested that TBI had an indirect effect on all outcome variables through mental health service utilization. It is possible that those who were involved in arguments, fights, infractions, punitive segregation, and who recidivated had accessed mental health services in Rikers due to TBI-related difficulties. These difficulties could have predisposted them to custodial and reentry challenges. The qualitative phase involved in depth semi-structured interviews with 20 detained adolescents. Participants were screened for TBI using the TBIQ, and then asked open ended questions about custodial arguments, fights, and injuries, as well as about their experiences with punitive segregation and perceived challenges upon their release from Rikers. Interviews were transcribed, and organizational and substantive catergories were developed to facilitate open coding. Comparative anlayses were made between participants with and without TBI, and emrgent themes were presented. Findings suggest that participants with TBI experienced unique challenges in relation to verbal arguments and physical fights with other inmates, rapidly escalating physical altercations with corrections officers, weapons-related infractions, punitive segregation, and associated difficulties with coping mechanisms such as self-injury and attempted suicide, and feelings of hopelessness about their reentry into the

community. Five themes emerged and detail how what participants with TBI experience in the facility were transferred into their daily activities. Themes included inmates experiencing the following: (a) violence as a norm, (b) the need to survive by all means, (c) a life of ongoing trauma, (d) punitive deprivation and shame, and (e) hopelessness. In converging results from both methods, findings suggest that some inmates with TBI are experiencing custodial challenges, and are being mislabelled as having a mental illness. In addition, many arguments, fights, and injuries were intentionally unreported and therefore undocumented. It is posible that this led to inconclusive fingings in anlayses of administrative data. Future research should seek to disaggreate the behavioral consequences of TBI and of mental illness, and should attempt to pursue more reliable measures of custodial fights and injuries. Education and training of correctional staff about TBI, its symptoms, and long-term consequences could improve correctional management of these inmates. Screening at intake and at multiple points in an inmate's custodial stay, along with asessment of cognitive functioning can inform approporiate custodial therapy; keeping in mind that brain injury is not synomous with mental illness, successful interventions will be social rather than medical. Information about TBI should also be considered before (e.g., courts) and after (e.g., reentry planning) an idividual is placed in jail. Overall, increased community awareness is essential for prevention and adequate care of people who are suffering from TBIs.

DEDICATION

For you, Dad. You silently and eagerly awaited this milestone in my life, but the Universe had other plans. Three years into my PhD journey, you unexpectedly succumbed to an unknown illness, leaving us in shock and disbelief. I will forever remember the twenty-one days I spent in the hospital, watching you, talking to you, and hoping you would come back to us. Life without you was unfathomable; we were helpless as we watched you take your last breaths. That day, our lives changed forever. We had no answers, but the love and support of our many friends and family propelled us to put our lives back together and move forward. Sadly, you could not be here for the end of this chapter in my life but my hard work, motivation, and perseverance was because of, and for you. I know you are proud. We miss you every day.

God saw you were getting tired,
a cure was not meant to be.
He wrapped His arms around you,
and whispered "come with me".
You suffered much in silence;
your spirit did not bend.
You faced your pain with courage,
even at the end.
You tried so hard to stay with us;
your fight was not in vain.
God took you to His loving home,
and freed you from your pain.
Your golden heart stopped beating,
your working hands at rest
God broke our hearts to prove to us,
He only takes the best.

Rest In Paradise
Suruj Dean Ramdath
November 24th, 1955 – July 25th 2012

ACKNOWLEDGEMENTS

First and foremost I would like to thank my dissertation committee members: Dr. Hung-En Sung, Dr. Jeff Mellow and Dr. Homer Venters. I truly appreciate your guidance during this learning experience. You enabled me to gain firsthand experience in designing and conducting applied mixed methods research, and encouraged the cultivation for my passion in the important and growing interdisciplinary field of criminal justice and public health.

I must express my deepest gratitude to my colleagues at the New York City Department of Health and Mental Hygiene. Dr. Homer Venters and Fatos Kaba provided ongoing support and openly accommodated all of my dissertation needs and requirements. Together, they facilitated my access to inmates in Rikers Island, and ensured my safety was of paramount concern. My escort correctional officer, Officer Brunson, also made sure I left the island with interviews on a daily basis. This experience has changed my life and has motivated me to keep working for change in the corrections system as an integral part of my future career.

I would also like to thank my family at John Jay College's Research and Evaluation Center (REC). It goes without saying that anyone who meets Dr. Jeffrey Butts is incredibly lucky. He may have a germ phobia, but his warmth and generosity is infinite. Without him, I most definitely would not be where I am today. Dr. Mike Maxfield was also there for me every step of the way, talking me through the ups and downs of academia. I also can't forget my REC family, who kept me together during the tough times I faced over the years. My REC family will forever be a part of me and I am truly grateful for their guidance, support, and wise words along the way.

I have utmost appreciation for the patience and stress relief I received from my amazing roommates and friends. Kathy Boyd, Pam Ruiz and Marissa Mandala – the Scandal T.V. nights in our apartment kept me sane. Sheyla Delgado, some of my best nights in this awesome city were with you, filled with fun and dancing until the break of dawn. My mom, my family and I appreciate your great efforts in making sure those who couldn't be here for my defense, could participate live via YouTube. Thank you: Michelle Cubellis, for helping me get to the finish line of program; Evan Missula, for always being the number one fan of my corrections research; Brittany Hayes for our ASC dates and comic relief; Delene Bromirski for your kindness and optimism no matter what situation came our way; Dan Stageman and Leonid Lantsman for always making me laugh (sometimes at, rather than with, you); and to Shirley Leyro, Nicole Hanson, Alex Hiropoulous, and Megan Welsh, for lending an ear when things were going array. Can you believe it's been 6 years?

My family in Toronto has been my backbone throughout life. No matter where I was – Ottawa, Australia or New York City, there was always a place waiting for me when I returned home. Of course I owe so much to my wolf pack (defined by Urban Dictionary as: A group who consider themselves different from the norm but are bound to each other because of their unique qualities): Melissa Rampaul, Shanta Bertie, Anya Rampersad, Tarun Rampersad and Rehanna Ramdath. You have always been there to make me smile, help me overcome obstacles and sadness, and of course to help me get into a little harmless trouble from time to time. My supportive family also includes my mom and dad's siblings, and my cousins around the world. I can't name you all 50+ of you, but I appreciate the support through thick and thin, and I am forever indebted to you all.

To Ankur Sood. When we met in 2014 I don't think you knew what you were walking into. Meeting someone in the midst of a PhD program can be intense to say the least. I am wholeheartedly appreciative of the mountains you have climbed to help me achieve this milestone in my life. From helping me with laundry/groceries/cleaning, to spending hours formatting Excel tables and talking through my statistics, you kept my head up. As the finish line was approaching and my stress levels became elevated, I sometimes felt defeated. Nevertheless, you always went out of your way to make sure I pushed forward. Thank you for being my rock. Your family and friends have also been a tremendous support to me, always being positive and expressing a genuine sense of pride in my accomplishments.

Last but not least, to my mom. I wouldn't be who I am, or where I am without you. You supported me even when it was difficult and made sure I completed all the education I desired without any debt. This is a remarkable feat considering where you and Dad came from, the struggles and obstacles you faced, and challenges you overcame. My strength and determination came from you. I know we have made dad proud, and he is smiling down on us from above.

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CHAPTER ONE: OVERVIEW OF STUDY

Problem Statement

There is a higher prevalence of traumatic brain injury (TBI) in incarcerated populations (25% - 87%) than in the general population (8.5%) (Huw Williams, Cordan, Mewse, Tonks, & Burgess, 2010). A TBI caused by external influences can be from a bump, blow, or jolt, or by a penetrating force to the head, and can range in severity from mild (alters consciousness) to severe (extended periods of unconsciousness) (Centers for Disease Control and Prevention [CDC], 2011). Neurological anomalies can lead to effects such as impaired thinking, memory, movement, sensation or emotional functioning which can result in long term disrupted cognitive functioning (CDC, 2014; Luiselli, Arons, Marchese, Andrea Potoczny-Gray, & Rossi, 2000; Schofield et al., 2006; Shiroma et al., 2010; Yang et al., 2012)**.** This is particularly important in younger populations because the brain is still in its formative years and is more susceptible to damage and further injury (Huw Williams et al., 2010; Luiselli et al., 2000; Schofield et al., 2006; Shiroma et al., 2010; Yang et al., 2012). In addition, incarcerated adolescents affected by TBI related to neurocognitive difficulties may display maladaptive behaviors to the jail environment, resulting in a disparate frequency of fights, injuries, and infractions compared to those who not affected by TBI.

From both a health and safety perspective, this is important for correctional management. Correctional facilities are often plagued with a culture of violence stemming from a complex set of societal, psychological, physiological, institutional, and political factors. This complicates the multifaceted roles and responsibilities of correctional staff and management who are responsible for enforcing the regulations and governing the operation of correctional institutions. As a part of their job, correctional officers are in intense and dangerous situations where they are required to

respond in a way that curbs violence and injuries in the facility, while also sometimes having to consider underlying causes of the behavior such as mental illness, substance abuse, and gang involvement.

Purpose, Goals and Objectives

The purpose of this study is to investigate the potential contribution of neurological anomalies to the maintenance of antisocial behaviors among adolescent offenders by assessing the prevalence and correlates of TBI among adolescent males in Rikers Island, New York City jail. The goals are the following: (a) to establish the prevalence of TBI in this population; (b) to examine TBI as a predictor of injuries, fights, and infractions in the facility; and (c) to examine TBI as a predictor of recidivism and the amount of time it takes to recidivate. To attain these goals, there are two major objectives: (a) quantitative analyses of administrative health and justice data collected from 300 detainees; and (b) qualitative analyses of in-depth face-to-face semi-structured interviews with 20 detainees.

Based on the contextual, theoretical, and empirical framework of the study, this mixed methods study focused on three main research questions:

1. Is TBI more common in the adolescent jail population than in the general adolescent population? Why? How do these inmates feel about these injuries?
2. Do adolescent inmates who suffered a TBI experience unique custodial challenges in regards to fights, injuries, and punitive segregation?
3. Do adolescent inmates, who suffered a TBI, have unique re-entry challenges that lead them to recidivate more frequently and more quickly?

Importance of the Study

The higher prevalence of TBI in incarcerated populations could indicate the frequent incarceration of those with cognitive behavioral and other psychological difficulties. Figure 1.1 demonstrates institutionalization in the United States between 1930 and 2000.

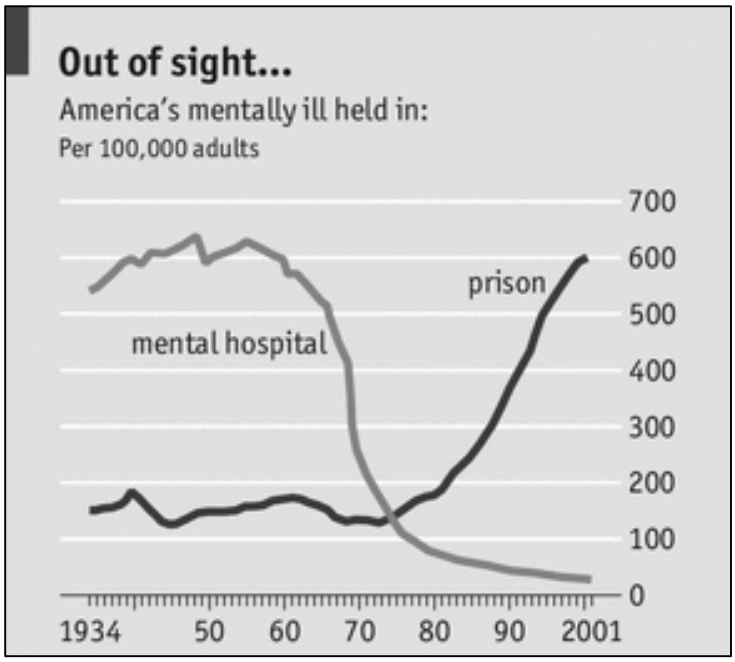


Figure 1.1. Institutionalization in the U.S. since 1930. Reprinted from "An institutionalization effect: The impact of mental hospitalization and imprisonment on homicide in the United States, 1934–2001," by B. E. Harcourt, 2011, *The Journal of Legal Studies*, 40, p. 39. Copyright 2011 by *the Journal of Legal Studies*. Reprinted with permission.

The deinstitutionalization of psychiatric hospitalization and decreased availabilities of psychological services since 1960 might be associated with an increase in the number of inmates with mental health problems (Barr, 1999). As a result, correctional facilities are sometimes termed "the new asylums" (Shenson, Dubler, & Michaels, 1990) because they now play a greater health care role both during and after incarceration than ever before. This is particularly important for the study of correctional health, as the health status of the jail population connects to the health status of a community (Korb, 2011).

This is one of the first studies of TBI in the New York City jail system using a mixed methods approach. The study will contribute to the literature by identifying the prevalence and the correlates of TBI in this population and will advance the field of correctional health by offering information about challenges faced by inmates affected by TBI. The quantitative and qualitative components both independently and combined will pave the way for further research on this topic.

CHAPTER TWO: CONTEXTUAL FRAMEWORK

Definition of TBI

A TBI occurs when sudden trauma causes temporary or permanent damage to the brain and its neurological functioning (Buck, 2011; National Institute of Neurological Disorders and Stroke, 2014a). This could be due to internal factors such as stroke, infectious disease, or ingestion of toxic substance trauma, or it could be due to external factors such as vehicle accidents, gunshot wounds or other types of injuries (Luiselli et al., 2000). The focus of this study will be on TBIs that occur from external forces.

Trauma from external factors can generally occur from either a closed or a penetrating injury that disrupts neurological or neuropsychological functioning (Buck, 2011; CDC, Department of Health and Human Services, 2011; Labbe, 2012; Marshall et al., 2012; Yang et al., 2012). A *closed injury* is when a blow (such as being hit by a baseball) to the head causes damage to the brain, or when acceleration, deceleration, and/or rotational forces of the head (such as forces to the head and neck from an airbag) cause the brain to bounce off the surface of the skull. A penetrating injury occurs when an object pierces the skull and enters the brain tissue (such as a knife wound to the head) (Buck, 2011; National Institute of Neurological Disorders and Stroke, 2014a).

Symptoms and Classification of TBI

The severity of brain damage ranges from mild to severe based on the physiological symptoms that occur during and after the injury (CDC, Department of Health and Human Services, 2011; Marshall et al., 2012; Yang et al., 2012). There are three main symptoms: (a) being in a coma (the level of consciousness based on the person's ability to respond to the environment, (b) an alteration of consciousness ([AOC], feeling dazed, confused, having

difficulty thinking clearly, or losing consciousness for a prolonged period of time), and (c) post-traumatic amnesia (the inability to remember the events that occurred immediately before or after the injury) (Marshall et al., 2012). These three measures classify TBIs into different categories.

Mild traumatic brain injuries (mTBI) are commonly referred to as a concussion and may involve an AOC for up to 24 hours (including a loss of consciousness for less than 30 minutes) and post-traumatic amnesia for less than 1 day. Immediate symptoms are headaches, dizziness, nausea, and vomiting. Brain imaging technology cannot adequately detect symptoms.

Moderate traumatic brain Injuries are associated with an AOC for up to 24 hours (including a prolonged loss of consciousness for at least 1 hour) and post traumatic amnesia for between 1 and 7 days. Brain imaging technology can detect symptoms of abnormal neurological activity and functioning**.**

Severe traumatic brain injuries are linked to serious neurological dysfunction sometimes involving an alteration of consciousness. An AOC can be a coma or having a complete loss of consciousness for more than 24 hours, and/or post-traumatic amnesia for more than seven days. Brain imaging technology can detect symptoms including abnormal neurological activity, skull fracture, intracranial hemorrhaging, or contusions.

It is important to note that some research indicates that multiple mTBIs could have a cumulative effect, resulting in more severe effects over time (Cifu, Steinmetz, & Drake, 2014; Weill Cornell Brain and Spine Center, 2014).

Physiology of Brain Damage

To understand how TBIs can lead to neurological anomalies that can have long term effects, it is essential to understand the physiology of brain damage. The physiological damage

resulting from TBIs are primary and secondary injuries to the cerebral cortices, the brain's outer layer of neural tissues (Labbe, 2012; Lundgren, 2012; Yang et al., 2012). The brain consists of right and left cerebral cortices that are made of gyri (folded bulges), protecting the brain's cerebrum and cerebellum (Figure 2.1).

Figure 2.1. Right and left cerebral cortices of the brain (gray matter).

(Left) Reprinted from Cerebral Cortex Motor Areas, by *Anatomy of Humans*. Retrieved from http://anatomyofhuman.net/wp-content/uploads/2015/05/left-side-of-brain-controls-what-functions-555dd2736aad9.png. Copyright 2015 by Anatomy of Humans. Reprinted with permission.

(Center) Reprinted from Anatomy of the Brain, by *Johns Hopkins Medicine.* Retrieved from http://www.hopkinsmedicine.org/healthlibrary/conditions/nervous_system_disorders/anatomy_of_the_brain_85,P00773/. Copyright 2015 by Johns Hopkins Medicine. Reprinted with permission.

(Right) Reprinted from Cerebral Cortex, by *Psych Brain Trust.* Retrieved from https://psych-brain-trust.wikispaces.com/Cerebral+Cortex. Copyright 2015 by Psych Brain Trust. Reprinted with permission.

Primary injuries occur immediately after the initial trauma and tend to be structural, causing deformation in brain tissue. Secondary injuries may take longer to appear and can cause diminished brain activity in regions that negatively affect cognition (Yang et al., 2012).

Combined, primary, and secondary injuries may disrupt the brain's multiple, widely distributed neural networks that may compromise various cognitive functions (Cralidis, 2012).

Primary injuries are focal, and can occur because of a blow to the head causing a coup impact or a coup-countercoup impact or because of acceleration-deceleration, rotational forces, or penetrating wounds to the head (Cralidis, 2012). Figure 2.2 demonstrates a closed blow coup-contrecoup injury.

Figure 2.2. Coup and contrecoup closed head brain injuries.

Reprinted from Concussion, by *Physio Atlas*. Retrieved from http://www.physioatlas.com/en/concussion. Copyright 2015 by Physio Atlas. Reprinted with permission.

A coup impact is when there is injury at the specific site of the blow. A *contrecoup impact* is when the injury occurs to the opposite side from the site of the blow as result of the force of the coup blow propelling the brain towards the back of the skull (Cralidis, 2012; Labbe, 2012). These impacts can cause skull fracture, cerebral contusion (bruising), or diffuse axonal injury (resulting in widespread cell death). Figure 2.3 demonstrations how acceleration–deceleration and rotational forces can also cause the brain to move and bounce around within the skull.

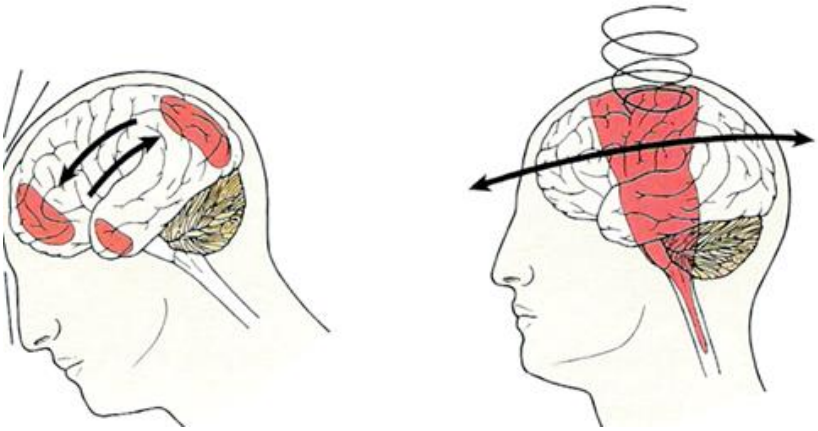


Figure 2.3. Acceleration–deceleration close head brain injuries.

Reprinted from Traumatic Brain Injury, by *Nursing Help.* Retrieved from http://www.nursing-help.com/2011/08/traumatic-brain-injury.html. Copyright 2011 by Nursing Help. Reprinted with permission.

These types of impacts can lead to twisting and stretching in the brain, have neurophysiological effects such as inflammation, edema (swelling and fluid buildup), excitotoxicity (damage to or death of nerve cells), and can produce damage within frontotemporal, occipital, and subcortical regions (Cralidis, 2012). Figure 2.4 demonstrates a penetrating wound to the head and brain, which can evidently lead to both structural and functional damage of the brain.

Similar to non-penetrating wounds, primary injuries include hemorrhaging, edema, and diffuse injury, which can be further complicated by secondary injuries (Barth & Hillary, 2000). Secondary injuries are diffused and molecular in nature. They frequently occur as a reaction to primary injuries and include cerebral edema (swelling), traumatic hematomas (bleeding), apoptosis (neuronal death), inflammation, hypoxemia (low blood oxygen), and hypotension (low blood pressure) (Cralidis, 2012; Di Giovanni et al., 2005; Labbe, 2012). Collectively, secondary injuries can contribute to widespread neuronal degeneration and tissue loss, compromising the cortical and subcortical tissues. This worsens the outcomes for those suffering from a TBI. In

addition, if another TBI occurs before the symptoms of the first head injuries have been resolved, the symptoms of the second injury are much more severe (Cifu et al., 2014; Weill Cornell Brain and Spine Center, 2014). Consequently, multiple concussions over time can result in serious long-term neurological damage and functional deficits (Dennis, 2009).

Figure 2.4. Penetrating brain injuries. Reprinted from Radiology of Ophthalmic Emergencies: A Pictorial Guide to Emergency and Emergent Radiology Investigation, in *Abstracts Online,* by D. Mullan, V. Gough, R. Symtes, & S. Lea. Copyright 2007 by Abstracts Online. Reprinted with permission.

Diagnoses and Consequences of TBI

The detection of TBIs can help gain insight into the symptoms and guide cognitive recovery to prevent long-term damage and consequences. Severe or moderate TBIs are relatively easy to detect using diagnostic technology such as computer tomography (CT) scans and magnetic resonance imaging (MRI), together with as focal neurological functioning assessment (Buck, 2011; Curtis, 2012). Mild TBIs, however, are difficult to diagnose and complex to study for two main reasons: first, many individuals who sustain an mTBI do not seek out medical attention because the symptoms are not always alarming, and second, evidence of the neurological damage from an mTBI cannot reliably be detected by CTs or MRIs (Buck, 2011; Curtis, 2012).

There is no biomarker for TBI, which makes it difficult for imaging techniques (i.e., MRI, CT, DTI, and PET) to adequately capture the extent of the injury (Corrigan & Bogner, 2007). While these technologies allow for detection and can inform treatment of more severe brain injuries, they cannot asses the neurological damage of milder TBIs. The immediate symptoms of mTBI can resolve themselves within a few weeks to a few months after the injury, diminishing evidence of cell dysfunction without permanent structural damage. Despite this, the non-pathophysiological mechanisms that result in biochemical anomalies remain (Curtis, 2012). Therefore, the damage that generally results from a milder TBI is more molecular in nature, disrupting the neural networks of the brain, which cannot be easily detected through brain imaging. Until technology advances, the main source of information about mTBI is self-report (usually much later after the injury) (Marshall et al., 2012).

The literature well documents the consequences of TBI, but mTBI can lead to disrupted neurological functioning that reduces information processing speed, concentration, memory, and attention (Borgaro, Prigatano, Kwasnica, & Rexer, 2003; Huw Williams et al., 2010). Research also suggests that mTBI may alter frontal lobe functioning, causing problems with executive functioning, which inhibits the ability to reason, think abstractly, use judgment, and control impulses (Korb, 2011). TBIs result in a number of physical and mental short and long-term consequences. Figure 2.5 provides a compilation from the literature exemplifying some of the documented consequences from TBIs that affect cognitive and behavioral functioning, physical and emotional wellbeing, and psychological and psychiatric health.

Cognitive/behavioral	Physical/ Emotional	Psychological/Psychiatric
▪ Thinking clearly	▪ Headaches	▪ Attention deficit hyperactivity disorder (ADHD)
▪ Memory	▪ Blurry vision, dizziness	▪ Post-traumatic stress disorder (PTSD)
▪ Poor concentration	▪ Nausea, vomiting	▪ Obsessive compulsive disorder (OCD)
▪ Remembering information	▪ Sensitivity to noise light	▪ Anxiety disorder
▪ Easily distracted,	▪ Balance problems (vertigo)	▪ Depressive disorders
▪ Strategic learning	▪ Fatigue	▪ Mania
▪ Information processing	▪ Irritability	
▪ Slowed thinking and response	▪ Sadness	
▪ Difficulty finding words/communicating	▪ Emotional	
▪ Slower reaction	▪ Anxiety	
▪ Decreased situational awareness	▪ Mood Swings	
▪ Speech and language	▪ Aggression	
▪ Executive function: reasoning, judgment, impulse control		

Figure 2.5. Long- and short-term consequences of TBI

Treatment of TBI

Since detecting severe to moderate TBIs are relatively easy, treatment is usually immediate. Emergency medical treatment focuses on preventing secondary injuries, beginning with stabilization (ensuring proper oxygen supply and blood flow to the brain and body, and controlling blood pressure), followed by severity classification (assessing level of consciousness and neurological functioning) (National Institute of Neurological Disorders and Stroke, 2014b). Based on diagnosis and prognosis, a continuum of care may include options such as surgery and

post-surgery care, pharmaceuticals, physical therapy, cognitive therapy, outpatient care, and long-term case management (Brain Injury Association of America, 2014). In the case of mTBI, however, symptoms are difficult to detect but can sometimes be resolved on their own with a critical rest and recovery period to avoid secondary injury and/or further multiple mTBIs and its cumulative consequences. Treatment for mTBIs focuses on early intervention through symptom management, supervised rest and relaxation, monitored progressive exercise, recovery, patient education, and therapeutic services if required (Marshall et al., 2012).

Prevalence and Significance of TBI

TBI is a growing public health concern. The CDC estimated that in 2010 there were approximately 2.5 million TBIs[1] in the United States, excluding military personnel serving abroad and those who did not seek medical care[2] (CDC, 2014). This means that in 2010, approximately 824 people per 100,000 people were affected by a TBI (a spike from 566.7 per 100,000 people in 2007 and from 595.1 per 100,000 people in 2006). Prior to this, between 2002 and 2006, approximately 1.7 million people per year in the United States sustained a TBI with the most common external causes being falls (35.2%), unknown (21%), motor vehicle accidents (17.3%), being struck by a moving or stationary object (16.5%), and assaults (10%) (Faul, Xu, Wald, & Coronado, 2010). On average, TBI has resulted in 1,365,000 emergency department visits, 275,000 hospitalizations and 52,000 deaths each year.

Research also indicates that some groups, such as infants, adolescents, and males, are more likely to sustain TBIs from unique external causes (Faul et al., 2010). Between 2009 and

[1] Traumatic brain injuries were estimated based on TBI related emergency department visits, hospitalization and/or deaths. This could results in overestimates since not all visits would necessarily result in diagnosis of a TBI. The average annual number of TBIs was 1.7 million, and is based on 80.7% emergency department visits, 16.3% hospitalizations and 3% deaths. Overall TBI rates are largely driven by the increasing rates of TBI related emergency department visits in more recent years.

[2] This could result in underestimates since it would also exclude those who had a lack of access to affordable healthcare.

2010, the highest rates of TBI were reported among infants 0-4 years (2193.8 per 100 people) and adolescents 15-years (981.9 per 100,000), and injuries were more common among males than females (800.4 per 100,000 vs. 633.7 per 100,000) (CDC, 2014). Since 2001, the rates of TBIs have always been highest amongst males, infants, and adolescents, and between 2005 and 2010, these rates have consistently increased. During 2006–2010, the primary mechanism leading to TBI-related incidents for infants (0-4 years) was falls (72.8%), and for adolescents (15-19 years) included assault (~23%), falls (~22%), and motor vehicle accidents (~21%) (CDC, 2014). For all age groups, falls were the leading cause of TBI with the exception of adolescents (15-24 years), for which it was assaults.

TBIs in younger populations is of particular importance because the disruption in biochemical properties of developing brains and skulls can lead to differing neurological activity patterns compared to when a TBI occurs in adults (Pinto, Poretti, Meoded, Tekes, & Huisman, 2012). Susceptibility to brain injury is higher during infancy and childhood due to anatomical factors (i.e., the head being heavier relative to the body, weaker neck muscles, cerebral white matter containing less myelin which is essential for proper functioning of the nervous system), and higher water content in the brain, making it softer and more vulnerable to injury) (Pinto et al., 2012). Although the effects of TBI for younger populations may be easy to overcome since the brain has more plasticity and physical recovery is generally positive, some cognitive and behavioral deficits that initially appear to be minor or nonexistent can later manifest, causing developmental difficulties in the future (Engberg & Teasdale, 1998). The early assessment and intervention of TBI in younger populations is essential in preventing long-term consequences.

Contemporary neuroimaging research demonstrates that brain growth and development continue during adolescence, well in to the twenties (Johnson, Blum, & Giedd, 2009).

Researchers consistently demonstrate that TBIs are frequently reported in the adolescent male population, often as a result of assault, and some suggest that TBIs can put children at a higher risk for delinquent behaviors during adolescence due to its potential for long-term cognitive, emotional, and social consequences (Buck, 2011; Cralidis, 2012; Huw Williams et al., 2010; Pinto et al., 2012; Yang et al., 2012). The current study sets out to understand TBI within the adolescent inmate population in the New York City jail system.

CHAPTER THREE: THEORETICAL FRAMEWORK

Bio-Social Criminology

The theoretical framework for the current study on TBIs and antisocial behaviors among detained adolescents in the New York City jail system uses a bio-social criminological approach with a focus on neurocriminology. Bio-social criminology puts forth that antisocial behavior is a function of a multitude of factors from a person's biological make up to social and environmental factors, which interact and evolve dynamically throughout life (Fishbein, 2001). Various biological factors (i.e., autonomic under-arousal, obstetrical factors, brain deficits, and neuropsychological impairments) are linked to antisocial behaviors, and, independently, social and environmental factors (i.e., low social class, peer influence, and physical abuse) have been associated with antisocial behaviors (DeLisi & Beaver, 2012).

For the most part, extensive research has established social and biological risk factors independent of one another, but there has been very little attempt to understand their interaction effects (DeLisi & Beaver, 2012). Particularly when thinking about explaining antisocial behavior and criminality, for most of the 20th century criminological theories have used a strong reliance on sociological factors (Fishbein, 2001; A. Raine, 2002; A. Raine, 2013a). However, with the idea that crime and behavior is complex and unlikely to be adequately understood and effectively addressed without using an overarching conceptual framework, there has been recent encouragement to develop an interdisciplinary understanding of the interaction between biological, social, environmental, and psychological factors (Fishbein, 2001; Ward & Durrant, 2011). Contemporarily, the framework that best incorporates these factors when examining criminality is bio-social criminology.

The bio-social criminology approach to crime emphasizes the interdependence between biological and environmental influences on antisocial behavior (Beaver & Walsh, 2010; A. E. Raine, Brennan, Farrington, & Mednick, 1997; Walsh & Beaver, 2008). It focuses on violence, aggression, and antisocial behavior rather than on crime and criminality, which not static, as they defined by social construction within specific contexts (Rose, 2000). Some researchers believe that antisocial behaviors are the result of biological underpinnings that interact with environmental factors and lead to criminal activity, but these biological characteristics are not deterministic. Similar environments have different effects on different people (Walsh & Beaver, 2008) and some biological malfunctions, such as a brain injury, can themselves be the result of environmental factors (Beaver & Walsh, 2010; Rowe, 2002). Bio-social criminology states that an individual's biological and genetic make-up puts them on a particular developmental trajectory, but aversive social and environmental situations can send those trajectories askew resulting in criminal behavior.

Some bio-social criminologists talk about the interaction between sociological and physiological factors that lead to antisocial behaviors with the use of the social push hypothesis (A. Raine, Venables, & Mednick, 1997; Wilson & Scarpa, 2012). Based on this hypothesis, psychophysiological impairments may have greater influence when social predispositions to crime are minimized, and social disadvantages may have a greater influence for those who had early exposure to adverse environmental conditions (DeLisi & Beaver, 2012). This means that if an individual is not exposed to social risk factors that could push them towards antisocial behavior, then it is likely that physiological factors might better account for their antisocial behavior. However, if an individual has exposure to social risk factors, the biological mechanisms still exists, but the sociological factors have a greater influence. While sociological

factors provide sufficient information about criminal behavior, some subset of individuals may be more heavily influenced by physiological factors solely or in combination with social factors (Wilson & Scarpa, 2012).

Bio-social criminologists posit that biological factors early in life can push some kids toward violence when placed in environments of social disadvantages sometimes leading to the perpetuation of crime. It suggests that behavior is determined in part by a set of biological predispositions (such as genetically acquired biological traits) that can predispose individuals to certain psychological and behavioral outcomes in particular environmental settings (DeLisi & Vaughn, 2014; A. Raine, 2013a; Van den Berghe, Pierre L, 1974). Behavior is the result of the relationship between traits that people are born with and their subsequent experiences and the probability of pathological responses increase in the presence of adverse environments and severe external stressors (Fishbein, 2001). Under the bio-social criminological approach, it is important to understand how the anatomical underpinnings of violence interact with external forces to produce antisocial behaviors (A. Raine, 2013a).

Neurocriminology

Bio-social criminological approaches typically focus on three main factors: genetics, evolution, and neurophysiology (Walsh & Beaver, 2008). Brain injuries are neurophysiological in nature, so to investigate the potential impact of brain impairments on antisocial behaviors for this study, this study is guided by the bio-social criminological principles of neurocriminology. Neurocriminology is a relatively new and emerging field. It focuses on studying the brain to identify neurological and genetic predispositions for violent and antisocial behavior based on the idea that physiological traits of the brain underlie all behavior (A. Raine, 2013b). In other words, all behavior originates in the brain, and has a neurological basis. Brain impairments that inhibit

or affect neurodevelopment can create a biological risk for antisocial behavior (Glenn & Raine, 2013; A. Raine, 2013a).

It is important to note that neurocriminology does not focus on attempting to reverse neurological damage, but to understand its effects to promote prosocial neurological development. It is not deterministic. The brain is malleable, with new neural connections continuously evolving and developing through observation and experience (Ross, 2008). The belief is that by identifying biological risk, people can create new personal narratives over time to strengthen neural connections that encourage and lead to prosocial behavior.

To support this theory, advances in neuroscience focus on examining the anatomy, physiology and chemistry of the brain using technology such as electroencephalograms (EEGs), MRI, functional magnetic resonance imaging (fMRI), positron emission tomography (PET) and single photon emission computed tomography (SPECT) (Walsh & Beaver, 2008). These technologies have the ability to reveal information about the structure (anatomy) or the functioning (the processing of information) of the brain and can advance our understanding of how our biology influences our behavior (Glenn & Raine, 2013).

Theoretical Challenges

It would be careless to neglect the historical contexts that lead to the use of predominantly sociological explanations of criminal behavior and the dangers of using biological approaches to understanding antisocial behavior. Early biological criminological work argued that antisocial behaviors occurred because some biological characteristics were deterministic in nature (Ferri, 1884; Garofalo, 1914; Hooton, 1939; Lombroso, 1911). Characteristics varied from physical features that appeared unevolved, the somatotype of an individual.

If someone had a certain biological trait, they were considered a criminal, which had detrimental effects on application and policy development and implementation. Ultimately, principles of biological criminology resulted in crime prevention proposals that involved eugenics (Rafter, 1997; Vaske, Galyean, & Cullen, 2011). The eugenics movement was an effort to breed better humans by encouraging the reproduction of people with "good genes" and discouraging those with "bad genes." This lead to racial and ethnic segregation, restrictive immigration policies, and sterilization of those considered genetically unfit; this influenced the Nazis' use of biological characteristics to create Aryan and Non-Aryan typologies, eventually culminating in the Holocaust (Fishbein, 2001; Adler, Lauger, & Mueller, 2009). The dangers of using biological criminology and lessons learned from eugenics are well researched and sufficiently documented (Boas, 1916; Chesterton, 1917; Sutherland, 1917; Ward., 1913). The works of various eugenics researchers influenced the field of criminology, which was influential in the shift towards a predominantly sociological approach to understanding antisocial and deviant behaviors.

Understandably, there is much discomfort with considering biological influences on antisocial behaviors because the idea that biological reductionism (reducing violence to a biological cause) is deterministic removes elements of accountability, responsibility, and free will/choice, and neglects social injustice in communities (Fishbein, 2001; A. Raine, 2013a). In addition, in looking for biological predispositions, there is concern that claims for causal relationships between biology and criminal behaviors will again be used for harm, leading to the establishment of racial differences, inferiority in groups, and the justification for gross inequalities in society (Fishbein, 2001). There is much fear of what using biological based explanations of behavior might imply (Fishbein, 2001). If biological characteristics are

associated with antisocial and violent behaviors, will this lead to the medicalization of antisocial behavior and therefore less focus on punishment since the element of individual choice will be removed? Would it mean there is an attempt to predict dangerousness and that there is an obligation to intervene or mandate treatment? Bio-social criminology takes seriously the historically negative uses of biology to explain crime and the ongoing risk of its use for racism and eugenics, but is sensitive to the increased recognition of human rights and ethical violations (Rafter, 1997; Vaske et al., 2011; Walsh & Beaver, 2009). Despite this, there should be an awareness that the production and consumption of research is often not controlled by the researcher and can be misconstrued for the purpose of supporting unethical policies and promoting injustice (DeLisi & Vaughn, 2014).

Bio-social theory has the potential to contribute to existing criminological theories (DeLisi & Vaughn, 2014). There have been a small number of attempts to integrate social, biological, and psychological disciplines for a more comprehensive understanding of antisocial behaviors, but there is a need for further development (A. Raine & Liu, 1998; A. E. Raine et al., 1997). Bio-social factors are critically important in understanding violence and can offer humane treatment of offenders and for treating the epidemic of violence and crime in society (A. Raine, 2013a). The goal is not to make changes based on biological factors, but to develop prevention efforts that could focus on improving healthy human development while considering both internal and external factors together. It is important to not censor the past and diminish the significance of the lessons learned from history, as this would be an active suppression of new knowledge (A. Raine, 2013a). Understanding bio-social factors of violence and antisocial behavior can inform prevention and intervention, with more compassionate rather than punitive

responses to antisocial behavior, and theories that do not incorporate the instrumental influence of biology on behavior would be in some form misguided and incomplete.

CHAPTER FOUR: EMPIRICAL FRAMEWORK

Neuroscience, Stressful Environments, and Behavior

The recent neuroscience revolution and ongoing advances in brain imaging technology has led to the rapid development of bio-social research. This development is allowing for a greater understanding of the neurobiological processes that are associated with behavior, particularly with antisocial behavior (Cornet, de Kogel, Nijman, Raine, & van der Laan, 2014; DeLisi & Vaughn, 2014). A significant body of accumulating evidence supports that brain deficit, structural/functional abnormalities, or brain damage, may act as precursors to the development of antisocial behavior by heightening a person's sensitivity to negative environmental circumstances (DeLisi & Beaver, 2012; Moffitt, 1997).

The brain structure and its biochemical properties are specified largely by a person's genetic makeup; Shore (1997) puts forth that 50%-60% of a person's genes are involved in brain development. In addition, the brain consumes 20% of the body's energy to perceive, evaluate, and respond to environmental stimulus through an intricate network of neurons that are sorted into domain specific neural modules (Walsh & Beaver, 2008). Some of these domains (i.e., the stem) are hardwired at birth, and others (i.e., the cerebral cortex) are developed and shaped by environmental experience during the building of neural networks in early developmental years (Seth & Baars, 2005). Neural networks and pathways develop early in life and can become resistant to elimination pathways later on. Neural networks that are shaped by stressful and traumatic experiences (i.e., violence) tend to process subsequent events along the same pathways, increasing the risk of antisocial behavior. This occurs because ongoing exposure to trauma during the brain development phase reinforces the idea on the neural circuitry that the

world is hostile, and it follows that these established neural pathways are then more easily activated (Walsh & Beaver, 2008).

Extensive research on stress on the brain shows that people with stress-related illnesses (e.g. post-traumatic stress disorder) have brain abnormalities such as compromised gray and white brain matter. These parts of the brain are responsible for storing and processing information, creating neural pathways in the brain and the speed at which neurons and electrical signals flow (Chetty et al., 2014). Chronic stress can trigger long-term changes in brain structure and function. For example, stress can affect the volume of gray matter (responsible for executive functioning), white matter (create neural networks), the size and connectivity of the amygdala (responsible for emotional regulation), and the hippocampus (responsible for memory). The amygdala and the hippocampus together are responsible for the brain's fight or flight response (i.e., impulse control) (Bergland, 2014).

The mechanisms by which stressful environments can influence the brain are through the release of cortisol. Cortisol is the stress hormone and can hardwire the pathways between the hippocampus and the amygdala that makes an individual predisposed to being in a constant fight or flight mode. It can inhibit connects to the prefrontal cortex (Bergland, 2014). Suggestions from the study encourage "healthy" or "moderate" stress such as playing sports or studying which can build stronger circuitry and a more resilient brain. Routine physical activity and mindful meditation can also reduce stress and lower cortisol levels.

The current study examines adolescents who are constantly in stressful and violent environments both in the community and in the jail. Principles of neuroscience would suggest that these adolescents' exposure to ongoing stress at a time when their brains are still developing could lead to various behavioral difficulties. In addition, those suffering from a TBI and its

related consequences could face even further challenges, particularly if they do not seek treatment.

The brain is responsible for behavioral choice and environmental/stimulus response, and neuropsychological cognitive deficits in childhood is consistently observed as one of the strongest correlates of behavioral difficulties and cognitive/emotional processing (Fishbein, 2001; Moffitt, 1993; Moffitt, 1997; Rocque, Welsh, & Raine, 2012; Rowe, 2002; van Goozen, Fairchild, & Harold, 2008). These neuropsychological cognitive deficits are often observable by people having difficulty with planning and organization, having selective attention and inhibitory control, and having difficulty with attention, memory, verbal skills, and intelligence (usually referred to as executive or higher level functioning) (Morgan & Stewart, 1999; Rocque et al., 2012; Tibbetts & Piquero, 1999). The most recent research in neuroscience research supports that these deficits most frequently result from brain damage to the frontal lobe, which is responsible for the aforementioned forms of executive functioning (Cauffman, Steinberg, & Piquero, 2005; Moffitt & Henry, 1989; A. Raine, 2013a).

A significant body of research has examined the impact of brain injury on antisocial behaviors, which could overlap with criminal behavior. Most research suggests that structural and/or functional damage to the prefrontal cortex (located in the frontal lobe) is directly correlated with disinhibited, impulsive, aggressive, and other antisocial behavior (A. Raine, 2013a; Verplaetse, 2009). Although a child's brain has greater plasticity than an adult's brain, brain injuries during this developmental phase can be a predisposition to conduct disorder and externalizing behavior problems (Max et al., 1998; A. Raine, 2013a). However, it is important to note that these behaviors could also be due to other physical, environmental, or social factors.

Neurobiology has been relatively absent in the criminological literature, but bridging neurosciences and criminal justice research can be important in understanding the efficacy and effectiveness of correctional intervention (Vaske et al., 2011). The predictive value of neurobiological factors could provide insight into the variability of treatment (not just what works, but what doesn't work), can improve current screening and treatment, and can contribute to alternative treatment options (A. Raine, 2013a; van Goozen et al., 2008). A growing number of studies have increased our understanding of the interplay between biological, social, and environmental factors, resulting in a more thorough understanding of individual differences in brain structure and function. The neural basis that is involved in the multiple brain processes that are responsible for social and psychological processing can increase the risk of developing antisocial behavior, and it is important to use this information to develop protective factors and promote healthy healing and behavior.

TBI in Criminal Justice Research

TBI among prison and jail inmates is an important health and safety concern (Korb, 2011). Few researchers have examined TBI in offending populations, but a small number of studies suggest that there is a higher prevalence of TBI in incarcerated populations (between 25%-87%) when compared to the general U.S. population (8.5%) (CDC, 2011; Diamond, Harzke, Magaletta, Cummins, & Frankowski, 2007a; Korb, 2011; Wald, Helgeson, & Langlois, 2008). Pre-existing brain injury can increase antisocial behaviors that result in arrest, conviction and incarceration (Miller, 2002) and thus many people in prisons and jails are living with the effects of TBI.

The small number of studies that have focused on TBI in prisons and jails suggests a high prevalence of this injury among inmates, and that some correlates can identify possible risk and

protective factors associated with TBI. Most recently, Kaba, Diamond, Haque, MacDonald, and Venters (2014) found that 50% of adolescent males and 49% of adolescent females in the New York City jail system had pre-existing TBIs, with an incidence of 3,107 TBIs per 100,000 person-years. Prior to this, Wald et al. (2008) compared four U.S. prisons and one New Zealand prison, finding that in each prison the prevalence of TBI was greater than 78%, and was between 36% and 58% when examining TBI with a loss of consciousness. Diamond et al. (2007) found that approximately 83% of male prisoners in a state facility in Minnesota had at least one head injury during their lifetime. Slaughter, Fann, and Ehd (2003) found that among inmates in a Washington county jail, 87% reported TBI in their lifetime and 36% within the prior year. Internationally, a study of Australian prisoners revealed that 82% of the participants had at least one TBI in their lifetime and 65% had a TBI with a loss of consciousness (Schofield et al., 2006). The prevalence of TBI among incarcerated populations is increasingly being documented and though the effects of the neurological anomalies that may result have been difficult to determine, some risk factors in small-scale prison studies have been identified.

In the United States., the CDC (2011) reports that prisoners who have had head injuries tend to experience mental health problems (i.e., depression and anxiety), substance use disorder, difficulty with anger, suicidal ideation and attempts, perpetuated domestic and other kinds of violence, and were affected by homelessness. Wald et al. (2008) found that incarcerated males affected by a TBI were more likely to have substance abuse problems and psychiatric disorders, and that incarcerated females convicted of a violent offence were likely to have suffered from a TBI. Slaughter et al (2003) found that jail inmates who reported recent TBI scored poorer on anger, aggression, and cognitive tests and reported more psychiatric disorders. Cohen, Rosenbaum, Kane, Warnken, and Benjamin (1999) found that incarcerated males with a history

of TBI were more likely to have committed acts of domestic violence. In the United Kingdom, adults affected by a TBI entered the custodial system at a younger age, recidivated at a higher rate, and had longer lengths of prison stay (Huw Williams et al., 2010). In a New South Wales prison study (Schofield et al., 2006), TBI increased the risk of further TBI and exacerbated health problems due to the high levels of interpersonal violence that exist in a prison environment.

There have been a small number of studies in prisons using CT and MRI imaging techniques to study the brains of inmates, though they did not particularly examine TBI. Most studies have used brain imaging to understand the association between brain structure and antisocial behavior. Schiltz, Witzel, Bausch-Hölterhoff, and Bogerts (2013) compared brain anomalies among a sample of 162 violent and 125 non-violent offenders using MRI and CT scans. Scans were rated based on the evidence of structural brain damage. Findings suggested a remarkable prevalence of brain pathology among the violent offenders, especially in the frontal and temporal structures (Schiltez et al., 2013). These areas of the brain are essential for controlling aggressive and violent behaviors. Another study by Aigner et al. (2000) used MRI brain imaging to examine 96 inmates in a high security prison who were stratified as being in either a high violent sex offender group or a no-low violent sex offender group. Almost half of the inmates in the sample (48.8%) had abnormalities, and there was a statistically significant difference between the two groups; the high violent sex offenders showed more abnormalities (59.4%) compared to the low violent sex offenders (22.2%) (Aigner et al., 2000). Ly et al. (2012) used MRIs in a sample of adult male prison inmates diagnosed with psychopathy to examine the thickness of their brain cortex based and functional connectivity. The researchers based the study on the idea that cortical thickness could measure neurobiological abnormalities in various

psychiatric disorders. Results showed that psychopaths had thinner cortices in a number of brain regions not related to age, IQ, or substance use (Ly et al., 2012) . This suggested an association between cortical thinning and reduced functional connectivity. Lastly, Bufkin and Lutrell (2005) examined 17 neuroimaging studies demonstrating that certain areas of the brain were associated with aggressive and/or violent behavior. Findings about emotional regulation also show the relevance of emotional dysregulation in understanding aggressive and violent behaviors (Bufkin & Luttrell, 2005). However, the field of criminology and criminal justice is still cautious about the use of these techniques because of aversion to biological explanations or contributions to the field.

The current study is unique in that it sets out to explore how damage to the brain may lead to difficulties and maladaptive behaviors in aversive jail environments. The purpose is not to predict future criminality or increase supervision of those identified as having had a TBI, but rather to utilize a therapeutic approach in creating healthy environments for healing and rehabilitating. Due to a high overlap of adolescents who have TBI and who enter the system, it is imperative that their correctional management consider potential cognitive impairments that may have resulted from a brain injury. These inmates may display behaviors due to emotional dysregulation and delayed information processing, and are then be further punished for disobedience.

Management of prison inmates with TBI is challenging because TBI can cause attention deficits (making it difficult to follow or respond to instructions); memory deficits (making it difficult to remember rules); irritability (leading to conflict); slowed verbal and physical responses (causing the appearance of insubordination). It is also associated with difficulty with impulse control, anger physical and verbal aggression (CDC, 2011; Farrer, Frost, & Hedges,

2012; Schofield et al., 2006). These difficulties can lead to what appears to be incompliant behaviors, resulting in disciplinary infractions and fights (Huw Williams et al., 2010; Korb, 2011). Evidence suggests that reoccurring TBIs (i.e., resulting from fights and violence in prisons and jails) can have a cumulative effect and have poor clinical outcomes (Schofield et al., 2006). TBI can also interfere with rehabilitative efforts and academic achievements that can make successful reintegration into the community difficult (Yang et al., 2012). Prisoners who suffer from TBI have been found to also experience mental health problems (i.e., depression, anxiety, suicidal thoughts or attempts) and substance use disorders, posing more complex challenges for inmate care and release plans (CDC, Department of Health and Human Services, 2011).

The neurological impact of TBI during early brain development results in cognitive behavioral effects that can put younger populations at risk for criminal behaviors (Buck, 2011; Luiselli et al., 2000). Within adolescent male populations, TBI appears to be a significant chronic health condition, as they generally have higher rates than non-offender populations (Huw Williams et al., 2010). Neurological anomalies that result from early injuries in this population can complicate effective custodial management and treatment, which can also pose challenges to reentry and reintegration. Persisting symptoms of TBI continue to be a large health care problem and there is a need for continued research to better explain their causal factors, and evaluate the psychological, social, and motivational factors that contribute to persisting symptoms (Curtis, 2012).

Understanding challenges faced by adolescent inmates affected by TBI can lead to better management and care during incarceration and provision of appropriate resources upon release (Korb, 2011). This study will focus on understanding the prevalence and correlates of adolescent

males in Rikers Island. With a focus on TBI, the examination of quantitative data consisting of electronic health and justice records will be combined with exploration of qualitative data drawing on narratives and detailed accounts of inmates' custodial experiences.

CHAPTER FIVE: STUDY SETTING

The current study set out to explore TBI among adolescents housed in Rikers Island. The researcher selected this setting for three reasons:

1. the unique nature of the environment as a case study;
2. the feasibility of access to conduct a mixed methods study and
3. the opportunity to conduct applied research as part of a collaboration with NYC DOHMH.[3]

Neuroscience has found that stress and violence can cause structural and functional changes in the brain, leading to various behavioral difficulties. Change in gray matter can lead to impaired executive functioning; change in white matter can deplete neural networks and therefore interrupt information processing and its speed; and disconnect in the amygdala and hippocampus can result in difficulties with emotional regulation and impulse control. Implementing this study in Rikers Island will allow the potential to capture and better explain how those with TBI, when placed in significantly hostile setting, may face a specific set of custodial challenges due to TBI-related consequences (e.g., delayed information processing).

In addition, the NYC DOHMH is responsible for administering health care in Rikers Island and maintains health and custodial records for all inmates. As part of a mutual data sharing agreement, negotiation for access to inmates for interviews and for administrative data to analyze facilitated the desired mixed methods approach to this study. Lastly, collaborative work with the agency responsible for administering health care in Rikers Island offers the opportunity to inform change in the facility. This chapter contextualizes the study setting by discussing the

[3] New York City Department of Health and Mental Hygiene

New York City jail system as a whole, Rikers Island, and adolescents in Rikers Island. A number of policy changes that occurred in Rikers Island during the course of the study are also presented.

New York City's Jail System

The New York City's (NYC) jail system is the nation's second largest, with approximately 80,000 annual admissions (i.e., 12,000 per day) (Graves et al., 2015). The average inmate population varies between 12,000 and 14,000, which is greater than the entire prison population of many state correctional facilities. Within these jails are inmates who are detained (awaiting trial and/or sentencing), city-sentenced to less than 1 year, parole violators, those awaiting transfer to another Department of Corrections (DOC) or upstate facility, or state prisoners who have been returned to DOC. Of these, approximately two thirds of the NYC jail populations are detainees, and most of the remaining are city sentenced.[4] Most detainees are in held jail because they were unable to afford bail. As a whole, the New York City jail system consists of 32 facilities within four main compartments: (Blau & Gregorian, 2014):

1. Borough jails: There are four borough facilities, one of each in Manhattan, Queens, Brooklyn, and the Bronx, which have a combined capacity of approximately 3,000 inmates;
2. Detention facilities: There are 16 court detention facilities ("court pens") located in the criminal, supreme, and family court buildings in each borough;
3. Hospital prison wards: There are two prison wards for seriously ill inmates requiring intensive psychiatric observation located in Elmhurst General Hospital and Bellevue Hospital.

[4] Jail inmates are either detained, city sentenced, violators of their parole, waiting to be transferred to a DOC facility, waiting to be transferred to an upstate prison facility, or are state prisoners who have been returned to DOC.

4. Rikers Island: This island has 10 jail complexes that combined hold approximately 10,000 inmates at any given time.

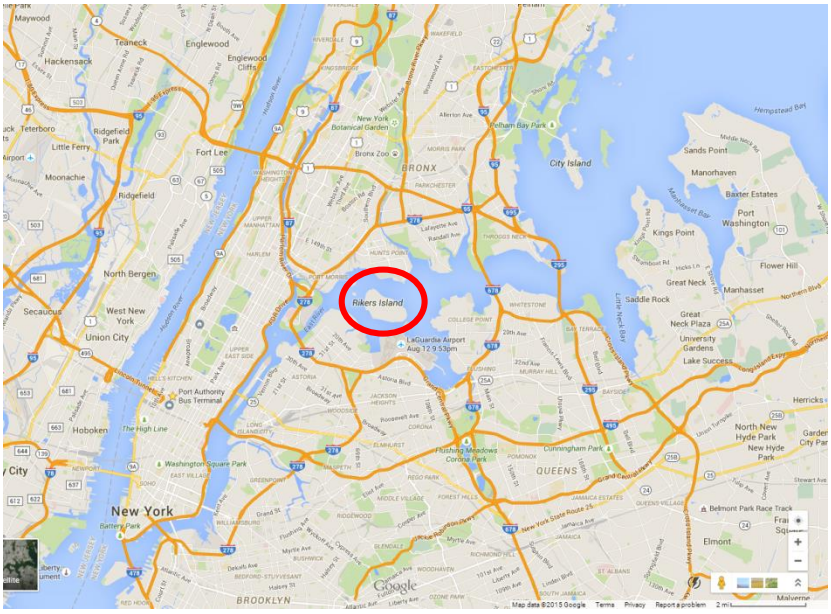


Figure 5.1. Rikers Island map. Reprinted with permission from "Facilities Overview" by the New York City Department of Corrections. Retrieved from http://www.nyc.gov/html/doc/html/about/facilities-overview.shtml. Copyright 2015, New York City Department of Corrections. Reprinted with permission.

Rikers Island

Rikers Island is one of the largest municipal jail complexes in the country (United States Department of Justice, 2014). The island is located in New York City, and is only accessible by vehicle or public transit (only the Q100 bus operated by the Metropolitan Transportation Authority). The sole route to get to the jail is via the Rikers Island Bridge, which connects the borough of Queens to Rikers Island, just near La Guardia Airport (Figure 5.1).

Rikers Island houses most of NYC jail inmates who are awaiting trial and cannot afford, obtain, or were not given bail from a judge (Goldstein et al., 2015). The island has the capacity to hold up to 15,000 inmates, and currently houses approximately 10,000 inmates on any given day. The entire island is comprised of various facilities (Figure 5.2):

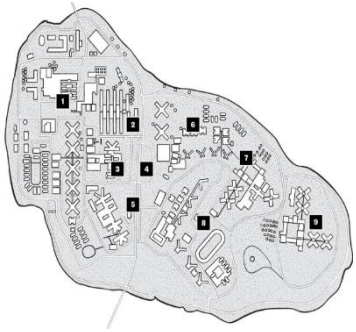
Figure 5.2. View of Rikers Island. Reprinted with permission from "Rikers Island cycle of violence violates teen inmates' constitutional rights DOJ" by R. Blau and D. Gregorian, *New York Daily News*, 2014. Copyright 2014 by the *New York Daily News*. Reprinted with permission.

The 10 main jail housing complexes include the following:

1. North infirmary: Holds inmates who require medical care, who have AIDS-related needs and who require extreme protective custody because of the profile or nature of their case.
2. James A. Thomas Center: No longer houses inmates but was used as a maximum-security single-cell facility.
3. Eric M. Taylor Center: Houses both adolescent and adult male inmates who are serving a city sentence of 1 year or less using a dormitory design.

4. George Motchan Detention Center: Houses adult male detainees.
5. Robert N. Davoren Center: Houses adolescent male detainees using a combination of modular dormitories, sprung structures and cells, and houses inmates in two different punitive segregation wards: RNDC Bing and Restricted Housing Unit (RHU), which is for adolescent inmates with a mental illness.
6. Anna M. Kross Center: Houses adult male inmates and is the location of the methadone detoxification unit.
7. Otis Bantum Correctional Center: Houses adult male inmates and houses inmates in central punitive segregation units (CPSU).
8. Rose M. Singer Center: Houses adolescent and adult female detainees and sentenced inmates, and is the location of a nursery with the capacity for up to 25 infants.
9. George R. Vierno Center: Houses adult male detainees and used to house inmates with a mental illness in the Mental Health Assessment Unit for Infracted Inmates (MHAUII).[5]
10. West facility: Although no longer fully in use, this facility is made up of sprung structures and is the location of the communicable disease unit and holding for high security inmates (New York City Department of Corrections, 2015) (Figure 5.3).

[5] The Department of Corrections closed MHAUII in late 2013



OTIS BANTUM CORRECTIONAL CENTER

1. The 1,647-bed unit contains the 400-bed unit for **punitive solitary confinement (known as the bing, and for being particularly violent)**, plus a new supermax unit where inmates have to be escorted wherever they go.

NORTH INFIRMARY COMMAND

2. Houses **sick inmates who aren't ill enough to be hospitalized**, with separate areas for people needing special protection (like those who have cut ties with gangs) and inmates with HIV or AIDS-related conditions.

ANNA M. KROSS CENTER

3. Contains beds for 2,388 inmates in 40 units. Besides its **high concentration of mental-observation units and a center for inmates under treatment for drug detox**, it contains an experimental unit, where officials now divert inmates who have serious mental illnesses when they violate the rules.

BENJAMIN WARD VISIT CENTER

4. Check-in for visitors to all ten jails.

ERIC M. TAYLOR CENTER

5. Generally known as the calmest jail, because it **houses inmates with short sentences**. It has 1,851 beds, mostly in dorm-style units.

GEORGE MOTCHAN DETENTION CENTER

6. 2,098 beds in 50 separate housing areas. This is where **18-to-21-year-old inmates** often go, grouped together in part for special young-adult programs (GED prep, cognitive therapy).

ROSE M. SINGER CENTER

7. Known as "Rosie's," it's **the only women's jail**. It has 1,139 beds and a nursery for women who give birth at Rikers and those who qualify to have their newborns brought in after they're booked. (In recent years, more than half of applicants are denied, some because of prior behavior or substance-abuse issues.)

ROBERT N. DAVOREN CENTER

8. Contains all **16- and 17-year-old boys and has a long history of intense violence**. A DOJ investigation revealed that in 2012, staff members inflicted 1,059 injuries on inmates (the adolescent population here at the time: under 800).

GEORGE R. VIERNO CENTER

9. A 1,350-bed jail that contains **restricted housing units**. Traditionally, the inmates here start off spending 23 hours a day in their cells and earn more time outside through good behavior.

Figure 5.3. Rikers Island layout of jails (this figure does not include James A. Thomas Center and West Facility, which are not currently fully operational). Reprinted with permission by "Inside Rikers Island, through the eyes of the people who live and work there," by D. Goldstein, S. Weichselbaum, C. Thompson, E. Hager, B. Schwartzapfel, M. Chammah, A. Santo, and N. Tabor, 2015, *New York Magazine.* Copyright 2015 by *New York Magazine.* Reprinted with permission.

Adolescent Housing: Robert N. Davoren Complex (RNDC)

Of all New York City jail admissions, 7% are adolescents between the ages of 16 and 18 years (i.e., 840 per day) (Graves et al., 2015). The average daily adolescent population at Rikers has been decreasing, from 791 in 2012 to 682 to 2013, and to 489 in 2014 (United States Department of Justice, 2014). This particular population is unique because of the fact that New York is one of the only two states that automatically charges, convicts, and sentences all

individuals 16 and older olds as adults[6] (City of New York Board of Correction, 2013; New York City Department of Corrections, 2015; United States Department of Justice, 2014). Though treated as adults within the legal system, adolescents are housed separately from adults within the jail system (Graves et al., 2015).

On Rikers Island, adolescents are housed in the RNDC.[7] As of April 2014, DOC assigned 18 year olds to be housed separately (and only with other 18 year olds), while 16 and 17 year olds were still housed together in RNDC (New York City Department of Corrections, 2014; United States Department of Justice, 2014). All inmates are placed in cells, except for those who are newly admitted[8] or are in mental observation units, and are in dormitories (United States Department of Justice, 2014).

Adolescents in Rikers are unique from other juvenile delinquents in NYC, and from adults in Rikers Island. The populations is largely male, Black and Hispanic and often present as a difficult population to deal with compared because they more frequently suffer from mental illness and face felony charges (United States Department of Justice, 2014). In 2013 over half (51%) of the adolescents in Rikers were diagnosed with some form of mental illness, which makes them less likely to make bail as they have fewer financial resources and family support. Also in 2013, nearly 67% of adolescents in Rikers were charged with a felony crime which was almost double that of adults. This means that adolescents in Rikers are detained longer than adults. In 2013, the average length of stay on Rikers Island for adolescents was 75 days, or 2.5 months (United States Department of Justice, 2014).

[6] The other state is North Carolina.
[7] RNDC was established in 1972 (making it over 40 years old) and is in poor condition.
[8] Newly admitted adolescent inmates remain in dorms for about 2 days while they go through intake procedures and are then placed in a housing unit based on various factors such as their classification scores, mental health needs, or special protection needs.

A Typical Day in RNDC

A day in the jail complex consists of a mundane schedule (Goldstein et al., 2015). Generally, inmates wake up in the early hours of the morning (i.e., 4:00 a.m.-5:00 a.m.) as breakfast is served by 5:30 a.m. Inmates are allowed recreation time outdoors between 6 and 7 in the morning and then go to schools and programs throughout the day. Lunch begins at 11:00 a.m.; then, from 3:00 p.m. to 5:00 p.m., they receive mail and have quiet time for reading, napping, and working out. At 5:00, inmates can watch television or play games in the day room and during some seasons are again allowed outside for recreation. Inmates can also have a shower just before dinner is served between 5:30 p.m. and 7:00 p.m. After meals, inmates who need medication go to the clinic. Phone calls are allowed at 8:00 p.m. and lights go out for bed at either 9:00 p.m. or 11:00 p.m. depending on which housing unit they are in. During the day, if there are fights or alarms in the houses, all inmates could be locked in. When inmates are locked in, all inmates in that house have to return to their cells and remain there for the rest of that day.

Punitive Segregation and Violence in RNDC

Many adolescents also face time in punitive segregation units at Rikers Island. Inmates who are infracted for behavioral disobedience in the facility are confined to a six-by-eight cell for 23 hours per day (Chan, 2014; United States Department of Justice, 2014). In 2013, the City of New York Board of Correction (2013) estimated that almost 27% of adolescents in Rikers were in punitive segregation and about 71% of those were diagnosed with a mental illness. While in punitive segregation, adolescents are allowed recreation time and visits, but are in a cage or an isolated booth during this time to avoid interaction with other inmates. Most adolescents choose not to go for recreation because they do not want to be searched, shackled, and placed in a cage. Programming and privileges are denied for the most part, but adolescents can have schoolwork

delivered to them in their cells. Three meals are served through slots in their cell doors, but there is no access to commissary and the purchase of additional food.

Punitive segregation wards are either in the Bing (in RNDC) or in CPSUs (in OBCC) (City of New York Board of Correction, 2013; United States Department of Justice, 2014). In 2012, the prison developed the Restructure Housing Unit (RHU) for inmates with mental health needs, and offered individual and group therapy. It used a graduated incentives approach that slowly offered increasing privileges and reduced segregation time with demonstration of good behavior. As of October 2012, only 29% of the hundreds of adolescents who went to RHU had actually graduated and benefited from a reduced sentence (City of New York Board of Correction, 2013). This low success rate was attributed to a lack of mental health training among corrections officers in that unit. Despite attempts at using rewards as incentives for good behavior, RHU is still being punitive rather than therapeutic.

The violence and punitive segregation terms that adolescent inmates face in Rikers Island (in both frequency and duration) is significantly higher than in other jail facilities in New York. In August 2014, the Department of Justice released a report from a 2.5 year internal investigation they conducted in Rikers Island.[9] The study found a "deep seated culture of violence in Rikers Island" and that the New York City Department of Corrections systematically failed to protect adolescents; adolescents were subject to violence at alarming rates, and had frequently suffered from blows to the head, experienced use of force as a means of retribution, and endured excessively prolonged use of punitive segregation. Because of this investigation, the Department of Justice deemed that the New York City Department of Correction was in violation of the

[9] For full report see: http://www.justice.gov/sites/default/files/usao-sdny/legacy/2015/03/25/SDNY%20Rikers%20Report.pdf

Eighth Amendment, which protects inmates from excessive and unnecessary use of force by corrections officers.

Political Change in the Midst of the Study

In late 2014, the Department of Justice sued Rikers Island for the "deliberate indifference to inmates' constitutional rights" (United States Department of Justice, 2014; Weiser, 2015). Rikers Island was court-ordered to implement change within 49 days and given 70 recommendations for how to reduce violence against adolescents. Following this investigation, a number of policy changes were made including the following:

- January 2015: Punitive segregation for 16 and 17 year olds was eliminated.[10] By 2016, punitive segregation for 18–21 year olds will also be eliminated. As of January 2015 the maximum amount of time an 18-year-old inmate can be in punitive segregation was decreased from 90 to 30 days. Also during this time, owed time was eliminated. This means that inmates released before completing their punitive segregation sentence would no longer owe the remaining days and be placed in punitive segregation if they ever went back to jail.
- January 2015: In response to eliminating punitive segregation for younger populations, concerns arose from the idea that 18-21 year olds are significantly more violent than many other age groups. In response, Rikers debuted a new Enhanced Supervision Housing unit. This is a 250-bed housing unit for the most violent inmates.

[10] 16-17 year olds are now being placed in a newly designed unit called the Transitional Restoration Unit and functions with the use of a token economy and points system with graduated incentives and sanctiongs, but no punitive segregation

- April 2015: Mayor Bill de Blasio initiated a push to reduce court delays to alleviate overcrowding in jail populations (Brown, Stephen, Blau, & Slattery, 2015; Fuller, 2015; Weiser, 2015; Winerip, 2015).

In addition to the reforms that have been implemented, more recently negotiated strategies for reducing violence in Rikers Island are anticipated:

- A federal monitor: An appointed federal monitor would have access to jail, records, and inmates to conduct confidential interviews, as well as staff outside of the jail for confidential interviews. The monitor would report to the federal judge in Manhattan.
- A pilot program of 100 body cameras, and 8,000 new security cameras in the facility.
- A different place to house inmates under 18 that is accessible by public transportation.
- Explicit prohibitions against guards' striking prisoners in the head.
- More thorough screening and assessments for incoming corrections officers.

In addition, Michael Jacobson (the executive director of the CUNY Institute for State and Local Governance and a correction commissioner under former Mayor Rudolph Giuliani) went as far as to suggest the elimination of Rikers Island. He argued that the ultimate reform of Rikers Island, the largest penal colony in the United States, would be to move pretrial detainees closer to the courts and to their families (Barsky, 2015). Other recommendations by the Department of Justice (2014) include more cameras, stronger directives about the use of force against inmates, a hotline for anonymous reporting of incidents by both staff and inmates, investigation of use of force incidents, and better-trained staff. Overall, recommendations focused on an imitative that directly targets reducing violence between inmates and corrections officers and increasing accountability for violence.

Ongoing Culture of Violence in Rikers

Despite these measures, violence between inmates and COs increased at the end of last year and early this year (Goldstein et al., 2015). Some corrections officers argue that ending solitary confinement for 16 to 17 year olds has resulted in more violence because there is very little consequence for misbehavior. Other corrections officers believe that the aforementioned measures inhibit their ability to do their job. Some even believe that bringing in corrections officer that have education that is more formal but have less street smarts will lead to increased conflict with inmates. Most notably of concern is the presence of gangs in Rikers Island; Rikers has historically been dominated by the Bloods and its connected smaller subsections. The Department of Justice (2014) reported that the core problem in Rikers is the excessive use of unnecessary force by correction officers and the lack of accountability for their conduct, which very few reforms in the past have worked to address.

Jails are unique from prisons as they are transitional in nature, making it difficult to adapt especially in the dense environment of Rikers. While many of the challenges in Rikers exist in other big city jails, they are exacerbated in Rikers Island. Even with various contemporary attempts by the de Blasio administration to reform Rikers Island, the culture of violence still exists. Adolescents in Rikers Island are surrounded by an overwhelming amount of violence, distinguishing them from juvenile delinquents in New York City and in other states where they are not treated as adults. This particular group faces greater amounts of violence in the jail, and due to their TBI-related consequences, they may have additional difficulties with comprehending and following the rules, and with the transitional nature of the environment. This is particularly important for adolescents whose brains are still developing in this violent setting. Inmates serving longer sentences in prisons offer the opportunity to study TBI over longer periods of

time, but the transient and violent nature of Rikers can allow for a better understanding of how custodial and reentry challenges are exacerbated by young people affected by TBI in NYC jails.

CHAPTER SIX: RESEARCH DESIGN AND METHODS

Research Design

Informed by the contextual, theoretical, and empirical framework, this mixed methods study was designed to focus on three main research questions:

Q1. Is TBI more common in the adolescent jail population than in the general adolescent population? Why? How do these inmates feel about these injuries?

Q2. Do adolescent inmates who suffered a TBI experience unique custodial challenges in regards to fights, injuries, and punitive segregation?

Q3. Do adolescent inmates who suffered a TBI have unique re-entry challenges that lead them to recidivate more frequently and more quickly?

Quantitative and qualitative methods were used to collect and analyze information on two different samples of characteristically similar adolescent inmates in Rikers Island. The quantitative sample (*N*=262) and the qualitative sample (*N*=20) were obtained using different sampling techniques and selection criterion, which are further detailed below. For the quantitative component, existing data was provided by the Bureau of Correctional Health Services at the New York City NYC DOHMH. Variables included health, demographic, socioeconomic, custodial, and criminogenic risk data. The researcher performed statistical analyses to examine the influence of TBI on injuries[11], punitive segregation, and recidivism.

[11] Injuries can also be used as a proxy for fights. Most injuries resulted from fights with another inmate (75%), followed by DOC use of force (11%), self-injury (5%), slips and falls (4%) and other (5%).

The qualitative component involved interviews with inmates while in Rikers Island. Participants were asked about their life before coming to Rikers, their experiences with custodial arguments, fights, injuries and punitive segregation, and their perceived challenges upon release. The researcher transcribed the responses and analyzed them using thematic coding with a particular focus comparative analyses between participants with and without TBI.

A mixed methods approach was used to (a) triangulate results from each method for verification and corroboration, and (b) complement the weaknesses of each method through elaboration and clarification (Bryman, 2006; Small, 2011). Comparing results from each method allowed for the identification of data inconsistencies. In addition, the larger sample size from the quantitative data analyses complemented the small sample size from the interviews, enabling inferences that are more generalizable. Accordingly, the depth of information from interviews compensated for the loss of richness in the data analyses, increasing the credibility of the findings.

Mixed methods designs generally incorporate three dimensions: (a) *priority*, the extent that each method is emphasized (predominantly quantitative, predominantly qualitative. or fully integrated); (Kraska & Neuman, 2012); (b) *implementation*, the order in which each method will be conducted (concurrent or sequential); (Fetters, Ivankova, & Creswell, 2004; Leech & Onwuegbuzie, 2009), and (c) *integration*, when and how integration will occur (during experiential, inferential or all stages, by converging, connecting or embedding the data*)* (Bryman, 2006; Ivankova & Stick, 2007; Leech & Onwuegbuzie, 2009). Integration also refers to what type of analyses will be done (cross- over or integrative) (Creswell, Klassen, Plano Clark, & Smith, 2010).

In the current study, quantitative and qualitative phases were given equal priority and were implemented concurrently. Results from both components were of equal importance, and data from NYC DOHMH was collected and coded synchronously to when interviews were conducted and transcribed. Analyses of all data were conducted within the period between March 2015 and July 2015. Integration occurred during inferential stages of the study (discussion) and was done by converging results from each method. The overall approach was an integrative analysis (Small, 2011), which used results from both methods to yield a more inclusive understanding of the jail experiences faced by inmates who suffered from a preexisting TBI.

Quantitative Research Methods

Questions and Hypotheses

Quantitative secondary analyses of data provided by NYC DOHMH were conducted. Shaped by principles of neurocriminology and informed by the existing literature on TBI in inmate populations, research questions and hypotheses were developed. The main research questions for this part of the study were part of the larger investigation into whether neurological anomalies during childhood could lead to cognitive behavioral difficulties leading to custodial and reentry challenges for adolescents in Rikers Island. Specific research questions asked if TBI predicted custodial injuries, punitive segregation, and recidivism. The research questions and hypotheses were the following:

Q1: How many adolescents in the inmate population are affected by a pre-existing TBI?

H1: Inmates will have a higher prevalence of TBI than in comparable group in the general population.

Q2: Does having a history of TBI predict custodial fights and injuries while in jail?

H2: Participants who were affected by TBI will have experienced more fights and injuries while in Rikers.

Q3: Does having a history of TBI predict whether an inmate is placed in punitive segregation?

H3: Participants who were affected by TBI will have been more likely have spent time in punitive segregation.

Q4: Did having a history of TBI predict recidivism? If so, how?

H4: Participants who were affected by TBI will have recidivated more frequently and more quickly.

Data, sample, and variables. The dataset for analyses included health, demographic, socioeconomic, criminal justice, criminogenic risk, and custodial data provided by the New York City NYC DOHMH. Data was provided for 300 adolescent males in the RNDC on Rikers Island[12]. Of the 300 cases, 38 were missing significant amounts of data and were removed to keep the N consistent for analyses and interpretation. The final sample included data on 262 inmates, which was approximately one third of the entire adolescent inmate population in Rikers at the time.[13] All 262 participants had been screened for TBI using a validated instrument [14](Appendix A) within the first few days of admission between August 2012 and February 2013. The data set provided by NYC DOHMH was coded for this study to create the following key variables:

Exposure variable: Traumatic brain injury. TBI was defined as self-reported indicators of lifetime head injury resulting in an AOC based on the TBIQ. For descriptive analyses TBI was

[12] The Robert N. Davoren Complex is a facility on Rikers Island that holds adolescent male detainees

[13] In 2012, there were 791 adolescents in Rikers Island, and in 2013 there were 682. The sample in the current study includes 262 inmates, which is between 33% and 38% of the population.

[14] The Traumatic Brain Injury Questionnaire (TBIQ) has been validated for test-retest reliability and internal consistency for the use of identifying and assessing the lifetime history of head injury and frequency and severity of symptoms of head injury in offender populations (Diamond et al., 2007a)

coded in four ways: first as a dichotomous variable (Yes/No), second as a dichotomous variable (Yes with an AOC/No)[15], third as a continuous variable (number of pre-existing TBIs), and fourth as continuous variable (age of first reported TBI). For all bivariate and multivariate analyses, the exposure variable was coded as TBI with an AOC (Yes/No).

Outcome variables: Injuries, punitive segregation, and recidivism. Outcome variables were created using official administrative records from the NYC DOHMH database. Custodial injuries and punitive segregation terms were defined and measured using up to the first 10 incidents while in custody[16]. Recidivism was defined as being readmitted into Rikers[17] and was measured in three ways: first as a dichotomous variable (Yes/No, within the first 365 days of first discharge), second as a continuous variable (number of readmissions into Rikers), and third as a continuous variable (average number of days between first discharge and second admission, within the first 365 days).

Control variables: Demographic, socioeconomic, and criminogenic risk factors. To control for confounding factors, a number of control variables were included in all analyses (Figure 6.1).

[15] TBI with an alteration of consciousness (AOC) involved any head injury that resulted in either a loss of conscious or post traumatic amnesia.
[16] Some inmates were detained for long periods of time and accumulated a large number of injuries, fights and infractions. To facilitate data extraction, management and analyses, up to the first ten of each outcome (injuries, fights and infractions) were included.
[17] Data was only available for admission into a New York City jail facility, and thus excludes prior admissions into juvenile and/or state facilities. As a result, the measure of recidivism in this study is potentially underestimated.

Variable	Conceptualization	Operationalization
Age	Number of years to date.	Continuous variable measured in years.
Sex	Physiological Sex.	Categorical dichotomous variable measured as Male or Female.
Race	Identifying as White, Black, American Indian, Asian, Native Hawaiian, Pacific as Islander, Other[18]	Categorical dichotomous variables measured as White - Not White; Black- Not Black; Other.
Ethnicity	Identifying as Hispanic or Not-Hispanic	Categorical variable measured as Hispanic or Not-Hispanic
Education	Whether or not some high school was completed as yet (based on the expectation that 16,17 and 18 year olds would have had some exposure to high school)	Categorical variable measured as some high school or no high school.
Income	Median household income based on zip code of residence prior to being in Rikers.[19]	Continuous variable measured in dollars.
Mental Health Service Utilization	Mental health services utilization in Rikers (at least 3 times). [20]	Categorical Dichotomous variable measured as Yes or No.
Substance Use	Using marijuana at intake[21]	Categorical Dichotomous variable measured as Yes or No.
Criminal History	Previous charges (serious enough to be an adult charge and result in admission to Rikers)	Continue variable measured as number of previous charges
Length of Stay	Accumulated amount of time ever spent in Rikers	Continuous variable measured in days.

Figure 6.1. Control variables for statistical analyses.

Statistical analyses. Data cleaning, manipulation, and analyses were conducted using SPSS and STATA. Descriptive analyses (frequencies) were used to characterize the sample and demonstrate the prevalence of TBI. Bivariate analyses (*t*-tests and chi squares) were performed to characterize the differences between inmates with and without TBI, and to present direct associations between variables of interest. Multivariate analyses (binary logistic regressions and

[18] . Based on a social definition as used in the US Census. (United States Census Bureau, US Department of Commerce, 2013)

[19] Median household income is the only available measure of socioeconomic status, but is not reliable. Most inmates are between 16 and 19 years of age and would not have any income. In addition, using zip codes to calculate median household income could be problematic since many inmates move frequently or provide zipcodes for a place even though they don't live there. In addition, in some cases for zipcodes in parts of Manhattan the median household income is well over $100,000, which might not be an accurate depiction of the socioeconomic status of inmates in this sample.

[20] In Rikers, a Mental Health Status is given to an inmate who accesses services for mental health problems at least three times. Access could be due to someone referring them (i.e. a CO or a medical professional.) or because they requested it. This is not a status that is determined at intake.

[21] The use of illegal narcotics was rarely reported (only 2 people) so it was excluded from analyses.

survival cox regressions) were used to examine TBI as a predictor of injuries, punitive segregation terms, and recidivism. Due to emerging results suggesting a potential overlap between TBI and mental health service utilization, structural equation modeling (SEM) was used to explore the indirect effect of TBI on outcome variables, through mental health service utilization. The following figures depict the structure of each model (Figures 6.2, 6.3, and 6.4):

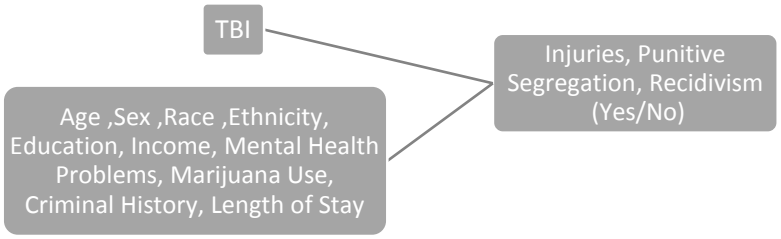


Figure 6.2. Binary logistic regression model.

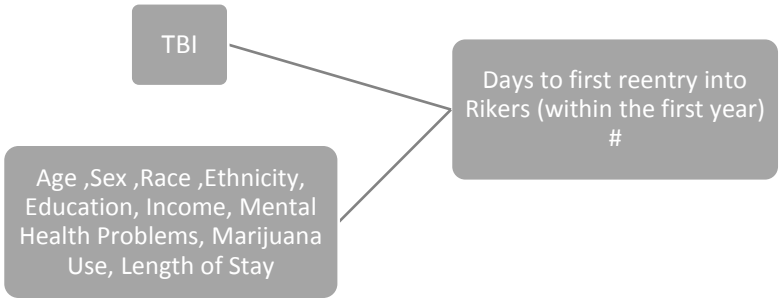


Figure 6.3. Survival Cox regression model.

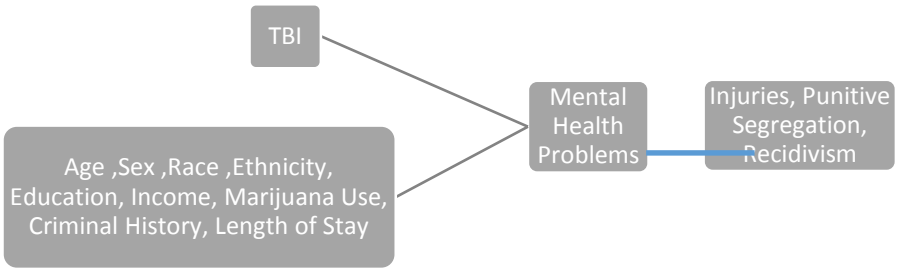


Figure 6.4. Structural equation modeling model.

Qualitative Research Methods

Research questions. The qualitative phase of this research used a phenomenological approach to describe the lived experiences of adolescent inmates in Rikers Island. Interviews were conducted using a semi structured interview guide and open-ended questions, shaped by principles of neurocriminology and previous research suggesting that neurological anomalies from a TBI could lead to custodial and reentry challenges. The broader research questions set out to obtain a rich understanding of inmates' backgrounds, custodial experiences and perceived reentry challenges. A comparative analysis explored how these experiences and challenges differed between inmates with and without TBI. The specific research questions explored the following:

Compared to participants who never experienced a TBI,

Q1: How do participants with TBI talk about their head injury?

Q2: What challenges are participants with TBI experiencing concerning arguments, fights, and injuries in the facility? How do they feel about this? Why do they feel this way?

Q3: What challenges are participants with TBI facing in regards to punitive segregation? How do they feel about this? Why do they feel this way?

Q4: What challenges do participants perceive they will face upon release into the community? Why do they anticipate these problems? How do they feel about available help in dealing with these challenges?

Participants. In the most recent study examining TBI among adolescent males in the New York City jail system, there was a 50% prevalence of TBI (Kaba et al., 2014). Based on these findings, purposive quota sampling (Given, 2008; Sandelowski, 2000) was used to select 20 participants, 10 with a TBI and 10 without a TBI. To obtain valid information, all participants had been in Rikers for at least 7 days, ensuring they had sufficient exposure to the environment to be able to talk about custodial challenges. The sampling process remained open until the projected sample quota was filled.[22] Selected participants were screened for pre-existing TBI (injuries that occurred prior to being in Rikers) and then interviewed about their jail experiences and perceptions surrounding their release into the community.

After the interview, each participant was entered into a database as being either a TBI or Not-TBI participant, based on self-reported having had a head injury that resulted in an AOC (post-traumatic amnesia or a loss of consciousness). Only 22 interviews were conducted until the quota was met. Out of these, one duplicate participant was removed and one extra participant with TBI was removed to fulfill the quota. The final sample included 20 male adolescent inmates who were interviewed in Rikers Island between March 2014 and October 2014.

Recruitment. Potential participants were selected from a regularly updated list of all inmates provided by NYC DOHMH. The list was sorted by inmate New York State ID (NYSID) numbers, and every 10th inmate on the list was highlighted and selected for potential participation. An escort officer called the unit where the selected inmate was being housed to

[22] This quota was set to facilitate a comparative analysis between TBI and non-TBI participants.

determine if they were there and to bring them to the interview room and learn about the study.[23] Once an inmate was located and available, they were escorted to the private interview room where their interest in participation was gauged by the researcher. If interested, inmates were verbally read and provided an assent form (Appendix B). The assent detailed the purpose, risks, benefits, voluntariness, compensation ($10 placed into commissary for their time participating in the interview), and confidentiality involved in the study. Assent was also documented for permission to audio record the interview.

Throughout the study, 32 inmates were asked to participate, and 22 accepted (68.8%)[24]. It was noted that those who refused, most refused during the summer months (June and July), and some had very high profile cases. Throughout the study, it was discovered that during certain times of the year (i.e., summertime) and the day (i.e., recreation or visits) there was less interest in participating in the interviews. In addition, on days where tensions were high due to alarms and lockdowns, participation was less likely.[25] Finally, in a small number of cases some inmates who were in protective custody for high profile cases chose not to participate. This was possibly because their case was pending and they may not have trusted that the interview was confidential.

Interviews. In-depth semi-structured interviews were conducted to generate a comprehensive account of meaning (how participants described their custodial experiences) and process (how their experiences and perceptions transformed into their daily activities and interactions). Interviews were conducted and audio recorded by the researcher, and each lasted

[23] Sometimes the inmate would be unavailable due to being in court, being released or transferred to a new housing unit or to being in solitary confinement. In these cases, the escort officer would call the next highlighted inmate on the list.

[24] All participants that agreed to participate in the study also permitted their responses to be audio recorded. Documentation was obtained in signatory form on each assent form.

[25] Alarms and lockdowns occurred because of large riots, severe fights, and miscounts of inmates.

between 45 and 60 minutes in addition to the 15-minute TBI screening. Interviews took place in a private office in the video teleconferencing center in RNDC. To increase confidentially and encourage honest responses, the door to the interview space was closed at all times. Simultaneously, to ensure safety an escort officer was stationed outside of the room but out of ear's way during each interview.

The interview instrument was developed using information from previously administered focus groups. In 2013, nine focus groups with 80 adolescents in six housing areas were conducted over a period of 6 months to estimate the level of understanding of TBI in this population (Graves et al., 2015). With this information, the interview guide (Appendix C) was developed. The instrument was piloted twice and minor adjustments were made for the sake of better flow. The final interview structure included (a) TBI screening, (b) closed-ended questions on background characteristics, (c) open-ended questions about custodial injuries, fights, and infractions (including punitive segregation), and (d) open-ended questions about perceived challenges with reentry.

To improve credibility of the data, validity checks were put into place. This included member checks (repeating responses during interview to avoid misinterpretation and to obtain clarification), discrepancy searches (looking for deficits in the data), and building comparison groups (comparing those with and without TBI, rather than just examining only those affected by TBI).

Data collection and analyses. Data from interviews (audio files) were transcribed into electronic Word format for analyses, which was an ongoing and iterative process. Audio files were listened to and transcripts were read to explore emerging themes from participant's

responses. Reflections of memos that were periodically written throughout the study were instrumental in progressively refocusing interviews and identifying themes.

Interview responses were used to develop organizational and substantive categories (Maxwell, 2012). Organizational categories were pre-established and functioned as a way to sort responses. They included (a) demographics (age), (b) socioeconomic status (education, employment, borough of residence), (c) criminogenic risk factors (drug and alcohol use, negative peer influences, living situation, mental illness), (d) custodial challenges (verbal and physical conflict, solitary confinement), and (e) reentry challenges (social, environmental, and personal difficulties). Substantive categories were formed surrounding inmate's beliefs about the challenges they were facing in Rikers Island.

Through an open coding process, responses from interviews were translated into codes and entered into a matrix. Codes were later used to discover patterns and connect overarching themes about custodial and reentry challenges though a thematic analysis. Comparisons were made between those affected and not affected by TBI with the goal of providing a thick description (Ponterotto, 2006) of how those affected by TBI talked about and perceived their custodial and reentry challenges. Quotes and narratives were included to emphasize findings and highlight the richness of inmates' experiences.

Through iterations of analyses, combined themes were used to construct theories about how participants' perceptions and experiences were translated into daily activities, and to understand the challenges they were facing. Theoretical underpinnings informed by neurocriminology and existing research on TBI among adolescents in jail were used to inform policy implications and recommendations.

Mixing the Methods

Integration of results from each method occurred during the discussion phase of the study, and used a converging technique. Based on the theoretical framework of the study, comparative analyses examined how adolescent inmates with TBI experienced custodial sentences and reentry challenges uniquely, compared to those without TBI.

CHAPTER SEVEN: QUANTITATIVE RESULTS

Descriptive Analyses

Descriptive analyses were conducted to obtain a thorough understanding of the characteristics of inmates in the sample and the prevalence of custodial injuries, punitive segregation, and recidivism. Data was also analyzed to describe the prevalence of TBI in this population, as well as detailed information about the circumstances surrounding the injuries.

Describing the inmate sample. Data from NYC DOHMH was provided on demographics, socioeconomic and risk factors for adolescent inmates in Rikers Island who were screened for TBI. A total of 300 adolescents were screened, but when all data was merged there was missing information on multiple variables for 38 cases, which were therefore removed. As a result, the sample consists of data on 262 inmates. To characterize the inmate sample, frequency distributions were performed (Table 7.1).

Table 7.1

*Descriptive: Characteristics of the Sample (*N*=262)*

	N	(%)	X	SD
Age	--	--	17.16	(0.83)
White	24	(9.16%)	--	--
Black	183	(69.85%)	--	--
Other	55	(20.99%)	--	--
Hispanic	77	(29.39%)	--	--
Some High School	246	(93.89%)	--	--
Median Household Income	--	--	$43,533.22	(17032.42)
Mental Health Service Utilization	109	(41.60%)	--	--
Marijuana Use at Intake	103	(39.31%)	--	--
Criminal History	--	--	3.08	(2.03)
Length of Stay in Rikers	--	--	105.66	(121.89)

Within the sample of 262 adolescent inmates, the average age was 17.6 years, and most

identified as Black (69.85%) and not Hispanic (70.61%). The level of education was consistent among most inmates, with 93.89% having completed at least *some* high school, and inmates were typically coming from zip codes where the median household income was about $43,500/year. In addition, 41.60% of inmates had accessed mental health services at least three times in Rikers, 39.31% had used marijuana and reported using it at the time of intake, and the average amount of time spent in Rikers was 105 days (3 months) throughout their lifetime.

Research question 1: Prevalence of TBI, injuries, segregation, and recidivism. The first research question addressed by the current study aimed to determine the prevalence of TBI in the adolescent population in Rikers Island. Frequency distributions demonstrate the prevalence of TBI, as well as custodial injuries, punitive segregation placements, and recidivism (Table 7.2).

Table 7.2

*Descriptive: TBI, Injuries, Segregation, and Recidivism in the Sample (*N *=262)*

Exposure: TBI	N	(%)	X	SD
At least 1 TBI	218	(83.21%)	--	--
At least 1 TBI with AOC	131	(50.00%)		
Lifetime TBI Incidents	--	--	4.28	5.34
Age of First Incident	--	--	12.28	4.07
Outcomes: Injuries, Segregation, Recidivism	N	(%)	X	SD
At least 1 Custodial Injury	152	(58.02%)	--	--
All Custodial Injuries	--	--	1.69	2.26
Placed in Punitive Segregation	68	(25.95%)	--	--
Recidivated at least Once	164	(62.60%)	--	--
All Recidivism	--	--	3.27	2.16
Days to First Recidivism	--	--	144.28	102.87

Of the 262 inmates, 83.21% had some form of head injury throughout their life[26], and 50% had a head injury that lead to an AOC (blacking out or suffering from post-traumatic

[26] Head injuries could be minimal (i.e. bumping your head on the top of the car while getting out), mild (resulting in an alteration of consciousness), or severe (resulting in coma). Severity of head injuries is further disaggregated in later analyses.

amnesia). The average number of lifetime head injuries per inmate was four, with the average age of first head injury being 12 years. In examining the outcome variables, 58.02% were injured in Rikers at least once[27] , with an average of 1.69 total injuries sustained while in Rikers. Of all inmates, about 26% were placed in punitive segregation. As of February 2013, 63.60% of the inmates in the sample had been admitted into Rikers at least once before their current admission. For those who recidivated, it took an average of 144 days (or 5 months) within 1 year of their discharge to recidivate.

TBIs in the sample. As previously determined, 82.31% of all inmates had at least one head injury. However, further analyses demonstrated how these injuries differed in severity and therefore classification (Table 7.3).

Table 7.3

*Descriptive: Severity of Most Serious Head Injury (*N*=262)*

	N	(%)
No/Minimal	86	(32.82%)
Multiple Minimal	45	(17.18%)
At least 1 AOC	131	(50.00%)

Of the 262 inmates, 32.8% of the inmates had no or very minimal head injuries. These types of injuries could occur from simple everyday occurrences such as bumping the head while getting out of a car. For the remaining inmates, 17.2% had multiple minimal injuries (repeatedly bumping head while getting out of car), and 50% had at least one head injury with an alteration of consciousness. Head injuries with an AOC indicate that the injury was severe enough for the

[27] Injuries most frequently resulted from fights with another inmate (75%), followed by DOC use of force (11%), self-injury (5%), slips and falls (4%), and other (5%). Injuries therefore could be a proxy for fights in Rikers.

individual to have suffered from post-traumatic amnesia and/or a loss of consciousness. This is frequently regarded as a mTBI, but for the purpose of this they will be referred to as a TBI.[28]

Determining the short and long-term consequences and developing treatment plans for TBIs can depend on identifying the anatomical location of the injury, the symptoms of the injury, and how quickly care was sought out. In the sample, the anatomical location of the first injury that resulted in an AOC mostly fell in two categories (Table 7.4).

Table 7.4

Descriptive: Anatomical Location of Blow to the Head (first injury with AOC)

	N	%
Front	37	(28.24%)
Left Side	13	(9.92%)
Right Side	14	(10.69%)
Top	8	(6.11%)
Back	40	(30.53%)
Multiple	8	(6.11%)
Unknown	5	(3.82%)
Other	6	(4.58%)

Most inmates who had a TBI suffered from at least one AOC from a blow to either the front or the back of the head (58.77%). This is important, as damage to the frontal lobe can lead to difficulty with executive functioning of the brain. Injuries to this part of the brain could occur from a direct blow to the front of the head, or from a contre-coup injury where impact to the back of the head causes the brain to bounce off the front of the inside of the skull.

[28] mTBIs are commonly referred to as concussions. More severe TBIs would likely have resulted in hospitalization and long term brain damage. Although these injuries were included in the data, the majority of injuries fall into mTBI which are still considered brain injurie as a result of trauma (TBI) for the purpose of the study.

The symptoms of TBI were measured by the type of AOC an inmate reported having from their first incident of an AOC. This included experiencing post traumatic amnesia (PTA), a loss of consciousness (LOC) or in some cases, both (Table 7.5).

Table 7.5

*Descriptive: Symptoms of TBI with an AOC (*N*=131)*

		N	%
Post Traumatic Amnesia (PTA)		17	(12.98%)
	< 1 Day	12	(9.16%)
	> 1 Day	5	(3.80%)
	Unknown or None	114	(87.02%)
Loss of Consciousness (LOC)		91	(69.46%)
	< 1 Hour	79	(60.31%)
	>1 Hour	12	(9.16%)
	Unknown or None	40	(30.53%)

The most commonly reported symptom of the first incident of TBI was having had a loss of consciousness for up to an hour. While 69.46% of inmates had a TBI that resulted in loss of consciousness, only 12.98% had one that resulted in in post-traumatic amnesia. Despite having symptoms of a TBI, health care or treatment was not always sought out (Table 7.6).

Table 7.6.

*Descriptive: Treatment for First Head Injury with AOC (*N *= 131)*

	N	%
Inpatient	2	(0.93%)
ER	58	(26.85%)
Outpatient	2	(0.93%)
None	67	(31.02%)
Other	2	(0.93%)

Most of the time, for the first TBI that resulted in an AOC, no care was sought out. In 31.02% of instances, inmates did not seek out or receive care for their injuries. For the

remaining, 26.85% accessed treatment by going through the emergency room. It is likely that care was sought out in these cases because the injury was severe enough that an ambulance had to be called. If an ambulance were not called, perhaps care would still not be received.

Causes of injuries (events). To understand the environmental conditions that led to head injuries among these adolescents, a cross-tabulation was conducted to describe the sources of injuries for all TBI events. The total number of head injury events was 1,121, but information on 195 injuries was missing for reasons such as the inability to recall details about the injury. Of the remaining 926 injuries, 707 (80%) involved an AOC (Table 7.7).

Table 7.7.

*Descriptive: Environmental Source of All TBI Events in the Sample (*N = *707)*

	N	(%)
Vehicle	110	(15.56%)
Fall > 10ft	21	(2.97%)
Fall < 10ft	120	(16.79%)
Sports	171	(24.19%)
Assault	237	(33.52%)
Other	48	(67.89%)

The leading cause of the 707 incidents of TBIs in this population was from being involved in an assault (33.52%). Aside from fighting, 24% of the incidents occurred from sports, 20% occurred from a small or large fall, and 15.56% were the result of a vehicle accident. The environmental source for TBIs among this population is unique in that the injuries are more frequently a result of community violence, compared to adolescents in the general community where the most common source of injury is from playing sports.

Descriptive analyses provided answers for Research Question #1 and confirmed Hypothesis #1. Inmates in the sample had a higher prevalence of TBI (50%) than in a

comparable group in the general population. In addition, results show that most TBI has occurred from fighting that led to a blow to either the front or the back of the head. Symptoms of TBI were mostly a loss of consciousness for up to one hour, however in many cases treatment was not sought out.

Bivariate Analyses

Bivariate analyses were conducted to explore direct relationships between TBI and key variables of interest, without controlling for confounding factors. Chi-squares and *t*-tests were performed to compare how TBI and non-TBI inmates differed in characteristics, as well to identify associations between TBI and the outcome variables.

Inmates with and without TBI**.** To understand how inmates who were affected by TBI may have been different from those who were not, bivariate analyses in the form of Chi Squares and T-tests were administered. These tests examined the direct relationship between TBI and the control variables without controlling for any other factors. To look at the magnitude of the effect (indicated by the OR), TBI was regressed on each variable of interest alone without controlling for any other confounding variables. In later analyses, controls were included to see if the results held true once other measures were considered (Table 7.8).

The only statistically significant differences in the groups were in their use of mental health services in Rikers (Chi Sq.=6.93, $p<0.05$) and length of stay in Rikers ($t=0.011$, $p<0.05$). Almost 50% of TBI inmates accessed mental health services in Rikers compared to the 34% of non-TBI inmates who accessed these services. In addition, the length of stay was longer for TBI inmates, with their average being 125 days compared to 87 days for non-TBI inmates. Results show that without controlling for any other factors, having a TBI increased the likelihood that an inmate used mental health services in Rikers by 95% (OR=1.95, $p<0.05$). In addition, for every

additional day spent in Rikers Island there was an increase in the likelihood of an inmate having had a TBI by 7% (OR=1.07, $p<0.01$).

Table 7.8

Bivariate Analyses (Chi Sq. and T-*Tests): Characteristics of TBI and Non-TBI Inmates with Measures of Effect Size (*N*=262)*

	TBI					No TBI				
	X	(SD)	N	(%)	OR	X	(SD)	N	(%)	OR
Demographic Factors										
Age	17.21	(0.85)	--	--		17.11	(0.82)	--	--	
White	--	--	13	(9.92%)	1.2	--	--	11	(8.40%)	0.98
Black	--	--	88	(67.18%)	0.76	--	--	95	(72.52%)	1.19
Hispanic	--	--	44	(33.59%)	1.5	--	--	33	(25.19%)	0.89
Other	--	--	30	(22.90%)	1.26	--	--	25	(19.80%)	0.95
Socioeconomic Factors										
High School	--	--	122	(93.13%)	0.77	--	--	124	(94.66%)	1.29
Median Household Income	$41,774.78	(16296)	--	--	1.00	$45291.66	(1539.92)	--	--	1.71
Risk Factors										
Mental Health Service Utilization	--	--	65	(49.62%)*	1.95	--	--	44	(33.59%)*	0.76
Marijuana Use at Intake	--	--	56	(42.75%)	1.33	--	--	47	(35.88%)	0.90
Criminal History	3.21	(2.12)	--	--	1.07	2.95	(1.93)	--	--	0.82
Length of Stay in Rikers	124.57	(130.3714)**	--	--	1.00	86.66	(110.03)**	--	--	0.76

**p<0.05, ** p<0.01, ***p<.001*

Although the remaining factors were not statistically significant in this sample, inmates can be described as having been relatively similar in age, race, level of education, and criminal history. TBI- inmates differed slightly in ethnicity, marijuana use, and income; Among TBI- inmates, 34% were Hispanic, 43% had used marijuana, and their median household income was ~$42,000, compared to 25%, 36%, and ~$45,000 respectively among the non-TBI inmates. This indicates that within this particular sample, inmates with TBI were more likely to be Hispanic, come from lower socioeconomic status, and have used marijuana. Overall, bivariate analyses demonstrate that TBI-inmates more frequently requested mental health services and spent a greater number of days in Rikers throughout their lifetime, when compared to non-TBI inmates.

TBI and custodial injuries, punitive segregation, and recidivism. To understand how inmates with TBI experienced injuries in jail, solitary confinement, and recidivism, bivariate analyses in the form of Chi Squares and t-tests were administered. These tests examined the bivariate relationship between TBI and the outcome variables, without controlling for any other factors. Again, to look at the magnitude of the effect (indicated by the OR) TBI was regressed on each outcome variable independently. In later analyses, controls were included to see if the results held true once other measures were considered. The odds ratio shows how TBI predicts the likelihood of each outcome variable (Table 7.9).

Table 7.9

Bivariate Analyses (Chi Sq. and T-*Tests): TBI & Injuries, Punitive Segregation and Recidivism (*N=*262)*

	TBI					No TBI				
	X	(SD)	N	(%)	OR	X	(SD)	N	(%)	OR
Injuries										
At least 1 injury	--	--	83	(63.36%)	1.55	--	--	69	(52.67%)	0.77
All injuries	1.94	(2.50)	--	--	1.11	1.45	(1.96)	--	--	0.84
Segregation										
At least once in seg	--	--	42	(32.06%)*	1.91	--	--	26	(19.85%)*	0.85
Recidivism										
At least 1 recidivism	--	--	88	(67.18%)	1.48	--	--	76	(58.02%)	0.78
All recidivism	3.46	(2.25)	--	--	1.09	3.08	(2.06)	--	--	0.76

p<0.05, ** p<0.01,*p<.001*

Among all outcomes, the association between TBI and punitive segregation was the only significant factor (Chi Sq.=5.08, $p<0.05$). Of those inmates who had a TBI, 32% had spent time in punitive segregation compared to 20% who did not have a TBI. In addition, having had a TBI increased the likelihood of an inmate having been placed in segregation by 91% (OR=1.09, $p<0.05$). Though there is not a statistically significant bivariate relationship between TBI and injuries or recidivism, more TBI-inmates suffered at least one custodial injury and recidivated at least more frequently than those not affected by TBI did. Overall, bivariate analyses demonstrate that when compared to non-TBI inmates, TBI-inmates experienced being place in punitive segregation more often.

Multivariate Analyses

Research Questions 2, 3, and 4 in the current study ask whether having a TBI predicts custodial injuries, punitive segregation placements, and recidivism. To examine the relationship between TBI and these outcomes while controlling for all other variables in this study, multivariate analyses were conducted. Three logistic regressions and one Cox regression were performed. Single predictor and multivariate associations are presented side by side to examine where the significance of relationships weaken when controlling for other factors in the model.

Research question 2: TBI and custodial injuries. A binary logistic regression was conducted to examine the likelihood of TBI inmates experiencing custodial injuries. Single predictor results from regressing TBI on custodial injuries in bivariate analyses are displayed next to multivariate results. This identified where the significance of the prior results were strengthened or weakened when considering all other measures in the model (Table 7.10).

Table 7.10

*Multivariate Analyses (Binary Logistic Regression): TBI and Custodial Injuries (*N=*262)*

	Univariate		Multivariate	
	B	OR	B	OR
Exposure: TBI				
TBI with an AOC	0.44	1.55	-0.35	0.71
Controls				
Age	-0.02	0.98	-0.46	0.63*
White	0.01	1.01	0.47	1.60
Black	0.28	1.33	0.11	1.12
Hispanic	-0.5	0.61	-0.41	0.66
Some High School	0.61	1.85	0.01	1.01
Median Household Income	-4.31	1.00	0.00	1.00
Mental Health Service Utilization	2.93	18.68***	2.20	9.07***
Marijuana Use at Intake	-0.38	0.69	0.13	1.14
Criminal History	0.54	1.72***	0.61	1.85***
Length of Stay in Rikers	0.01	1.02***	0.01	1.01***
**p<0.05, ** p<0.01, ***p<.001*		*Pseudo R2 = 0.469*		*chi2= 167.33***

The model is significant (chi=167.33, $p<0.001$), and all variables combined explain 47% of the variance in custodial injuries among inmates (Pseudo R2=0.469). In comparing the single predictor and multivariate associations, most remained the same with the exception of age. At the single predictor level, age had little or no significance in predicting custodial injuries, but after controlling for all other factors, the effect was statistically significant. TBI was not a significant predictor of custodial injuries in either the single predictor or multivariate analyses. In the model, significant predictors of custodial injuries were age (OR=0.63, $p<0.05$), mental health service utilization (OR=9.07, $p<0.001$), criminal history (OR=1.847, $p<0.001$), and length of stay in Rikers (OR=1.013, $p<0.001$). This means that the likelihood of having custodial injuries decreased by 34% for every year older an inmate was, increased by over 800% if an inmate used mental health services in Rikers, increased by 85% for each additional criminal charge accumulated in their history, and 1% for every additional day ever spent in Rikers Island.[29]

To answer Research Question 2, in the current study having a history of TBI did not predict custodial injuries in the facility. As a result, Hypothesis 2, which states that participants affected by TBI will experience more injuries while in Rikers, cannot be accepted.

Research question 3: TBI and punitive segregation. A binary logistic regression was conducted to examine if TBI predicted the likelihood of an inmate being placed in punitive segregation. Again, single predictor results from regressing TBI on punitive segregation in bivariate analyses are displayed next to multivariate results to identify where the significance of the prior results were strengthened or weakened when considering other measures in the model (Table 7.11).

[29] Effect sizes were calculated by converting the odds ratio into percentages

Table 7.11

*Multivariate Analyses (Binary Logistic Regression): TBI and Punitive Segregation (*N=*262)*

	Univariate		Multivariate	
	B	OR	B	OR
Exposure: TBI				
TBI with an AOC	0.64	1.91*	0.43	1.53
Controls				
Age	-0.05	0.95	-0.24	0.79
White	-0.31	0.73	0.46	1.58
Black	0.55	1.74	1.11	3.04
Hispanic	-0.62	0.54	0.30	1.35
Some High School	1.73	5.62*	1.37	3.92
Median Household Income	2.33	1	9.71	1.00
Mental Health Service Utilization	2.52	12.42***	1.95	7.018***
Marijuana Use at Intake	-0.5	0.61	-0.51	0.60
Criminal History	0.16	1.18*	0.12	1.12
Length of Stay in Rikers	0.01	1.01**	0.01	1.007***
**p<0.05, ** p<0.01, ***p<.001*			*chi2= 98.64****	
			Pseudo R2 = .329	

The model is significant (chi=98.64, $p<0.001$) and all the variables combined explain 33% of the variance in solitary confinement terms for inmates (Pseudo R2=0.329). Most notably, when only considering TBI and punitive segregation, the two variables have a significant association (OR=1.91, $p<0.05$). This indicates that without controlling for all other factors, having a TBI increased the likelihood of an inmate being placed in punitive segregation by 91%. However, once considering all other measures, the significance of TBI predicting punitive segregation diminishes. The same effect is seen for high school education and criminal history, each of which was significant predictors of punitive segregation in single predictor but not multivariate analyses. Significant predictors of having been in punitive segregation while controlling for all factors included using mental health services (OR=7.02, $p<0.001$) and length

of stay in Rikers (OR=1.00, $p<0.001$)[30]. This means that the likelihood of being placed in punitive segregation increased by over 600% if an inmate has a mental health status.

To answer Research Question 3, in the current study having a history of TBI did not predict placement in punitive segregation. As a result, Hypothesis 3, which states that participants affected by TBI will be more likely to be placed in punitive segregation while in Rikers, cannot be accepted.

Research question 4: TBI and recidivism. A binary logistic regression and a survival Cox regression were administered to examine recidivism. The logistic regression examined if TBI predicted the likelihood of an inmates recidivating within one year of their release, and the Cox regression examined if TBI predicted the amount of time it took inmates to recidivate within the first year of their release. For both analyses, it is important to note that due to overlap, criminal history is not included as a control. Single predictor results from regressing TBI on recidivism in the bivariate analyses are displayed next to multivariate results (Table 7.12).

[30] Even though the relationship was significant, an OR=1.00 indicates the effect size is 0 and therefore there is no change in the outcome.

Table 7.12.

*Multivariate Analyses (Binary Logistic Regression): TBI and Recidivism (*N=*262)*

	Univariate		Multivariate	
	B	OR	B	OR
Exposure: TBI				
TBI with an AOC	0.40	1.48	0.34	1.41
Controls				
Age	-0.02	0.98	-0.07	0.94
White	-0.38	0.68	-0.18	0.84
Black	0.19	1.21	0.1	1.10
Hispanic	-0.25	0.78	-0.30	0.750
Some High School	-1.00	0.37	-1.53	0.22*
Median Household Income	0.00	1.00	0.000	1*
Mental Health Service Utilization	1.12	3.07***	1.13	2.80**
Marijuana Use at Intake	-0.64	0.53*	-0.78	0.46**
Criminal History				
Length of Stay in Rikers	0.00	1.00**	0.00	1.00
**p<0.05, ** p<0.01, ***p<.001*			*chi2= 38.33****	
			Pseudo R2 = .0111	

The model is significant (chi=38.33, $p<0.001$) and all the variables combined only explained 1% of the variances in recidivism (Pseudo R2=0.011). TBI was not a significant predictor of recidivism. The only significant predictors of recidivism when considering all measures in the model were high school education (OR=0.22, $p<0.05$), median household income (OR=1.00, $p<0.05$), mental health service utilization in Rikers (OR=2.8, $p<0.01$), and using marijuana at intake (OR=0.46, $p<0.01$). Results indicate that the likelihood of an inmate having recidivated within 1 year of their first discharge increased by 180% for those who used mental health services in Rikers, decreased by 78% for inmates who had some high school, and decreased by 54% for those who reported using marijuana at intake. Although median household income was a significant predictor, the effect size was zero. A Cox regression was also performed to measure TBI as a predictor of the number of days it took for an inmate to reenter Rikers after their first discharge within the first year (Table 7.13).

Table 7.13.

Multivariate Survival Analyses (Cox Regression): Time to Recidivism

	TBI with AOC		Age of First TBI	
	Haz. Ratio	B	Haz Ratio	B
TBI	1.16	0.15	1.03	0.03
Controls				
Age	0.900	-0.11	0.97	-0.03
White	0.970	-0.03	0.97	-0.03
Black	1.130	0.12	0.93	-0.07
Hispanic	0.910	-0.1	0.78	-0.25
Some High School	0.42*	-0.88**	0.46*	-0.77*
Median Household Income	1*	0*	1	8.4
Mental Health Service Utilization	2.04***	0.71***	1.91**	0.65**
Marijuana Use at Intake	0.64*	-0.44*	0.69*	-0.37*
Length of Stay	1.000	0	1*	0
**p<0.05, ** p<0.01, ***p<.001*	*chi2= 45.21****		*chi2= 32.89****	

number of subject 262
number of failure 164

Out of the 262 inmates, 164 (62.60%) came back to Rikers at least once within 1 year after their release. The model was statistically significant (Chi Sq.=45.21, $p<0.001$), but TBI was not a significant predictor of recidivism. The significant predictors of the recidivism rate was high school education (HR=0.42, $p<0.01$), median household income (HR=1.00, $p<0.05$), mental health service utilization (HR=2.04, $p<0.001$), and marijuana use at intake (HR=0.64, $p<0.05$). This means that the time to failure (recidivism) increased by 104% if inmates accessed mental health services in Rikers, decreased by 48% if inmates had some high school education, and decreased by 36% if inmates reported smoking marijuana at intake. Similar to results from the binary logistic regression examining TBI as a predictor of recidivism, median household income was a significant predictor but the effect size was zero.

To answer Research Question 4, in the current study having a history of TBI did not predict whether or not an inmate recidivated, or the time it took inmates to recidivate. As a result,

Hypothesis 4, which states that participants who were affected by TBI would have recidivated more frequently and more quickly, cannot be accepted.

TBI and mental health. Although null findings in the multivariate analyses suggest that TBI could not predict the outcomes of interest for this study, it was quickly evident that mental health service utilization was a strong predictor of all outcomes for each model. Therefore, further analyses were conducted to explore the relationship between TBI and mental health. Preliminary bivariate results suggested that there is a strong relationship between TBI and mental health (Table 7.14).

Table 7.14.

*Bivariate Analyses (Chi Sq.): TBI and Mental Health (*N*=262)*

	TBI		No TBI	
Mental Health	*N*	(%)	*N*	(%)
Yes	65	(49.62%)	44	(33.59%)
No	66	(50.38%)	87	(66.41%)

*chi2 = 6.93***
**p<0.05, ** p<0.01, ***p<.001*

There is a correlation between TBI and mental health (Chi Sq.=6.93, $p<0.01$). Of all TBI-inmates, 50% accessed mental health services in Rikers at least three times and 50% did not. For those who accessed mental health services in Rikers, 50% of them had a TBI and 34% did not. More people who accessed mental health services had a TBI, suggesting that those with TBI might have displayed behaviors that resulted in the use of mental health services. As a result, further analyses were conducted to examine the indirect effect TBI on outcome variables through mental health service utilization.

TBI, mental health, and outcomes: Injuries, punitive segregation, and recidivism. Structural equation modeling was used to test the theoretical model that TBI had an indirect

effect on all outcome variables through mental health service utilization. The first model examines TBI and custodial injuries (Figure 7.1).

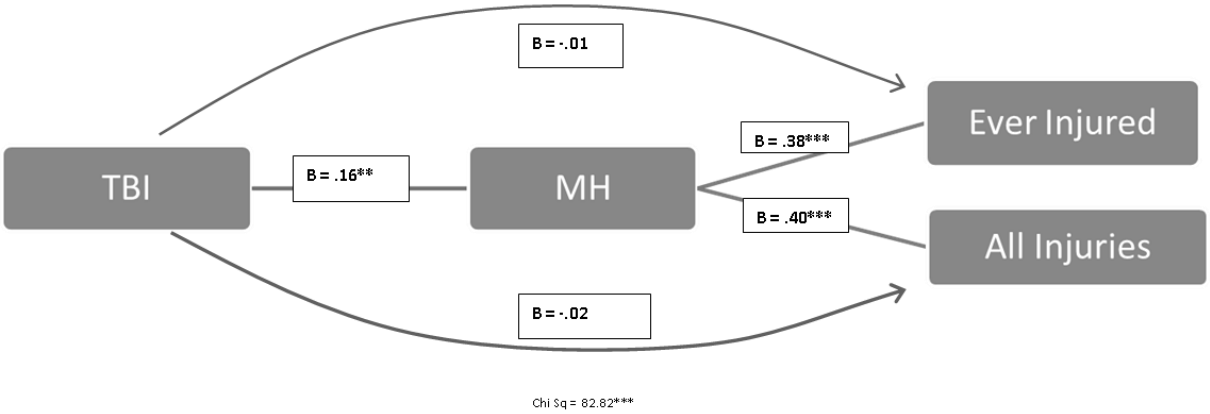


Figure 7.1. Structural equation modeling: TBI, mental health, and injuries.

The model was significant (Chi Sq.=82.82, p<0.01), but showed no significant direct relationship between TBI and custodial injuries while controlling for all other variables in the model. However there was a significant relationship between accessing mental health services in Rikers and TBI (B=0.16, p<0.01) as well as between mental health service utilization and all measures of custodial injuries (B=0.38, p<0.001 and B=0.40, p < 0.001). This suggests that while TBI may not have had a direct impact on custodial injuries, it may have an indirect impact through mental health problems. Another structural equation model examined TBI and punitive segregation (Figure 7.2.)

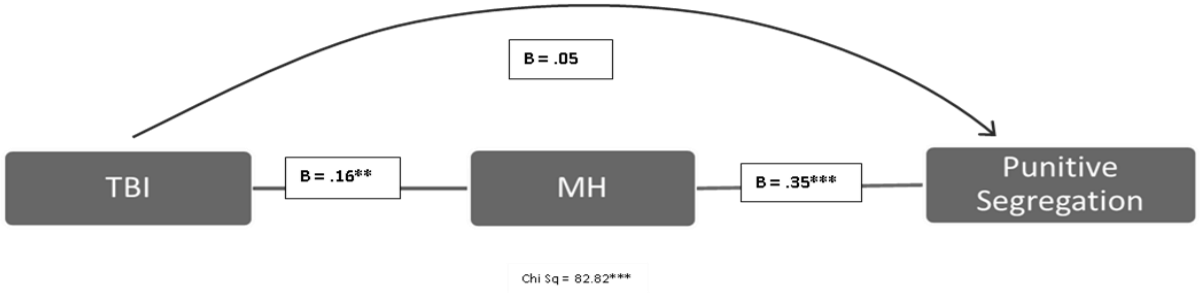


Figure 7.2. Structural equation modeling: TBI, mental health, and punitive segregation.

The model was significant (Chi Sq.=82.82, $p<0.01$) but again showed no significant direct relationship between TBI and punitive segregation while controlling for all other variables in the model. As previously established, there was a significant relationship between mental health and TBI (B=0.16. $p<0.01$). This model also shows a significant relationship between mental health service utilization and punitive segregation (B=0.35, $p<0.001$). Again, while TBI may not have a direct impact on punitive segregation, it may have an indirect impact through mental health problems.

The last structural equation model examined TBI and recidivism (Figure 7.3).

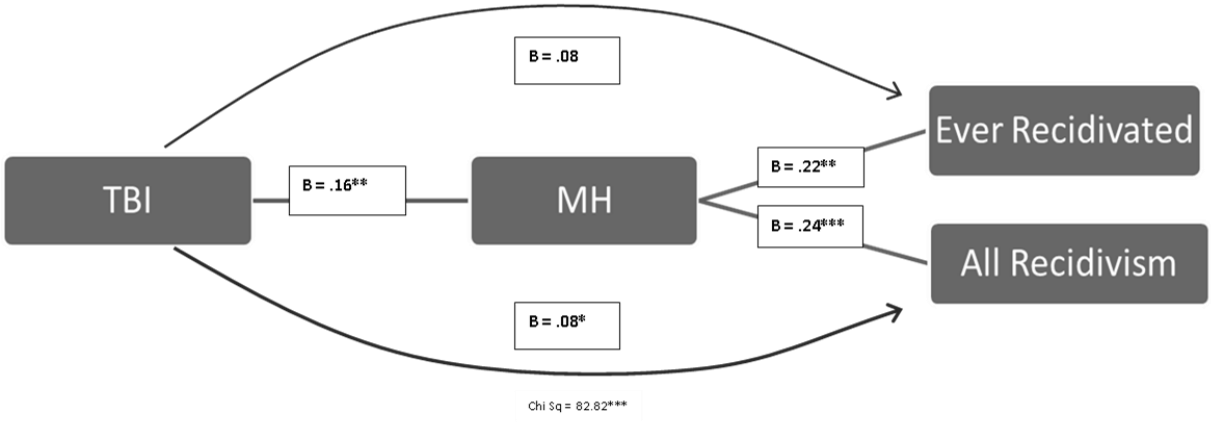


Figure 7.3. Structural equation modeling: TBI, mental health, and recidivism.

The model was significant (Chi Sq.=82.82, $p<0.01$) but showed no significant direct relationship between TBI and whether or not someone ever recidivated. However, there was a significant relationship between TBI and the frequency of which inmates recidivated (B=0.08, $p<0.05$). In addition there was a significant relationship between mental health and TBI (B=0.16, $p<0.01$) and between mental health service utilization and all recidivism measures (B=0.22, $p<0.001$, and B=0.24). It seems as though having a TBI and recidivating at least once is not directly correlated but having a TBI and reoccurring recidivism is. Once again while TBI may

not have a direct impact on whether or not someone recidivated, it may have had an indirect impact through mental health problems.

Overall Findings

Results from the quantitative analyses of administrative data on 262 adolescent inmates in Rikers Island demonstrate that there is a higher prevalence of TBI among adolescents in the jail population in New York City (50%) than in the general population (30%). The leading cause of these injuries is assault, compared to sports and motor vehicle accidents in a comparable population. TBI did not predict any outcomes in this study (custodial injuries, punitive segregation placement, or recidivism). However, there is reason to believe that there was an indirect effect of TBI on the outcomes in this study through mental health measures. It is possible that adolescents who suffer TBIs in the community may suffer from cognitive behavioral deficits because of a brain injury, and instead are labelled and treated as having a mental illness. Future research should examine the mechanisms by which TBI may influence adolescents' custodial challenges and outcomes while including other influential factors, such as mental health.

CHAPTER EIGHT: QUALITATIVE RESULTS

Interviews were conducted with 20 adolescent inmates in Rikers Island to explore potential custodial challenges faced by those who experienced a TBIs in the community. TBI was based on participants self-reporting a head injury that resulted in an alteration of conscious (post-traumatic amnesia [PTA] or a LOC). Of the 20 inmates, 10 were identified as TBI participants, and 10 were identified as non-TBI participants.

Using open coding and thematic analyses, responses were compared to understand how TBI and non-TBI participants perceived their jail experiences differently. Informed by the previously established research questions, five organizational categories for coding were created:

1. Participant characteristics,
2. TBIs,
3. Arguments, fights, and injuries in jail,
4. Punitive segregation, and
5. Re-entry challenges.

Substantive categories were used to code participants' beliefs and perceptions about interactions and altercations with other inmates and COs, challenges with punitive segregation, and perceived challenges about their release from Rikers.

Participant characteristics will first be presented to understand how TBI and non-TBI participants differed. The prevalence, source, and types of TBIs suffered, as well as treatment received will also be discussed. Then for each organizational category, coding results are presented and contextualized by participant accounts and narratives. For each question, thematic analyses will be used to present broader patterns and themes that emerged.

Participant Characteristic

Table 8.1.

Demographic Factors

	All Inmates			TBI			Non TBI		
Demographic Factors	N	(%)	Avg.	N	(%)	Avg.	N	(%)	Avg.
Age (yrs.)	--	--	17.4	--	--	17.4	--	--	17
Had 1 Birthday in Rikers	7	(35%)	--	2	(20%)	--	5	(50%)	--
White	3	(15%)	--	1	(10%)	--	2	(20%)	--
Black	16	(80%)	--	9	(90%)	--	7	(70%)	--
Hispanic	9	(45%)	--	6	(60%)	--	3	(30%)	--
Non-Hispanic	11	(55%)	--	4	(40%)	--	7	(70%)	--

At the time of the interviews, all participants were on average, 17.4 years old (Table 8.1). Some of them (35%) had already had at least one birthday in Rikers since their admission. More TBI participants self-identified as being Black (90%) and Hispanic (60%), compared to non-TBI participants who more frequently identified as being Black (70%) and not Hispanic (70%).

When examining levels of education, more TBI participants had no high school education (70%) than non-TBI participants (10%), and on average TBI participants were about one grade lower than non-TBI participants (9th compared to 10th grade completed) (Table 8.2).

Table 8.2

Education, Employment, and Spare Time

	All Inmates			TBI			Non TBI		
	N	(%)	Avg.	N	(%)	Avg.	N	(%)	Avg.
Level of Education									
Avg. grade completed	--	--	9.3	--	--	8.60	--	--	9.6
Less education than expected	13	(65%)	--	7	(70%)	--	6	(60%)	--
Some high school	11	(55%)	--	2	(20%)	--	9	(90%)	--
No high school	8	(45%)	--	7	(70%)	--	1	(10%)	--
High school/GED	1	(5%)	--	1	(10%)	--	0	(00%)	--
School Attendance									
Not going	8	(40%)	--	5	(50%)	--	3	(30%)	--
Going inconsistently	6	(30%)	--	3	(30%)	--	3	(30%)	--
Going to high school	4	(20%)	--	1	(10%)	--	3	(30%)	--
Going to college	2	(10%)	--	1	(10%)	--	1	(10%)	--
Spare Time									
Always with friends	12	(60%)	--	7	(70%)	--	5	(50%)	--
Sometimes with friends	4	(20%)	--	1	(10%)	--	3	(30%)	--
Always with family	2	(10%)	--	1	(10%)	--	1	(10%)	--
Alone	2	(10%)	--	1	(10%)	--	1	(10%)	--
Employed									
Yes	7	(35%)	--	4	(40%)	--	3	(30%)	--
No	13	(65%)	--	6	(60%)	--	7	(70%)	--

More TBI participants (80%) were not going to school or were going inconsistently, when compared to non-TBI participants (60%). For example, of the TBI participants one 18 year old had never went to school, three 18 year olds had only completed 9th grade, and three 17 year olds had not yet completed 10th grade. When asked about what they were doing when they were not going to school, many TBI participants talked about getting distracted by and involved in criminal activity:

> *I stopped going to school. [I started doing] stupid shit like selling weed, drugs and shooting guns. [I spent time] just drinking. We 'track', we sit on the corner and sell weed.*

I smoked, tried to get girls, and went to parties.–TBI participant, head injury from a small fall at 13 years old; suffered from a loss of consciousness for up to 5 minutes.

I haven't been in school since I was 15. I was going to class, but I just wasn't doing the work. I started doing stuff that I wasn't supposed to be doing…there's no money in going to school. –TBI participant, head injury at 17 from a car accident; suffered from a loss of consciousness for up to 5 minutes.

I didn't really go to school. [I stopped going] because I have a problem with asking for help… I do it as if I know, but I'm failing…. I started hanging out...I smoked, drank, hang with 'boys' [other young homosexual males], we changed our outfits up, stuff like that. [We also experimented with] liquor, weed, crack cocaine -TBI participant, head injury at 7 years old from fighting; suffered PTA for between 5 and 60 minutes and LOC for up to an hour.

TBI participants were falling behind in school; on average they were at least one grade lower than what would be expected for similar adolescents their age in the general community (at least 10th grade). Often when they stopped going to school they spent their spare time began engaging in risky behaviors.

When asked about living situations, most participants reported coming from various neighborhoods in the borough of Brooklyn (i.e., Crown Heights, Bed-Stuy, and Bushwick) (Table 8.3).

Table 8.3

Living Situations and Familial Relations

	All Inmates		TBI		Non TBI	
	N	(%)	N	(%)	N	(%)
Borough						
Queens	3	(15%)	1	(10%)	2	(20%)
Bronx	4	(20%)	3	(30%)	1	(10%)
Brooklyn	10	(50%)	4	(40%)	6	(60%)
Manhattan	3	(15%)	2	(20%)	1	(10%)
# of People in the House						
0-4	16	(80%)	8	(80%)	8	(80%)
5-7	3	(15%)	1	(10%)	2	(20%)
8+	1	(5%)	1	(10%)	0	(0%)
Father						
Present	4	(20%)	2	(20%)	2	(20%)
Not present	16	(80%)	8	(80%)	8	(80%)
Mother						
Living with mother	11	(55%)	3	(30%)	8	(80%)
Mother is employed	13	(65%)	8	(80%)	5	(50%)
Mother graduated high school	7	(35%)	2	(20%)	5	(50%)
Mother graduated college	6	(30%)	4	(40%)	2	(20%)
Other Relationships						
Girlfriend	9	(45%)	5	(50%)	4	(40%)
Kids	4	(20%)	2	(20%)	2	(20%)
No	16	(80%)	8	(80%)	8	(80%)

Other than that, TBI participants more frequently came from the Bronx, compared to non-TBI participants who more frequently came from Queens (Almost all of participants were living in an apartment in New York City usually with up to four other people (80%), though in four cases (20%) it was as many as between five and eight. Between TBI and non-TBI participants there was no difference in the immediate presence of their father; most had no or limited interaction, and two TBI participants had an incarcerated father (compared to one in the non-TBI group). More TBI participants were not living with their mother (70%) compared to non-TBI participants (20%), though more TBI participants reported that their mother was

employed (80%) and had a college degree (40%) compared to non-TBI participants (50% and 20%, respectively).

Results suggest that TBI participants came from low socioeconomic status and 'broken households; both their mothers and fathers did not have a consistent presence in their life. While TBI participants frequently reported believing that their mothers were employed and had college degrees, they were not always certain likely because they had less interaction with them. Alcohol and drug use was prevalent among participants, more-so smoking marijuana than anything else (Table 8.4).

Table 8.4.

Criminogenic Risk Factors

	All Inmates		TBI			Non TBI		
	N	(%)	N	(%)	Avg.	N	(%)	Avg.
Marijuana Use								
Heavily	14	(70%)	8	(80%)	--	6	(60%)	--
Moderately	6	(30%)	2	(20%)	--	4	(40%)	--
Alcohol Use								
Heavily	6	(30%)	4	(40%)	--	2	(20%)	--
Moderately	9	(45%)	4	(40%)	--	5	(50%)	--
Not at all	5	(25%)	2	(20%)	--	3	(30%)	--
Medicated for Mental Illness								
At least once	9	(45%)	4	(40%)	--	5	(50%)	--
ADHD	8	(72.73%)	3	(60%)	--	5	(83.33%)	--
Depression	1	(9.09%)	0	(0%)	--	1	(16.67%)	--
Bi-polar	2	(18.18%)	2	(40%)	--	0	(00%)	--
Still taking medication	2	(22.22%)	2	(50%)	--	0	(0%)	--
Criminal History								
# of juvenile detention admissions	12	(60%)	6	(60%)	--	6	(60%)	--
Cumulative time spent in juvenile detention (yrs.)					1.3			3.5
> 1 admission into adult facility (Rikers)	8	(40%)	5	(50%)	--	3	(30%)	--

Some TBI participants reported drinking heavily (40%) and slightly more than half of the non-TBI participants reported drinking moderately (60%). Similarly, with marijuana, all participants used marijuana but more TBI participants reported smoking heavily (80%) than non-TBI participants (60%) did. Narcotics use was not common, though two people in the TBI group experimented with molly shrooms and crack cocaine. Based on the results, most participants engaged in some alcohol and drug use as might be expected during adolescence. However, when considering dosage, TBI participants consumed alcohol and smoked marijuana more heavily and more frequently.

Nearly half (45%) of the participants were prescribed medication for mental health problems such as ADHD (78%), depression (22%), and bipolar disorder (22%), some of which were coexisting conditions. The average age that all participants who were medicated started taking medication was 10 years old, and they were usually referred to a doctor by a school professional. TBI participants were less frequently medicated for a mental illness (40%) compared to those without TBI (50%). However, when ADHD was removed, more TBI-participants were medicated for more severe diagnoses (20% for bipolar/manic depression) than those without TBI (0%). The two TBI participants who were medicated for more severe mental illnesses remained on their medication and believed it was helping, while none of the non-TBI participants remained on their medication. One TBI participant described his experience with being prescribed Depakote for bipolar disorder as a result of an outburst in his 7th grade classroom. His outburst led to psychiatric hospitalization when of his grandmother could not take time off from work to get him from school:

> *The teacher said something to me and I got mad. I tore the whole classroom up. I threw the chairs around, threw the books around. They called the ambulance and sent me to the*

mental hospital…I was hospitalized for 2 months. I tried breaking down the door [in the hospital] thinking it would break but it wouldn't. I tried to climb out the window but the window wouldn't open. [After some time] I could see that it [the medication] calmed me down. Certain things that I would do off the medication I wouldn't do on the medication. I feel better, it works –TBI participant, head injury at 7 years old from fighting; suffered PTA for between 5 and 60 minutes and LOC for up to an hour.

Another participant described his experience with being on Adderall and Risperidone for ADHD, anger, and bipolar when he was in pre-kindergarten. Since then he has remained on the medication, despite feeling negative "zombie-like" side effects:

[My school put me on]Adderall and Risperidone for ADHD, anger, and bipolar when I was in Pre-K. I still take them. I ain't take it today but if I would have I'd just be sitting here looking mad dumb. It's too strong. It relaxes me and keeps me calm but I don't know, it's bad…I don't like it. –TBI participant, head injury from a small fall at 13 years old; suffered from a loss of consciousness for up to 5 minutes.

Results demonstrate that while many participants have been diagnosed and medicated for mental illness, TBI participants appear to be suffering from more severe conditions. TBI participants also more actively choose to remain on medication, despite the negative side effects they may have to endure as a result.

Prior to ever being in Rikers, 60% of all participants who were interviewed reported spending time in a juvenile facility. Juvenile priors were mostly spent in detention centers such as Cross Roads, Horizon, Lincoln Hall Boy's Haven, and Boys Town Residential. TBI participants had less exposure to juvenile facilities but more extensive exposure to adult facilities. TBI participants were on average admitted to 1.33 different juvenile facilities

compared to 3.5 among non-TBI participants. Aside from juvenile facilities, half of TBI participants (50%) reported that was not their first time in Rikers compared to non-TBI participants (30%).

Results show that TBI participants appear to be getting involved in the justice system at later points in life, when their criminal behavior can be more consequential in the long term. For example, of some of the TBI participants, one who was turning 18 was about to go to an upstate prison for 8 years, one who was 18 was facing potentially 5 years in an upstate prison, and one who was 17 believed he might be sentenced to an upstate prison for 4 years.

Traumatic Brain Injuries

As a result of the sampling technique used, 50% of the participants had a TBI. Aside from this, every participant had at least one minor head injury in their life. The average number of all pre-existing lifetime head injuries was four, and the median was three. In two instances, each participant had more than 10 minimal injuries, but none of them resulted in an AOC.

For the 10 participants that had TBIs, the average age of their first injury was 12.3 years old and the median was 13 (Table 8.5).

Table 8.5

TBIs Among Participants who were Interviewed

ID	# of TBIs	Sources of Injury	Age of First AOC	Location of Blow to the Head	PTA	LOC	Treatment
0001	2	Car, Small Fall	17	Front	O	<5	ER
0002	1	Small Fall	12	Back	Unknown	Unknown	ER
0003	4	Big fall, Assault, Sports	17	Multiple	>5 but <60	>5 but <60	ER
0004	9	Small Fall, Sports, Assault	15	Back	<5	<5	None
0005	3	Small Fall, Assault, Other event	8	Front	O	<5	None
0006	4	Small Fall, Other	13	Back	O	<5	ER
0007	1	Assault	15	Front	O	<5	None
0008	2	Other Vehicle , Assault	13	Top	O	<5	ER
0009	5	Assaults, Other	6	Right	O	<5	ER
0010	3	Assaults	7	Left	>5 but <60	>5 but <60	ER

Almost half (40%) of their earliest injuries resulted from assaults (fighting), and the rest were evenly distributed between vehicle accidents, small falls, and other events. Participants' first TBIs were mostly due to a blow to the either the front or the back of the head (60%), and most frequently resulted in a loss of consciousness for less than 1 hour (70%). For the first TBIs experienced by a participant, most of the time (70%), treatment was provided as a result of being taken to the emergency room, but for the remaining cases, no care was pursued.

Research Question 1: How do participants with TBI talk about their experiences of suffering from a head injury?

The first research question asked about how participants who suffered from a TBI talked about their injuries. When screening for TBI, most participants expressed that head injuries were a part of the everyday violence that they experienced in the community. Community violence

was a key source of TBIs', as many of them spoke about being attacked by multiple people (being jumped) to the point where they blacked out and woke up in the hospital. Sometimes these fights were a part of ongoing conflict between rival gangs ("beef") that would escalate to physical violence. One participant talked about his experience getting a TBI after being jumped by a group of people:

> *I was having a fight with a whole bunch of people and I got hit with a metal cane on my head. On this side [right side] and I got I think six stiches. I blacked out. I lost consciousness and I woke up in the hospital. It was in the street…like beef… they didn't like me and I didn't like them. I was 14.*

Another participant talked about getting jumped on multiple occasions, and describes how he lost consciousness and suffered from post-traumatic amnesia:

> *The second time I blacked out I was walking around the same place. I think it was [by the same people as last time]. I got jumped, I cut on my face, and my head. I blacked out. Police came and they all ran. I woke up inside the ambulance after like five minutes. I didn't know what happened at first but it came back to me. I was like 17.*

Results suggest that many adolescents in this population suffered from TBIs because of community violence in the areas that they live. Conflict in the neighborhood escalated to physical alterations where blows to the head frequently lead to a loss of consciousness. Most participants reported not seeking treatment for their head injuries, and if treatment was received it was because the injury was severe enough that an ambulance had to be called.

Arguments, Fights, and Injuries in Jail

Research Question 2: What challenges are participants with TBI experiencing with regards to arguments, fights, and injuries in the facility? How do they feel about this? Why do they feel this way?

Participants were asked about both their direct and indirect experiences with verbal arguments and physical fighting as well as injuries in the facility. Indirect experience involved witnessing arguments and fights, and direct experiences involved personal accounts with them. Injuries were generally talked about in relation to fighting, though some other causes were discussed.

Indirect experience (witnessing arguments and fights). Most participants reported seeing verbal arguments occur between inmates (90%), and/or between corrections officers (COs) and inmates (75%) (Table 8.6).

Table 8.6.

Witnessed Arguments and Fights

		All Inmates		TBI		Non TBI	
Arguments		N	(%)	N	(%)	N	(%)
	Inmate-Inmate	17	(85%)	9	(90%)	8	(80%)
	CO-Inmate	15	(75%)	7	(70%)	8	(80%)
Fights							
	Inmate-Inmate	18	(90%)	9	(90%)	8	(90%)
	CO-Inmate	6	(30%)	1	(10%)	5	(50%)

All TBI participants (100%) saw verbal arguments between inmates. Slightly fewer TBI participants (70%) saw verbal arguments between CO and inmates compared to non-TBI

participants (80%). One TBI participant talked about witnessing a verbal argument over a card game and commissary[31]:

> *I remember when people were playing cards for money for commissary. The guy lost and the other guy who's playing didn't have commissary. So they started arguing. The guy is like, if you don't give up your commissary, I'm going to fight. They kept arguing. It died when he gave him back his commissary.*–TBI participant, head injury from fighting at age 15; suffered a PTA up to 5 minutes and a LOC up to 5 minutes.

In regards to witnessing physical altercations (fights) most TBI (90%) and non-TBI (90%) participants saw a physical altercation between inmates. Alternatively, very few TBI participants (10%) witnessed physical altercations between COs and an inmate when compared to non-TBI participants (50%).

Results suggest that indirect exposure to verbal arguments and physical altercations can serve as a means of informal social control in the jail. Witnessing verbal arguments can reinforce the rules about what behaviors could lead to fights and possibly infractions. It is also evident that fights between inmates are common and ongoing. In addition, physical altercations between COs and inmates are more frequently witnessed by non-TBI than by TBI participants. This could suggest that non-TBI participants are observing physical altercations between TBI participants and CO's. Perhaps TBI participants are more likely to be directly involved in in these incidents.

Direct experience (involvement in arguments and fights). Participants were asked about their direct involvement in verbal arguments and physical altercations. Almost all TBI participants (80%) were involved in a verbal disagreement with an inmate compared to just over half for non-TBI participants (60%) (Table 8.7).

[31] Commissary refers to monetary accounts for inmates. Money can be added from people outside of Rikers, but the cash is never distributed to inmates. Instead, inmates' commissaries are deducted when they make purchases within the facility (i.e. food, toiletries, haircuts, postage).

Table 8.7.

Personal Involvement in Arguments and Fights

	All Inmates		TBI		Non TBI	
Arguments	N	(%)	N	(%)	N	(%)
Inmate-Inmate Argument	14	(70%)	8	(80%)	6	(60%)
CO-Inmate Argument	7	(35%)	3	(30%)	4	(40%)
Fights						
Inmate-Inmate Fight	17	(85%)	8	(80%)	9	(90%)
CO-Inmate Fight	3	(15%)	2	(20%)	1	(10%)

Conversely, slightly less TBI participants (30%) were involved in a verbal argument with a CO compared to non-TBI participants (40%). One TBI participant talked about having a verbal argument with other inmates over water being thrown at him:

> *I'm sleeping, I just woke up and there's water in my face [inmates through water at him while sleeping] I start yelling at all of them, "what are you guys doing?" Almost [lead to a fight]. But when they saw I was ready to fight they [got] scared. They backed off.* - TBI participant, head injury from other event at age of 8; suffered a LOC for up to 5 minutes.

For physical altercations, almost all TBI (80%) and non-TBI participants (80%) were equally a part of at least one physical altercation with another inmate. Slightly more TBI participants (20%) had a physical altercation with a CO compared to non-TBI participants (10%). One participant talked about his involvement in a physical altercation with a captain and four other COs because he was hiding something and refused to be strip-searched:

> *I got into a fight with a court captain because I didn't want to be stripped search. We stole something– it was something big, and if I had to get searched it would have fell out. So they're like, call the captain, he don't want to strip. The captain came, he was like "you're not going to strip?" I was like no. He slapped me and I punched him. I broke his*

nose and they jumped me after that. -TBI participant, head injury at age of 17 from a car accident; suffered a loss of consciousness for up to 5 minutes.

Results demonstrate again that verbal and physical arguments between inmates are common and that norms are shaped through a pressure to fight; displaying readiness to fight is a protection measure. In addition, as previously suggested, TBI participants have less verbal arguments and more physical altercations with CO's. Based on principles of neurocriminology and neuroscience research on TBI, it is possible that TBI participants are having difficulty with information processing and with impulse control. CO's may perceive disobedience (due to delayed processing) as insubordination, which may then quickly escalate to a physical altercation because of difficulty with impulse control.

Perception of fights on Rikers Island. To get a more comprehensive understanding of how participants experienced fighting in Rikers, participants were asked about why fights were happening and how they felt about it. They were also asked to reflect on fights they had been in and consider if they would act the same way under similar circumstances.

Most TBI participants reported that fights were happening because of "trash talking" or gang-related conflict (50%) compared to non-TBI participants who equally offered a variety of reasons such as gangs, phones, petty things, racial disputes, card games, and food (Table 8.8).

Table 8.8.

Reasons for Fighting

	All Inmates		TBI		Non TBI	
	N	(%)	N	(%)	N	(%)
Gang related	3	(15%)	2	(20%)	1	(10%)
Fight with CO	1	(5%)	1	(10%)	0	(00%)
Outside beef	2	(10%)	1	(10%)	1	(10%)
Just to fight	2	(10%)	1	(10%)	1	(10%)
Talking trash	4	(20%)	3	(30%)	1	(10%)
Card game	1	(5%)	0	(00%)	1	(10%)
Stolen food	1	(5%)	0	(00%)	1	(10%)
Attacked while sleeping	1	(5%)	0	(00%)	1	(10%)
For a friend	1	(5%)	0	(00%)	1	(10%)

From TBI participants' accounts, when gangs and crews were fighting outside, the effects of this violence were transferred into the facility as well.

Generally, it was widely and strongly agreed upon that physical altercations occurred on a daily basis mostly between inmates on inmates. Fighting was described as both the norm and as a requirement for survival in Rikers. Participants talked about how fights escalated especially due to extortion by other inmates (having to "pay rent"):

> *I'm locked down in my house every day because every day we fight….they just want to fight for fun. They be like "you got to pay to live in this house, pay rent" [but] nobody is supposed to pay rent in jail. Some people just see a little person they want to take advantage of and be like you got to pay rent or you got to get the fuck out of here because we will beat you up. Someone will ask you for $15.00 or $20.00 and if you don't have commissary they start cursing. You'll have to lock in [go in your cell] because you're going to get beat up. The whole house [will] jump in and beat you up, blood everywhere.*
>
> -TBI participant, head injury from other event at age of 8; suffered a LOC for up to 5 minutes.

I cut an inmate's face because they tried to make me pay rent. They tried to stop me from using the phone. I was in a Blood household. I'm not Blood, so if you're not Blood they try to make you pay rent. If you fight one, you have to fight all of them. So I caught one in the corridor, cut his face. These COs are just fucking retarded in this jail [for placing me in a house where they know I will get beat up]. I just came out of the box [solitary confinement] four days ago [I'm back in the same unit]. So now I'm just waiting to get jumped again. Or for me to do something so I can get out of the house (fight or cut someone)-TBI participant, head injury from small fall at age 15; suffered LOC for less than 5 minutes.

Participants' accounts of fights in Rikers continue to demonstrate how informal social control perpetuates fighting in the facility. Some inmates who have suffered a TBI might be at even more of a disadvantage, as they may be more likely to be involved in fights that quickly escalate due to difficulty with judgement and impulse control.

Fighting was evidently a means for survival. Because of this, inmates would have to adapt to their environment. Sometimes this meant joining gangs for protection, and sometimes this meant finding ways to make a weapon. More participants with TBI had fights involving riots (often gang related) and/or weapons (40%), than those without TBI (10%). One participant talked about how being placed in a housing area with rival gang members forced him to protect himself by making a knife out of his toilet bowl:

I cut him with my toilet bowl. When I was in the box [punitive segregation] my lock fell so I took it [when I went back to general population]. I just started banging it on the toilet bowl so pieces broke off. Then I sharpened it [the pieces] on the wall. It turned it

into a perfect knife. They never found it on me…You could go anywhere with it and it won't ring [in the metal detectors] because it's porcelain.

Results indicated that more TBI participants had weapons, possibly as a result of struggling with escalating conflicts in the facility. The pressure to fight and their impaired ability to make judgements, process information, regulate emotions and control impulses may have led them to more extreme measures in their attempt to adapt for survival. Having a weapon might feel more necessary for those who struggle with and anticipate ongoing conflict. Most inmates who were discovered with a weapon would go straight to solitary confinement, and would get a significantly large number of days in punitive segregation.

Participants were asked to reflect on fights that they had been in. TBI participants more frequently expressed feeling like "I wouldn't have done anything differently," "I would do it again to protect myself," "you always have to be ready to throw the first punch," and "he didn't have to slap me." Conversely, more non-TBI participants expressed that "it wasn't really necessary," "I could have acted differently," "I knew I should have stopped and next time I'll walk away." While it is possible that the aversive nature of the jail environment led them to rationalize fighting as a necessity for survival, fighting as a norm was the general consensus among all participants. TBI participants in some instances however, differed in their ability to process and develop alternatives to violence. These results suggest that TBI participants might be less able to offer accountability for conflict due to impaired judgement and reasoning.

Injuries. To understand what types of injuries inmates were incurring while in Rikers Island, participants were asked how injuries occurred, how they felt about them, and how they thought injuries could be prevented. Table 8.9 demonstrates the various types and sources of injuries that participants endured on Rikers Island.

Table 8.9.

All Sources of Injuries

	All Inmates		TBI		Non TBI	
Injury from CO	N	(%)	N	(%)	N	(%)
Maced	17	(70.83%)	6	(50%)	11	(91.67%)
Black/buster eye	1	(4.17%)	1	(8.33%)	0	(0%)
Blow to the head	2	(8.33%)	1	(8.33%)	1	(8.33%)
Hand injury	4	(16.67%)	4	(33.33%)	0	(0%)
Injury from Inmate						
Broken finger/hand	2	(14.29%)	1	(14.29%)	1	(14.29%)
Blow to the head	1	(7.14%)	0	(00%)	1	(14.29%)
Small injury from fight	4	(28.57%)	1	(14.29%)	3	(42.86%)
Black eye	1	(7.14%)	0	(0%)	1	(14.29%)
Busted lip	2	(14.29%)	1	(14.29%)	1	(14.29%)
Sliced/stabbed	4	(28.57%)	4	(57.14%)	0	(0%)

Almost all participants (80%) reported obtaining at least one injury from fighting. The most common injury for those with TBI was from a laceration (21.05%) and the most common for those without TBI was small injuries from fights such as a cut to the lip (15.79%) (Table 8.10).

Table 8.10.

Injuries from Fights

	All Inmates		TBI		Non TBI	
	N	(%)	N	(%)	N	(%)
Injuries						
Yes	16	(80%)	7	(70%)	9	(90%)
No	4	(40%)	3	(30%)	1	(10)%
Source of Injury						
Broken finger/hand	6	(15.79%)	5	(26.32%)	1	(5.26%)
Blow to the head	3	(7.89%)	1	(5.26%)	2	(10.53%)
Small injury from fight	4	(10.53%)	1	(5.26%)	3	(15.79%)
Black eye	2	(5.26%)	1	(5.26%)	1	(5.26%)
Busted lip	2	(5.26%)	1	(5.26%)	1	(5.26%)
Sliced/stabbed	4	(10.53%)	4	(21.05%)	0	(00%)

This finding suggests that in addition to possessing weapons (as previously discovered), TBI participants are likely to be the victim of a weapons related injury as well.

Though initially it was thought that all injuries occurred from fighting, it was discovered that the most common injury was instead from being maced. Participants described being maced as very painful but did not ever consider it to be an injury until they were probed by the interviewer. Once asked, participants spoke about the pain and the process involved in alleviating the injury. One participant talked about his experience being maced as a high classification inmate:

> *They spray your eyes and it starts burning. When you are on low classification [they use] five percent mace and when you are on high classification they use 10 percent. All it is, is hot hot hot pepper. When they sprayed me it burnt my skin. If it [mace] touches your face it's going to burn. The only way you could stop it from burning is milk– you can't put water you have to put milk. You're lucky if you got milk, but not all the time you got milk. You gotta have milk saved*. -non-TBI participant

Of the participants who talked about being maced, fewer were TBI participants (31.58%) compared non-TBI participants (57.89%). This finding was somewhat surprising given previous results indicating more physical altercations between TBI participants and COs. This suggests that perhaps TBI participants who had conflict with COs were more likely experience physical rather than non-physical (i.e., mace) restraints and use of force.

Perception of injuries on Rikers Island. Participants were asked about how fighting related injuries could be prevented or reduced. Most commonly they expressed feeling that nothing that could be done because "it's Rikers." Participants felt that fights were an integral part

of the jail experience and there was strong doubt that any efforts could ever reduce the fighting and injuries. Some participants offered suggestions anyway (Table 8.11).

Table 8.11

Strategies for Prevention of Fights

	All Inmates		TBI		Non TBI	
	N	(%)	N	(%)	N	(%)
Can't prevent fights	12	(24%)	5	(25%)	7	(23.33)
Prevention strategies						
Smoking in the facility	2	(4%)	1	(5%)	1	(3.33%)
Remove commissary	1	(2%)	0	(0%)	1	(3.33%)
Change/train Cos	3	(6%)	0	(0%)	3	(10%)
Separate inmates by gangs	10	(20%)	3	(15%)	7	(23.33%)
Allow regular clothes	3	(6%)	2	(10%)	1	(3.33%)
More phones	4	(8%)	1	(5%)	3	(10%)
More programs	7	(14%)	2	(10%)	5	(16.67%)
More visits	3	(6%)	2	(10%)	1	(3.33%)
Girls	1	(2%)	0	(0%)	1	(3.33%)
Reduce jail time	4	(8%)	4	(20%)	0	(0%)

The most common suggestion by TBI participants was reducing jail sentences (20%) compared to non-TBI participants' responses which were to separate inmates by their gang affiliation/ethnicity (23.3%) and to offer more programs to occupy their mind (16.67%). One TBI participant explained how having less time in the facility could incentivize good behavior:

> *If you face little time you don't want to lose a good time so you want to do your best. But if you got 15 or 10 years, or you don't know when you are going to go home, you are going be like, I don't care about none of this.* -TBI participant, head injury from small fall at age 12; suffered PTA and LOC both for unknown periods of time.

All participants indicated feeling that fights and injuries are the norm and there is no way around it in Rikers Island. However, TBI participants appear to be facing longer periods of time in Rikers, which created a sense of hopelessness, as their ability to adapt and manage in the

facility deteriorated over time. As a result, they become increasingly frustrated and resorted to maladaptive behaviors (i.e., fights and weapons). Perhaps the group of TBI participants had more difficulty with coping in the aversive environment as a result of TBI-related consequences.

Reporting and documenting fights and injuries. Participants were asked about oversight and reporting of fights and injuries. Firstly, physical altercations were described as being between inmates; however, some participants expressed that physical fights frequently occurred between CO and inmates, but in areas where there was no camera surveillance. In addition, one participant spoke about how detection of a fight by a CO did not always lead to them intervening because of the paperwork involved in infractions:

> *They're [CO's] are supposed to [stop it] but some COs are like, you all want to fight, go ahead – go in the corner and separate in like 5 minutes. Alright? And that'll be it – like, don't do nothing to get [infracted] on my tour.* -Non TBI participant

Most of the times however, fights went unnoticed because inmates did not want to "make the house hot." This means that if the CO found out about the fight, the PBA (alarm) might get pressed, calling in additional CO's and making the whole house have to lock in (stay in their cells) for the rest of the day. In addition, if a fight is detected, inmates might get maced, infracted, fined, and/or sent to punitive segregation. To keep fights quiet, inmates would fight in their cells when the CO was no looking, or in the shower out of vision from the COs and surveillance cameras. One participant described his planned fight in the shower and how easily it went undetected:

> *I fought in the shower. It was a plan. He [the inmate] was talking crazy so I had to put him in his place. I said don't talk until we lockout [come out of our cells], then just go to the shower. When we locked out, he got his stuff, went in the shower and I went in the*

shower after him. We started fighting. One person was a lookout and when the CO was coming he said "Hot nine, hot nine". Hot nine means the CO is coming. Then when the COs came, we acted like we was just playing around. If he loses the fight, he holds it down (deals with it and doesn't report it) and if I lose I hold it down. We go on about our day. Some COs know but they can't really prove it because they ain't seen nothing. -Non TBI participant

Similar to what was shared about fights, many injuries also intentionally went unreported to avoid "making the house hot." If an inmate went to the clinic for an injury, he would have to disclose what lead to the injury. This made it more likely that inmates would incur an infraction, a fine, and/or a sentence to punitive segregation. So instead, even if injured they would "hold it down". Holding it down meant they would clean up and allowing it to heal on its own. One participant described how "holding it down" was even an expectation from COs.

They'll [the CO] be like hold it down man. Let's say I bust somebody's lip, they'll [tell him] "hold it down" and give him a towel. They'll say "clean yourself up". So you get in the shower and you got to hold it down. - TBI Participant, head injury from car accident at age 17; suffered a LOC for up to 5 minutes

Interviews with inmates revealed that challenges with verbal and physical arguments are a highly prevalent in Rikers Island. TBI participants were both indirectly exposed to and directly involved in verbal arguments and physical altercations with other inmates. When it came to COs, however, conflict more often resulted in physical altercations potentially as a result of rapid escalation due to impulse control. Fighting is inescapable and often ignored, and has established a presence in Rikers Island as a mechanism of informal social control.

Being in "the Box"

Research Question 3: What challenges are participants with TBI facing in regards to punitive segregation? How do they feel about this? Why do they feel this way?

One of the most severe responses to an infraction that an inmate can receive in Rikers Island is being placed in punitive segregation, otherwise referred to as "the box." To obtain information about challenges related to punitive segregation, participants were asked what they knew about it even if they hadn't been there. For participants who had spent time in the box, they were asked how they felt about it and how they coped with it.

Most participants were able to offer information about punitive segregation even if they themselves hadn't spent any time there. Punitive segregation was described as a type of punishment for the most serious fights, especially the ones involving makeshift weapons and altercations with a CO.[32] Before being placed in punitive segregation, inmates would usually go to "Bing Court" for a hearing. During the hearing they were given the opportunity to plead guilty, plead guilty with an explanation, or to "beat the charge" (get it dismissed). In exceptionally serious cases, inmates could get "PHD'd" (pre-hearing detention) which meant the infraction was so severe that they were sent directly to the box before their hearing.

More TBI participants (70%) had been in the box than non-TBI participants (50%)[33] (Table 8.12).

Table 8.12.

[32] Some participants also talked about protective custody (PC), which was a different type of segregated housing though not punitive in nature. Inmates housed in PC were there because they had a high profile case (featured in the media), or were being targeted for gang membership or sexual orientation. PC was described as being both similar and different from the box; it was similar because inmates were in cells by themselves, but the different because they had access to commissary and could congregate to watch television in the day room.

[33] One TBI participant served his segregation term in a different facility in North Carolina.

Placement in Punitive Segregation

	All Inmates	TBI	Non TBI
Spent time in PS	12 (60%)	7 (70%)	5 (50%)
Range of days in PS	31 -210	90 - 210	31- 120
Average # of days in PS	109.60	137.50	67.75
Median # of days in PS	110	122.5	60

In addition, the average number of days in punitive segregation was higher for TBI participants (an average of 138 and a median of 123 days) compared to non-TBI participants (an average of 68 and a median of 60 days)[34]. "The box" was described as: "24/7 lockdown" with the only chances to get out of the cell being for an optional one hour of recreation at 7:00 am, if they got a visit, if they had court, or if they went to the clinic. If they went to recreation, they were still in a cage and were prohibited from talking with other inmates. Similarly, during visits they were placed in an isolated booth to prevent interaction with other inmates. While in punitive segregation, access to commissary was denied. Thus, inmates were not allowed the purchase additional phone calls or food, but were provided one phone call and three meals per day, which was frequently described as being insufficient.

While in their cells, participants would spend time reading, sleeping, and doing school work (school packages would be delivered to their cells). Despite being in punitive segregation where interaction was generally restricted, participants still managed to communicate with their neighbors. Some inmates used "fishing"; they rolled up toilet paper thin enough to make a string, tied it around objects such as magazine and letters, and slid it under their door and into another inmate's cell. Most inmates, however, described how even though they were in punitive segregation, they still spent much of their time talking to other inmates under the door or through

[34] One participant in each TBI and non TBI group spent time in the box but did not know for how many days, so they were not included in calculating the average.

the walls and doors of their cells. Two TBI participants described how they developed a sense of camaraderie with their neighbors, even though in most cases they don't even know what they looked like:

> *We'll be up 'til like two, three in the morning, us five. [We] be joking around with each other, talking, joking on the CO. We have a little arguing, like a little disagreement. "FU, FU, alright, alright go away from the gate (cell door)." Then I'd be like "Hey yo bro though, you mad at me?" He would say "No, I ain't." We start talking again and then we just go to sleep. I'll be talking from my bed, then I'll fall to sleep.*-TBI participant, head injury from car accident at age 17; suffered loss of consciousness for up to 5 minutes.
>
> *After a while [in punitive segregation] people started coming in and banging on my wall –"what's your name?".... I told them, talked to them, that's when we became cool. But you be in the box for so long you don't know what the person next to you looks like and you wonder like, "yo how do you look like?".. and one day [when you get out] you bump into him – "what's your name? You are lying… that's your name?" [and then you realize he was next to you]* -TBI participant, head injury from small fall at age 12; suffered PTA and LOC both for unknown periods of time.

Results demonstrate TBI participants were more likely to be sentenced to punitive segregation, and to be sentenced for longer periods of time. Long sentences to punitive segregation were reserved for severe infractions including physical altercations with a CO and possession and/or use of a weapon. Once again it appears likely that TBI participants spent more time in punitive segregation for serious violations as a result of rapidly escalating conflict with CO's and for weapon related altercations.

Most participants, whether they went to punitive segregation or not, or whether they liked it or not, thought the worst thing about being there was not having enough food (56.52%). They could not access their commissary to purchase additional food or phone calls, but were served three meals per day and granted one phone call per day, which they described as not being enough. To overcome this obstacle, inmates would try to conserve food throughout the day. For example, for breakfast they were provided cereal, bread, and jelly. They would eat the bread and jelly and save the cereal for when they were hungry to hold them over until the next meal. In addition, if the CO did not particularly like the inmate, they might not serve them meals, or might serve them smaller portions. One participant shared his experience of the CO withholding food:

> *They feed you whenever they want to feed you. If you curse at a CO or flood the box [clog the toilet with a milk carton] they'll say alright you're not eating today. We're going to make it seem like you didn't want to eat. When we come to your cell we're going to put it [tray of food] in your slot and we're going to close it (but not open the other slot on the inside for inmate). Then we're going to come back and shake our head "no?"[so the camera sees], and take it back. They'll open the slot, take your tray and give it to somebody else.* -TBI participant, head injury from a small fall at age of 13; suffered LOC for up to 5 minutes.

Alternatively, if the CO liked the inmate, they would get extra food. One other way to sneak food would be if an inmate was friends with an inmate who had a job serving food, and would bring him something extra or something from commissary. Most inmates talked about enduring feelings of constant hunger and losing weight while being in the box. For those who

had not been in the box, most reported seeing inmates lose weight or hearing about feelings of constant hunger.

Though inmates had to conserving food as a survival strategy, it put them at risk of further infractions and increased box days. Every so often, punitive segregation cells would be searched. The lights would be cut off, COs would bang on inmates' doors, and inmates got flexi-cuffed while waiting outside of their cells. If any contraband was found during the search, it would get confiscated and inmates could get infractions, fines, and/or more box days. One participant said that in some cases during the search the CO might "turn up your cell" and "violate you." Fines and box days were usually reserved for searches that discovered weapons, money, matches, lighters, cigarettes, and marijuana. If COs found any extra cereal boxes they would throw them away. However, when inmates knew a search was about to happen (i.e., if the lights were shut off) they would try to eat whatever food they had as quickly as possible. Other than food, for TBI participants the biggest challenge of being in solitary was being in a small space (26.67%) followed by not being able to use the phone (13.33%) and hot temperatures (13.33%) (Table 8.13).

Table 8.13.

Challenges in Punitive Segregation

	All Inmates		TBI		Non TBI	
Not enough food	13	(56.52%)	6	(40%)	7	(87.5%)
No phone calls	3	(13.04%)	2	(13.33%)	1	(12.5%)
Small space	4	(17.39%)	4	(26.67%)	0	(00%)
Hot temperature	2	(8.70%)	2	(13.33%)	0	(00%)
Mice/roaches	1	(4.35%)	1	(6.67%)	0	(00%)

For non-TBI participants, the biggest challenge (other than food) was not being able to use the phone (12.5%). One TBI participant talked about difficulty with being in a small space especially when mice would enter his cell:

> *"It was hell, I was ADHD, and I kept trying to move out of the [small] cell. The worst thing was the mice. The mice were running in and out of my cell and I screamed. The CO came, I told them to come in and get the mouse out but the mouse ran out of my cell. People often screamed about roaches, mice and water bugs."*

Results demonstrate how TBI participants were frequently subjected to punishment through the withholding of food and hunger for long periods of time (i.e., on average 4 months). They were also having difficulty with being in a small space, and sometimes described feeling "claustrophobic." This could be a function of TBI participants being sentenced to long periods of time in punitive segregation (and the unpleasant conditions that came with it such as mice and cockroaches), and a deteriorating ability to be in a small space over time.

Perceptions about Punitive Segregation

Participants were asked about their thoughts and feelings about solitary confinement, and mixed reactions were given. Many participants found solitary confinement to be difficult (67%), but some (33%) also said that despite the challenges in there it was still better than being in general population where they had to worry about getting jumped or having to fight (Table 8.14).

Table 8.14.

Perceptions of Punitive Segregation

	All Inmates		TBI		Non TBI	
Perceptions	N	(%)	N	(%)	N	(%)
Did not like it	8	(66.67%)	6	(85.71%)	2	(40%)
Liked it	4	(33.33%)	1	(14.29%)	3	(60%)

TBI participants more frequently expressed finding punitive segregation challenging (85.71%) compared to non-TBI participants (40%). Emotional or mental health difficulties were rarely self-identified as a being a concern until probed by the interviewer. Once specifically asked about their feelings, many talked extensively about the emotional toll that being in punitive segregation had on them. Two TBI-participants described the box as "getting to them" especially when things in their personal life became difficult to cope with, and one TBI participant described it as feeling like torture:

> *My girlfriend, she was pregnant and she had a miscarriage; it got to me. I was like, I can't be here no more. I can't be in the box no more. Sometimes you feel mad, and you just go to sleep, maybe the next day you feel a little better.*
>
> *When I was in the box I was going to crazy plenty times… I started reading books and I was thinking about changing my life. I was like alright, I'm not going to do none of this, I'm going to stop cursing and start reading the bible more. I'm going to turn my life towards God. Then one day I went to court and they offered me something [that I didn't like] and I'm like, I give up. I just started tearing things off the walls and cutting myself a little bit. And then I wasn't talking to anyone, I was going crazy every day and didn't care about nothing... At that moment I didn't even know what to do in the box. Sometimes you don't eat, sometimes you don't use the phone, sometimes you don't shower. I was going mad, like… I'm going to be in here for how many days just looking at these floor and walls? This is not even punishment, this is torture.*

When asked about coping mechanisms while being in punitive segregation, half of the participants talked about suicidal threats or attempts, otherwise referred to as attempting to "hang it up (50%) (Table 8.15).

Table 8.15

Coping Mechanisms in Punitive Segregation

	All Inmates		TBI		Non TBI	
Flood the cell (clogging the toilet or sink)	1	(8.33%)	1	(14.29%)	0	(0%)
Self-injury/suicide attempt	6	(50%)	5	(71.43%)	1	(20%)

More TBI participants who spent time in the box (71.43%) threatened or attempted to hang it up and/or self-injure themselves compared to those without TBI (20%). Attempts to hang it up were described as a way of getting out of the box rather than being identified as being related to any psychological component no matter how extreme and frequent the attempts. One participant detailed the process of attempting to hang it up:

> *[They don't hang it up] because they feel depressed; they just want to get out of the box. So they just wait till the captain walk, and then they just tie their sheet up to the vent and around their neck and say "I'm going to hang it up." They act like they're about to jump and they [the COs] come. They cut the thing around his neck and take him to Mod 8,*[35] *the mental observation dorm.*

Although participants did not always associate emotional and psychological trauma to being the box, a number of stories by participants made it the connection evident. One inmate provided precise details on the process of hanging it up to the point of dizziness and to the point of losing consciousness:

> *I tried to hang up like seven times. I decided to take the sheets off the bed, tie it up to the lights, make a hole and put my head through it. I was holding on so when the captain*

[35] Mod 8 was described as a mental observation unit where inmates who attempted to hang it up are placed under suicide watch (and some inmates reported they went to PC a few days after). Some inmates wanted to go to Mod 8 from the box because instead of cells they are in a dorm where there is a day room (they can watch television, but are handcuffed to the tables/chairs), and because there is air conditioning. One participant said that although he tried to hang it up, he didn't want to go to Mod 8 because he would get a mental health status on his record.

comes, I'll let go and be like I'm choking until she feels like I'm for real, or else I have to take myself down. It takes me 1 minute and 20 seconds to get dizzy and it takes 3 minutes to drop [pass out]. If they [COs] see that, they got to do something so you got to do it when they are looking. They [will have to] open my cell. They cut you down and take you out. You go to a medical room to make sure everything is good... But all the times it [hanging it up] didn't work. Sometimes they will just be like "oh, you playing" and so I finally let go for real. I was really hanging. I was choking to death. I had to try my luck. They weren't paying attention to the fake one so I did it for real. And they got me up out of there.

Another TBI participant spoke about his experience in solitary confinement, though this was in a facility in North Carolina. He went to great lengths to use the phone while in solitary, to the point where he tried to hang it up and self-injure himself.

In a previous facility, I was doing some dumb shit/crazy stuff. Inmates told me that if I threaten to kill myself that I would be allowed to use the phone but it was a lie. To get to use the phone I tried to hang it up. I ripped the blanket with my teeth, made a circle tied it around my neck and tried to hang it up. They put me in mental observation and there was a wooden chair. I scratched the wood off with my nails and tried to cut myself but it didn't work. So I took my teeth and bit through my wrist, I took a piece of a comb, I stuck it in my wrist and they had to call a surgeon because it got stuck in there. They had to take me to the hospital to get it removed.

The psychological trauma of being in punitive segregation is evident, though participants are often do not explicitly express it. For TBI participants (who are in punitive segregation more often and for longer periods of time), the cumulative effects of this ongoing trauma can make it

even more difficult for them to manage stress in their personal lives. In some cases a lack of healthy and safe options for stress relief, combined with a habituated tendency towards violence as a means of communication, could lead to self-injury. In other cases, desperation became so severe that participants were willing to risk their life (hang it up) to be removed from that environment. If TBI participants are less able to cope with stress as a result of their injuries, there is an increased likelihood that they may turn to self-harm and suicide as an attempt to escape.

Reentry

Research Question #5: What challenges do participants perceive they will face upon release into the community? Why do they anticipate these problems, and how do they perceive their ability to be helped in the community?

Participants were asked about their perceived re-entry challenges in regards to how their life would be different after release, what would be challenging for them, what help they would have, how they felt Rikers impacted them and what they were looking forward to upon release (Table 8.16).

Table 8.16.

Goals for Success and Available Support Upon Release from Rikers

	All Inmates		TBI		Non TBI	
	N	(%)	N	(%)	N	(%)
Keep in touch family	17	(85%)	9	(90%)	8	(80%)
Changing friends	13	(65%)	6	(60%)	7	(70%)
Going back to school	13	(65%)	6	(60%)	7	(70%)
Get a job	15	(75%)	7	(70%)	8	(80%)
Moving out of NY	10	(50%)	4	(40%)	6	(60%)
Going to change	7	(70%)	3	(30%)	4	(40%)
Not going to change	2	(10%)	1	(10%)	1	(10%)
Has support at home:	14	(70%)	8	(80%)	6	(60%)
Parent	8	(47.06%)	5	(55.56%)	3	(37.50%)
Children	1	(5.88%)	1	(11.11%)	0	(00%)
Girlfriend	2	(11.76%)	1	(11.11%)	1	(12.50%)
Sibling	5	(29.41%)	1	(11.11%)	4	(50%)
Family	1	(5.88%)	1	(11.11%)	0	(00%)

Almost half of TBI participants (40%) said they were going to move out of their current neighborhood or out of New York City, compared to just over half of non-TBI participants (60%). Other than that, there was very little difference between TBI and non-TBI participants in terms of changing their friends (Δ10%), going back to school (Δ10%), getting a job (Δ10%), and staying in touch with family (Δ10%). TBI participants most commonly worried about trying to avoid friends who were a negative influence and staying off the streets, compared to non-TBI participants who worried more about adapting out of the jail environment, avoiding old friends, trying to find new job and staying off the streets.

When asked to imagine their release from Rikers and reflect on their experiences while in custody, numerous and sometimes conflicting responses were provided. Fewer TBI participants indicated feelings of happiness and excitement about their release (36.36%) than non-TBI participants (50%). When asked to think about whether they learned their lesson from being in

Rikers, for those who said yes, slightly fewer were TBI participants (30%) compared to non-TBI participants (40%). For those who said they were not going to change, one was a TBI participant and one was not. Both TBI and non-TBI participants believed that for the most part nothing in the community could help them succeed. However, most TBI participants (80%) said they had support at home compared to non-TBI participants (60%). These sources of support from family for TBI participants most frequently included a parent figure (55.56%) or a sibling, girlfriend, child, or other family member (11.11%). For non-TBI participants, sources of support were from siblings (50%), parent figure (37.5%), and girlfriend (12.5).

To end the interview on a positive note, participants were asked what they were looking forward to when they were released from Rikers. This question was usually responded to with a smile and evidence of the participants vividly envisioning their release. Multiple responses were given and varied, but for those with TBI, participants were most looking forward to family (66.67%) compared to those without TBI, who reported more often looking forward to food (28.57%).

CHAPTER NINE: DISCUSSION OF RESULTS

This study used a mixed methods approach to explore TBIs among adolescent inmates in Rikers Island. Results from the quantitative analyses allowed for a better understanding of TBIs and its correlates in this population. Qualitative analyses provided a detailed account of how inmates created meaning of arguments, fights, injuries and punitive segregation in jail, and how they perceived their re-entry in the community upon release. Combined, results answered three broad research questions, and were brought together to highlight five emergent themes.

Broad Research Questions

Q1. Is TBI more common in the adolescent jail population than in the general adolescent population? Why? How do these inmates feel about these injuries?

TBI in the Sample

There was a 50% prevalence of TBI (head injury with an alteration of consciousness) among the adolescent inmates in the sample. This prevalence is higher than in the general population, which ranges from 8%-25% (Diamond et al., 2007), and in the general adolescent population, which is approximately 10% (CDC, 2014). Most TBIs were a result of fighting in the community, whereas in the general population of male adolescents TBIs mostly result from contact sports and motor vehicles (Asemota, George, Bowman, Haider, & Schneider, 2013). Adolescents in the sample were surrounded by community violence that in many cases led to blows to the front and/or the back of the head and a loss of consciousness for up to an hour.

When inmates talked about their head injuries, they made meaning out of them with a sense of normalcy and necessity. Getting jumped and beaten up was an everyday occurrence for them and their peers, and fighting was a requirement for survival. Inmates sometimes talked about not knowing of any safe place to walk around in New York City, and altering their routes

to school to avoid getting jumped or shot on certain blocks. Being surrounded by violence led to fighting as a norm, as they lived in anticipation and readiness for violent encounters.

Most inmates also did not feel that their head injuries were anything to be concerned about, again because violence and injuries are perceived as being part of everyday life. Many did not seek out treatment for their injury unless if it was so severe that they woke up in the emergency room. They were not aware of, or were not alarmed by, the potential long-term consequences that brain injuries could have. This was also probably due to the seemingly non-serious symptoms (seeing stars, headaches, and nausea). By the time inmates were on average 17 years old, most had at approximately four head injuries, and the average age of first TBI was 12 years old. This means that brain injuries, in many cases from violence, were reoccurring during important developmental phases in these inmates' lives.

Q2. Do adolescent inmates who suffered a TBI experience unique custodial challenges in regards to fights, injuries and punitive segregation? Why? How do they feel about it?

TBI and Arguments, Fights, and Injuries in Jail

There was no significant relationship between TBI and custodial injuries whether or not demographic, socioeconomic and criminogenic risk factors were considered. However, there was some indication that TBI might have had an indirect effect on the outcomes through mental health service utilization. Mental health measures were a strong predictor of all outcomes, but were also highly correlated with TBI; Inmates who accessed mental health services in Rikers were more likely to face custodial challenges such as arguments, fights and injuries, and a large portion of TBI participants were likely to have accessed mental health services in the facility.

Many inmates had previously received a blow to the front or the back of the head, causing potential frontal lobe damage.[36] This type of brain injury could have led to difficulty adapting to the jail environment. Accordingly, inmates affected by a TBI more frequently talked about experiencing fights and injuries with other inmates, and obtaining severe injuries such as being sliced or stabbed. They were also involved in less verbal, but more physical altercations with COs. This suggests that TBI inmates might have had more one-on-one conflict with COs that escalated quickly enough for physical use of force to be used.

Neurological research on TBI demonstrates that people who suffer from a TBI often display cognitive behavioral deficits such as delayed information processing and impulse control. Perhaps other inmates and COs perceived the behaviors of those affected by TBI as insubordination rather than as difficulty with understanding instructions. As a result, verbal conflict could have quickly intensified due to difficulty with impulse control. It is possible that cognitive-behavioral deficits from brain injuries could be posing unique challenges and additional sources of conflict for this group of inmates.

TBI and Punitive Segregation

The most prominent relationship between TBI and all outcome measures in this study was the one between TBI and punitive segregation. There was a significant direct relationship between these two variables, though this did not remain once controlling for all other factors in the data. Again, this outcome was predicted by mental health measures that were strongly correlated with TBI. Inmates who accessed mental health services were more likely to be placed in punitive segregation, and many of these inmates had previously experienced a TBI.

[36] A blow to the front of the head could cause a direct frontal lobe injury and a blow to back of the head could result in a contre-coup injury where impact to the back of the head causes the brain to bounce off the front of the skull resulting in damage to the frontal lobe.

Information from interviews demonstrated that inmates affected by TBI were experiencing punitive segregation differently; they were more frequently placed there, and for longer periods of time. They were likely to face this punishment as a result of weapon-involved fights, and physical altercations with a CO. Inmates with TBI also experienced more difficulty in punitive segregation. Being in a small space was challenging especially when their personal lives became stressful. The inability to cope in some instances led them to resort to self-injury and/or suicidal attempts.

It appears that inmates affected by TBI are less able to cope with punitive segregation, especially given that they are facing so many days in isolation (on average 4 months). For some this led to violence against themselves and for others it led to suicidal attempts. Extensive neuroscience research indicates that frontal lobe damage can lead to difficulties with regulating emotions, as well as increased anxiety in stressful or traumatizing environments. TBI participants might have a lower threshold for environmentally induced distress, putting them at risk of self-harm and suicide while in punitive segregation.

TBI and Mental Health

In discussion about TBI, there is undoubtedly the need to consider mental health. In all analyses, both quantitative and qualitative, mental health was clearly an overlapping factor with TBI. It is no surprise that mental health could be an influential factor in examining TBI and custodial challenges, particularly with punitive segregation in the case of this study. Many of the behavioral consequences of TBI overlap with the symptoms of various mental illnesses. Impulse control, limited attention span, and difficulty concentrating could be symptomatic of ADHD or of bi-polar disorder; delayed information processing could be symptomatic of ADD; and emotional dysregulation and decreased self-esteem could be symptomatic of anxiety and

depression. In addition, aggression and social inappropriateness that can result from TBI could be labeled as delinquent behavior. TBIs, especially if not treated, can cause a person to display cognitive deficits leading to behaviors that appear consistent with symptoms of mental illness. However, this does not mean that TBI *is* a mental illness, or that it will become one. While behaviors related to TBI, mental health and delinquency might overlap, the appropriate responses, interventions, treatment and prevention measures will differ.

In this study, findings suggest that some inmates who came in with a TBI accessed mental health services, possibly due to pre-existing brain injury symptoms. This group might maybe have been more susceptible to fights, injury and emotional distress due to their cognitive-behavioral challenges. Rather than getting the care and services needed, they were repeatedly subjected to ongoing physical, emotional, and psychological trauma.

Q3. Do adolescent inmates who suffered a TBI face unique re-entry challenges that lead them to recidivate frequently and quickly? Why? How do they feel about this?

Recidivism and Reentry

TBI was not a predictor of recidivism. However, discussion with inmates affected by TBI demonstrated a sense of hopelessness and cynicism about staying out of trouble with the system. This group of inmates appeared to be worried about their lives in the community, and often expressed feeling doubtful that they would be able to change. Avoiding negative peer influences and the distraction of "the streets" was perceived as a major difficulty with staying out of trouble in the future. They were also cynical about services and help in the community, and strongly believed that their only source of support was from their family. Family was talked about in a very positive light by inmates affected by TBI, and was what they most looked forward to when going home.

Emergent Themes

In combining results from the quantitative and qualitative components of the study, a number of consistent patterns emerged. The following five themes merge findings from analyses of data and interviews. While themes could apply to some adolescents in the general inmate population, the focus is specifically on inmates who had previously suffered from a TBI, making them more vulnerable to having difficulty in the facility.

Violence as a norm: "Just another day in Rikers." Consistent across all accounts was the idea that violence was the norm, both in the community and in the jail. Fighting was continuously reinforced as the only way to survive, as getting jumped and the readiness to resort to violence was their "way of life." In Rikers, inmates quickly learned that their autonomy was constantly controlled by rules and threats of violence. This was learned through mechanisms of formal control (overt rules enforced by penalties) and informal social control (covert rules enforced by violence). In addition to the formal jail rules and regulations (i.e., when to sleep, eat and shower) there were multiple layers of rules enforced by other inmates and by COs. These informal rules were used to control inmates through fear, and threats or acts bodily harm.

The establishment of these rules were enabled for many reasons: (a) reporting them could lead to the whole house getting punished (locked in their cells), (b) the inmate involved in the fight could get punished by other inmates (beat up) and penalized by the jail (infracted and fined), and (c) COs' failure to intervene and document incidences functioned as a symbol of permission to fight, as it demonstrated and communicated that there would not always be consequences for fighting. Together, these factors fostered an environment where violence as the norm was so strong that those who *wouldn't* fight become the "other," the ones who were "not normal" and were at a high risk for victimization. Under these circumstances, inmates affected

by TBI who were struggling with information processing, impulse control and/or emotion dysregulation may have faced an additional set of challenges.

Survival by all means: "I wasn't crazy, I just wanted to get out." Inmates turned to creative and sometimes extreme measures to adapt to and survive in the violent and punitive nature of the jail. They learned new mechanisms for survival such as: finding secret places to carry out planned fights, finding materials to make improvised weapons to protect themselves, developing camaraderie in physically isolating spaces to cope in solitude, conserving food to deal with hunger, and attempting suicide to be removed from traumatizing environments. These measures allowed them to cope, and sometimes facilitated their ability to abide by the informal rules without getting punished by the formal rules (i.e., hidden fights).

Adapting for survival was an ongoing process. From the point of entry into the facility inmates had to fight to earn their status. If an inmate did not fight or demonstrate a willingness to fight, they would be bullied as long as they remained in that house. To adapt to this, many inmates made weapons that would protect them, which if detected would lead them to punitive segregation. If placed in punitive segregation, inmates developed ways to build companionship with other inmates out of a desperate need for human contact and social interaction. Also in punitive segregation, to deal with hunger inmates would hide food in their cells and quickly eat it if a search was about to occur to avoid further punishment. Some inmates resorted to self-injury or suicidal attempts as a manipulation tactic to be removed from punitive segregation. All of these adaptations forced inmates to face the risk of additional punishment such as fines, increased days in punitive segregation, an increase in classification, or acquiring a mental health status. Despite this, inmates took all measures possible demonstrating that no sanction was truly a deterrent, but rather served as punishment for trying to survive.

Prolonged isolation and a reduced use of cognition, as well as inadequate nutrition, can have a greater impact on TBI participants; Upon release into the general population (where effective communication and the understanding of rules are required), transitioning out of punitive segregation may create confusion and maladaptive behaviors, and further conflict in the facility. Inadequate nutrition for the developing brain can further exacerbate neurological anomalies, since malnourishment can lead to neurotransmitter disruption and cognitive behavioral difficulties. TBI participants might have a lower threshold for this environmentally induced trauma, putting them at risk for mental health related problems (i.e., self-harm and suicide).

At first glance, attempting to commit suicide in punitive segregation might appear to be an extreme and abnormal measure. However, it is possible that under circumstances where the goal is to adapt to survive, this could be considered a 'normal' reaction. Perhaps the emotional and psychological trauma from having to live in a small space in unhygienic conditions, being isolated from social interaction, and being deprived of food would lead anyone to try all means to be removed. If suicidal attempts are the only known option, then perhaps that choice becomes the norm. The amount of time it takes to get to a mental state where one is able to attempt suicide is what may be shorter for those suffering from TBI, especially because they spend longer periods of time in punitive segregation.

A life of ongoing trauma: "You can run but you can't hide." This group of inmates endure repeated trauma throughout the lives starting with the environment they were raised in. The community violence they experienced lead to TBIs that go untreated, making them susceptible to further brain injuries and developmental problems. Challenges with cognitive and behavioral difficulties could have contributed to their involvement in the criminal justice system.

Once in the system, inmates with TBI were at a further disadvantage due to the cognitive and behavioral deficits from their brain injuries. These inmates were placed in an environment where they were subjected to further trauma, indirectly (through arguments) and directly (through involvement in fights). Potentially because of their TBI (i.e. impulse control, dysregulated emotions, delayed information processing), they were predisposed to further trauma (loss of privileges, fines, solitary confinement days). Externally-induced trauma from the conditions of the community, the jail, and in solitary confinement could have led to psychological and emotional trauma, as exemplified by these inmates behaviors (i.e. self-harm and suicide attempts).

Inmates affected by TBI were perpetually subjected to trauma throughout their lives, which was cyclical in nature; there was no point of intervention where the effects of one trauma could be addressed and reversed. Instead, repeated suffering through physical, psychological and emotional trauma was endured. While this may have affected all adolescent inmates in Rikers, those coming in with TBIs (especially if untreated) were at a further disadvantage and more susceptible to custodial challenges. In addition, their coping threshold for being in Rikers may have been lower. Continuous trauma that these adolescents faced was occurring during a time when their brains were still developing, which also potentially impeded their ability to rehabilitate.

Punitive deprivation and shame: "This is not punishment—this is torture." To add to the already punitive nature of the jail, when placed in punitive segregation, inmates were subjected to inhumane treatment and shame as a form of control. Inmates suffered from feelings of hunger and were deprived of food if they disliked by the CO. The dehumanizing experience of being denied food as a means of control and punishment might have been even more difficult to

cope with by those suffering from TBI. Having food withheld for long periods of time (i.e., on average 4 months) led to hunger and frustration as well as inadequate nutrition for those already dealing with cognitive difficulties.

Punitive segregation sometimes subjected inmates to unsanitary conditions and shame as a form of control. They were in cells sometimes plagued with mice, roaches, bugs, and sewage from nearby flooded cells. They experienced shame from the way that isolation and limited social interaction was enforced; for example, they were placed in a cage during recreation, placed in an isolated booth during visits, and were flexi-cuffed outside of their space while their cells were being searched. These living conditions and the use of shame symbolized the lack of regard for inmates, depleting their sense of self-worth and reinforcing feelings of degradation and inhumanity.

The challenges of punitive segregation can take an emotional toll on inmates, especially those with TBI if they are already struggling with cognitive functioning and emotional dysregulation. TBI participants were less able to cope with punitive segregation and the additional shame that comes with it, especially given that they were facing so many days there. For some this led to violence against themselves, and for others suicidal attempts and ideation ironically became the only way to survive. This dehumanizing experience can create feelings of helplessness, and reinforce cynicism towards the justice system and the community. Upon release, it is conceivable that they will continue to face of life of future violence and trauma, leading them to further intersection with the criminal justice system.

Hopelessness: "It makes me stop caring about anything." Inmates with TBI were less able to reflect on their behavior as being unnecessary, or to rationalize that a different route of action could have been taken. The disrupted ability to use judgement, problem-solving skills and

to control impulses are symptomatic of brain injuries to the frontal lobe. Inmates felt as though nothing could be done to reduce fighting and injuries in Rikers and the institutional violence and ongoing trauma had created feelings of helplessness and hopelessness. Some inmates explicitly expressed feelings of institutionalization, by saying they would not know how to adapt outside of jail or that they have been in there so long that that they just gave up and stopped caring. Though fighting was thought to be inevitable and unavoidable in Rikers, TBI inmates felt that the best way to reduce fighting in jail was to shorten their time there. They believed that having long periods of time in Rikers made it easier to stop caring and to give up.

Symptoms of TBI can involve difficulty with emotional regulation and perhaps inmates with TBI have more difficulty coping in Rikers. It is possible that the exposure to ongoing violence and trauma led them to give up on the idea of future change and rehabilitation, and to develop feelings of hopelessness. Without explicitly stating it, inmates affected by TBI were going to leave Rikers Island feeling "broken," and disconnected. They most often looked forward only to returning to their family, indicating their distrust towards the community and towards their friends. It was almost as though going through the trauma of being in Rikers led them to yearn for family support in their healing.

Future Research

Principles of neurocriminology, and more broadly, bio-social criminology, support that it is the interaction between the environment and a person's physiological make up that can predispose them to maladaptive behaviors under certain circumstances. In this study, many inmates suffered a brain injury with an AOC as a result of community violence (the leading cause of TBI in the sample). Community violence could be the result of environmental factors (i.e., poverty), individual factors (i.e., neurological anomalies) or a combination of both (i.e.,

exposure to violence leading to brain injuries or brain injuries leading to conflict and violence). Future research could attempt to disaggregate the environmental and individual physiological influences of TBI and their subsequent consequences. Perhaps those who are surrounded by violence are likely to engage in violence regardless to whether or not they had a TBI. Analyses using multilevel modeling could examine TBI, community level characteristics and criminal justice related outcomes. Since adolescent inmates are nested within neighborhoods, considering both individual and community factors could offer more insight into the frequent intersection of adolescents with TBI and the criminal justice system.

Research could also better tease out if and what behavioral change can be more strongly attributed to the TBI in this population. A timed series approach could examine the immediate effects of a TBI by looking at the timing of events (head injuries, fights, and trouble in school.). It would also be of interest to examine differences in behavioral change based on the various sources of injuries, for example, vehicle accidents compared to fights. If TBI from fights led to a different set of behaviors than TBI from sports, then perhaps there are confounding environmental influences that will need to be further considered.

Although analyses on TBI and custodial injuries (and potentially fights) were inconclusive, information from interviews were able to offer insight into why this may have occurred. Fights and injuries went very much unreported despite a general consensus that arguments, physical altercations and subsequent injuries were highly prevalent. Fights and injuries were intentionally not reported out of fear of disciplinary action against the inmate or the whole housing area. In addition, COs encouraged this by both enabling and ignoring fights and injuries that were occurring. Inmates were therefore discouraged from reporting fights unless they were serious enough that they had to be taken to the clinic, where the injury (but not always

the fight) would be recorded. This suggests that official records in this study may be unreliable, and can depict a misconstrued picture of custodial fights and injuries, underestimating the importance of this problem in Rikers Island. Future research should seek out more reliable data on fights and injuries in Rikers, though the culture of violence and the social pressure to conceal it will make this difficult. Triangulation or even a heavier reliance on inmate accounts of violence and injuries could be used for corroboration, though limitations with self-report will also need to be considered.

Future research should also work to distinguish TBI-related behavioral problems from mental illness. Many inmates who suffered from a TBI accessed mental health services for TBI-related problems. Better understanding the differences between behavioral and mental health problems could inform intervention and treatment strategies as well as correctional management. A number of inmates who may have been suffering from TBI related consequences could have been labelled as having a mental illness or as being a delinquent as a result of physiological anomalies to their brain. Treatment may not require medication as in the case of some mental illness, but instead may require strengthening through strategies such as cognitive behavioral therapy. Given that so many inmates suffer from TBI, more robust research should examine the physiological and behavioral consequences of TBI that could adolescents to criminal justice involvement.

CHAPTER TEN: LIMITATIONS OF THE STUDY

Broader limitations of this study include issues with generalizability due to the unique sample, and with validity due to time ordering concerns, defining and measuring TBI, and the reliance on self-report. More specific limitations are due to methodological issues such as quality of data, small sample size, and researcher bias.

The sample for this study is unique and therefore likely not generalizable to other jails; it involves adolescent inmates in Rikers Island in New York City. Firstly, adolescents (16–18 year olds) in most other jurisdictions are not detained in an adult facility facing adult charges, convictions, and sentences. Secondly, Rikers Island is unique in that it is the main city jail for all of New York City residents. Rikers Island holds about 11,000 inmates, and is comprised mostly of those awaiting trial (though some have been city sentenced to less than 1 year). This facility is distinct from most other jails and the culture of violence and inhumanity that was discovered may not be as existent in other facilities. Lastly, New York City is a large, highly populous, metropolitan city that overall cannot be compared to most other jurisdictions.

Threat to the validity of the study could include time ordering factors. Since all dates for injuries, fights, and custodial sentences were not available, it was difficult to state that head injuries occurred prior to admission into Rikers Island. It is possible that an inmate was admitted to Rikers, then released, then obtained a head injury, and then came back to Rikers where they were screened for TBI. This would have meant that involvement in the system predated their head injury, and custodial arguments and fights were experienced in a similar manner during each admission to Rikers, both before and after head injury. Nonetheless, the study relied on the assumption that pre-existing head injuries occurred prior to admission into custody. Most first

head injuries occurred at a younger age than each inmate would have been admitted into Rikers (i.e., average age was 12).

Since TBI is currently not diagnosable, the measures used for this study was based on a validated screening instrument. This tool was used to identify an inmate as either having had or not having had a TBI. Due to varying definitions of TBI, findings in another study with altered delineations (i.e., changing the cut off for the length of LOC or PTA) would lead to an overestimate or an underestimate of TBI, and a difference in its prevalence and correlates. The delineations for this study were consistent with those used by the TBIQ author though it is recognized that other tools or even the same tool with alternate criterion could produce significantly different results. In addition, though the instrument was validated for examining TBI in offending populations, it may not function the same way for incarcerated adolescents. This could potentially weaken the validity of the instrument when applied to this population.

Another major limitation of this study was the heavy reliance on self-report. Screenings for TBI asked inmates to recall injuries that occurred often many years ago. In some instances the mere consequence of the injury (post-traumatic amnesia) might have led to the inability to recall the event. Similarly, many other measures in the study even in official records from NYC DOHMH (i.e., age, race, ethnicity, zip code, education, medication for mental illness, and drug use) were obtained directly from the inmate. This information was often obtained in a criminal justice setting, which would have likely influenced the inmate's responses. Other common problems related to self-report involved reliability of memory and over or under-exaggeration of symptoms posed a concern to the accuracy of data and findings. However, head injuries could not be verified with medical records due to a lack of access, and also due to the lack of treatment

sought out by those who suffered a TBI. Consequently, self-report for TBI was the only reliable source of information for this population at this time.

Other methodological limitations include the quality of data in the quantitative component and small sample size and reflexivity in the qualitative component. Using mixed-methods to triangulate data allowed for the discovery that NYC DOHMH data on fights and injuries were significantly underestimated. More reliable data could improve quantitative analyses using these outcome measures. Although much of the quantitative analyses resulted in null findings, the qualitative component was beneficial in contextualizing and offering rich and detailed information about the information which otherwise would not have been drawn out from the data. However, it is important to consider that only 20 inmates were interviewed, with 10 being in the TBI group and 10 being in the non-TBI group. Such a small sample cannot be used to make generalizations, but were useful in detecting and exploring potential trends for further investigation.

The qualitative component also involved an intersection of the researcher and its participants, and inevitably faced the issue of reflexivity. Reflexivity would have influenced the credibility of the study because of the fact that the researcher was part of the study and came into it with certain perceptions. These biases would have influenced the analyses process and thus the findings. For example, another researcher would likely present a different account about the same participant based on the way the researcher interpreted the situation. In addition, certain questions/responses and themes that were focused on by the researcher may not have been explored by another researcher. On an ongoing basis, the researcher for this study wrote memos about personal reflections, methodological issues and feelings about interviews and participants. This was used in attempt to be conscious of and document potential bias. In contrast, despite the

inevitable researcher bias, the researcher's immersion with of all aspects of the data facilitated thematic analyses on a deeper level. As a result the researcher's thorough understanding from observing, interviewing and analyses allowed for a depth that strengthened the transferability (applicability of findings to similar groups) of this study.

CHAPTER 11: POLICY IMPLICATIONS OF STUDY

Many adolescents are affected by TBI and their subsequent effects. This is particularly true for young people coming from communities of violence who are likely to intersect with the criminal justice system. If incarcerated, this group of adolescents may face a unique set of custodial challenges in regard to arguments, fights, punitive segregation, and reentry. A number of these challenges could be the result of neurological anomalies that cause slower processing speeds, impulse control, trouble with judgement, and emotional dysregulation. These anomalies can lead to the display of maladaptive behaviors in the jail environment. Sometimes these behaviors are labelled as mental illness or as delinquent behavior, rather than being understood as the consequence of a brain injury. Education, training, detection, assessment, services, management and prevention in both custodial settings and communities should be promoted.

Educating Correctional Staff and Inmates

Educating and training correctional staff to identify and better understand how to work with inmates suffering from TBI can be beneficial to everyone in the jail overall. Understanding when inmates are having trouble processing direction rather than being insubordinate can make the job of correctional staff less frustrating, and can reduce conflict and physical altercations in the facility (Kirchner, 2015). Training on TBI should be offered to all corrections staff including medical and mental health personnel. In the facility, health professionals should inquire about TBI during intake as well as during the evaluation of inmates after they have endured any physical altercation and/or injury. At this point, they can provide referrals and recommendations for appropriate programs and services that may help the inmate heal, rehabilitate, and avoid further injury. Collaboration between medical staff, mental health staff, and correctional officers can help address TBI-related difficulties (i.e., impulse control, delayed information processing

and emotional dysregulation), which could assist with preventing and deescalating conflict in the facility.

Educating correctional staff should focus on recognizing the progressive effects of TBI and on mitigating the potential for further harm in an environment of prominent structural violence (Graves et al., 2015). Ultimately, training on TBI and encouraging best practices for the effective management of inmates who have suffered a TBI should be implemented (Magaletta & Diamond, 2007). Extensive and ongoing training of correctional staff should include increasing awareness of the term 'TBI' and its symptoms and consequences, and useful strategies for addressing inmates who have been affected by this injury. For example, the Minnesota Department of Corrections has collaborated with the Minnesota TBI Program to develop three online-training modules for correctional staff (Bridwell & Macdonald, 2014). Trainings were on identifying and assessing TBI, appropriate programs and effective management strategies, release planning, and available TBI resources in the community.

Education should also be provided to inmates, so they also better understand any potential cognitive behavioral difficulties they may be experiencing as a result of their injury (Bridwell & Macdonald, 2014). For example, two of the most common features of TBI include emotional dysregulation and delayed processing speed, which may be linked to criminal justice involvement and custodial challenges. Many inmates may not realize they are having cognitive difficulties even though they are having behavioral difficulties. This could be confusing and frustrating in an already stressful environment. To characterize the level of understanding of TBI among adolescents in Rikers Island, nine focus groups were conducted in 2014(Graves et al., 2015). Information on violence and TBI were presented, and not surprisingly most groups talked about violence with rationality and necessity. The groups also indicated a greater need to educate

adolescents about the long term and potentially life altering consequences of TBI. Similar to trainings for correctional staff, information should be provided to inmates on TBI, its consequences, and the importance of seeking out immediate treatment. Educating both correctional staff and adolescents could improve both the health and safety of all individuals in custodial settings (Kaba et al., 2014).

Identifying TBI: Screening and Assessment in Custodial Settings

The most effective way to curb the effects of a TBI is to receive immediate treatment and rehabilitation services. However, among younger populations who end up involved in the criminal justice system, most of the time care is not sought out. Screening for and assessment of TBI during custodial intake of adolescent inmates could offer an opportunity to mitigate the effects of the injury (Ferguson, Pickelsimer, Corrigan, Bogner, & Wald, 2012). Early detection of the presence and cause could assist injury surveillance better informing correctional staff about who might be at risk for adverse health and behavioral outcomes (Bridwell & Macdonald, 2014; Minnesota Department of Corrections, 2015). This is particularly important for inmates who are involved in ongoing physical altercations and may accumulate head injuries over time, resulting in chronic brain damage.

The major limitation with screening for TBI is that it relies on self-report, due to a lack of medical technology available to detect TBIs that are not in the most severe form. TBI associated neurological impairments can in itself inhibit an inmate's ability to recall events and details. However, current work by the Minnesota Department of Corrections suggests that ongoing screening could eventually capture head injuries that may have been overlooked at intake (Minnesota Department of Corrections, 2015). This suggests the need for ongoing TBI screening

and assessments in correctional settings. Routine screenings can serve as multiple checkpoints, helping to triangulate information provided throughout the duration of an inmate's custodial stay.

Once an inmate has been identified as having had a TBI through the screening process, evaluation of the specific TBI-related problems should be conducted. To do this, a comprehensive assessment should be done to obtain information on the inmates cognitive and emotional functioning. This is particularly important because of the fact that all individuals will have a differential response to their injury based on various other factors (i.e., genetics and environment) (Bridwell & Macdonald, 2014). Assessment, then, can be useful in determining an inmate's ability to navigate the correctional system (i.e., understanding and following rules). With this understanding, clarification about what services an inmate should be referred to can be used to develop specialized treatment protocols (Bridwell & Macdonald, 2014; Minnesota Department of Corrections, 2015). Intervention for cognitive behavioral difficulties using an inmate-centered approach could be beneficial, being mindful of the fact that successful interventions for TBI are often social rather than medical. (CDC, 2011; Ferguson et al., 2012).

One cautionary factor to consider is the complexity of administering "special statuses" to inmates (Bridwell & Macdonald, 2014). Adding yet another label to inmates could create additional challenges by flagging them even more, contributing to the net widening effect[37] (Levinson, 2002). This means that engaging certain inmates in services could unnecessarily expose them to greater harm (as a result of being more heavily surveilled) than if they had not received services to begin with. Care should be taken when identifying inmates with TBI, to ensure the focus is on rehabilitation rather than further control and excessive supervision.

[37] Net widening" refers to the process of administrative changes that result in a greater number of individuals being controlled by the criminal justice system. Ultimately it means that the net of social control is widened to manage the behavior of a greater number of individuals.

Currently in Rikers Island, upon intake all inmates receive a 4 to 6 hour medical exam (Graves et al., 2015). In some cases, this is the point where a history of any *severe* TBI can be detected. From there, inmates can be placed in various types of health care settings depending on their symptoms. There is also active surveillance for head injuries that occur *in* the facility from fights or accidental injuries. However, less severe TBIs that occurred prior to being in custody may go unreported despite the potential for related neurological impairments to pose custodial challenges. In addition, focusing on head injuries that only occur in the custodial setting can ignore the cumulative effect from previous head injuries.

All correctional staff in Rikers Island should participate in training about TBI and its short and long-term consequences. They should be trained in identifying inmates that were affected by TBI, appropriate intervention and treatment plans, and effective strategies for correctional management. Adolescent inmates should also be educated about TBI and long-term consequences, while emphasizing why immediate treatment is important. During medical intake and routine screenings staff should utilize the TBIQ (Diamond et al., 2007) to identify inmates with a TBI, particularly among the adolescent population. Once TBI is identified, an assessment of cognitive functioning should be conducted using brief screening tools, intermediate evaluations, or full neuropsychological tests, based on the extend of the injury and symptoms (CDC, Department of Health and Human Services, 2015). Appropriate referrals for services and programs (i.e., cognitive behavioral therapy) while in the facility and upon their release should be made.

Treatment and Management for Inmates with TBI

While sometimes immediate acute care should be provided, plans for chronic care and long term rehabilitation should be the focus (Bridwell & Macdonald, 2014; Kirchner, 2015).

Successful interventions are not always medical based, but instead aim to help patients understand their injury, its consequences and healthy ways to recover. Effective treatment could include physical therapy, occupational therapy, speech therapy, cognitive retraining, group therapy and recreational therapy (Bridwell & Macdonald, 2014). For example, cognitive retraining includes encouraging the development a routine and keeping track of things, and group treatment strategies strengthen social interaction and communication skills (Kirchner, 2015).

Effective management of inmates who have been affected by a TBI is essential in encouraging a healthy and safe environment for everyone in the custodial setting. In particular, certain forms of punishment should especially be avoided with inmates displaying difficulty with understanding and following instruction. Extensive research suggests that best practices involve the following: providing calm and direct instructions, avoiding arguments, rephrasing rules and instructions by breaking them into smaller parts, explaining things by breaking it down in a step-by-step manner, encouraging questions when something is not understood, and encouraging the required steps for task completion to be written down (Magaletta & Diamond, 2007).

Other research also suggests that individuals suffering from the consequences of a TBI can benefit from a 'cool down' period (Graves et al., 2015). During this time an individual should be removed from the situation and gradually returned to normal activities. This is difficult for inmates affected by a TBI because in the custodial setting there is rarely the opportunity to rest or pause. In addition, they are continuously faced with situations of immediate decision making, heightened stress, and are at an increased risk for further brain injuries. Therapeutic approaches to working with adolescent inmates could mitigate the progressive effects of TBIs. For example, offering "safe rooms" or "recovery rooms" (Bridwell & Macdonald, 2014) in the facility could provide a space for inmates to go to when they feel the need for a cool down

period, especially if they suffered a TBI in the facility. In addition, strategies reminding correctional staff how to interact with inmates affected by a TBI would be helpful. For example, the Center for Applied Behavioral Health Policy at the Arizona State University in collaboration with the Addiction Technology Transfer Center Network have created ROWBOATS cards (Addiction Technology Transfer Center, 2013; Bridwell & Macdonald, 2014) (Figure 11.1).

Figure 11.1. ROWBOATS tips card for helping people who are cognitively impaired.

These cards provide TBI facts and symptoms, as well as tips for working with individuals with who have cognitive impairments. The acronym on these ROWBOATS cards stands for the following:

1. Reduce the amount of information,
2. One instruction at a time,
3. Written and verbal when possible,

4. Breaks are helpful,
5. Often is better, routines help,
6. Ask persons to paraphrase/repeat,
7. Take the time, go slowly, and
8. Simple and organized info is best.

Following identification and assessment of a TBI in Rikers Island, adolescent inmates should be referred by medical and mental health staff to appropriate services, and have a specialized treatment plan developed for them if necessary. Correctional management should use a therapeutic approach, understanding the importance of slow and gradual rehabilitation for inmates faced with this injury. Where possible, a designated space in the clinics at Rikers should offer those suffering from TBI a place for a cool down period, especially immediately after a TBI occurs in the facility. In addition, having easily accessible facts about TBI and effective management strategies could remind staff of best practices in dealing with inmates who had a TBI.

Reentry Planning

Correctional staff should be trained in identifying a history of TBI, and should collaborate with TBI experts for the transitional planning for the release of each inmate (CDC, Department of Health and Human Services, 2011; Minnesota Department of Corrections, 2015). While still in the facility, planning for eventual release should factor in services that would accommodate TBI related problems in a specialized release plan (CDC, Department of Health and Human Services, 2011). Inmates should be assessed before release, to determine if they have cognitive impairments that might impact their ability to navigate their environment once they return to the community (i.e., difficulty with decision making, problem solving, or reasoning)

(Minnesota Department of Corrections, 2015). Following assessment, the reentry planner together with TBI experts can work to understand the inmates' needs and incorporate referrals into their release plans. Release plans could include options for medical/mental health, residential, vocational and educational support (Minnesota Department of Corrections, 2015). Reentry planners could also connect with community services and resources such as brain injury treatment centers, physicians, schools, probation and parole officers and other social service support agencies. Ensuring that various options are available allows for a comprehensive, but voluntary and inmate-centered approach to reentry.

Reentry planners in Rikers Island should work with health professionals to assess the cognitive functioning of inmates prior to their release. Results from the assessment should be incorporated into re-entry planning, factoring in any TBI-related services that might be needed. Connecting inmates with resources in the community can encourage long term and ongoing support upon reentering their communities.

Community Awareness

Physicians in the community should be more attentive to concussions and TBIs during routine physicals, especially among adolescents in urban settings where incidences of violence are high. Pediatricians should talk to kids about the importance of seeking treatment for a head injury, and highlight the long-term consequences that could affect them if they ignore it (CDC, Department of Health and Human Services, 2010). For patients who have suffered from a head injury, pediatricians should explain in detail the recovery process and the importance of getting adequate rest to prevent the worsening or reemergence of symptoms that can occur with exertion. Careful attention should be paid to how quickly patients are permitted to return to normal activity (i.e., driving), especially if they are still having difficulty with attention, processing

speed or reaction time (CDC, 2011). Recovery can be a slow and ongoing process, but patience is important in promoting healthy healing of the injury. During the healing phase the brain can be susceptible to further injury that can have a cumulative effect, resulting in chronic cognitive difficulties, severe brain injury, permanent brain damage and sometimes death in younger populations. Returning to daily routines and activities should be a gradual process, monitored by physicians (CDC, Department of Health and Human Services, 2015).

In the general community, awareness about TBI should be promoted. Spreading knowledge about TBI, its symptoms and its long-term consequences could communicate the problem of TBIs in the community as well emphasizing the importance of seeking out care and treatment. Ignoring the vulnerable phase immediately after a head injury could be detrimental to the healing process, increasing further risk of long-term consequences and future injuries. Various people in the community outside of physicians can be trained to identify and provide assistance with TBI related injuries. This includes nurses, school teachers, and parents. The CDC has initiated the Heads Up initiative (CDC, Department of Health and Human Services, 2015), which provides various resources for members of the community. Their Heads Up website (http://www.cdc.gov/headsup/index.html) includes information on TBIs, symptoms, prevention and contact information, and has specific resources for parents of school children, parents of youth and high school athletes, coaches, nurses, school counselors, and health care providers. For people in the community they have established a customizable concussion action plan, and for health care providers they offer online concussion training courses, concussion diagnostic and assessment tools, and discharge instructions.

Better understanding TBI and its effects in offending populations could improve the functioning and management of inmates (Shiroma, Ferguson, & Pickelsimer, 2010).

Contemporarily, a growing focus on developing custodial programs that can rehabilitee inmates affected by TBI has demonstrated that the best options for recovery are cognitive based therapy for inmates, and education in the community (Harmon, 2012). Inmates, correctional staff and people in the general community should understand what TBI is, the potential for long-term cognitive behavioral consequences, and the need for seeking out treatment. Extensive literature on TBI concurs that there should be an emphasis on obtaining advice from a health care provider, taking time to rest and heal, allowing for a slow and gradual recovery, and remaining patient when incrementally returning to routine activities.

CHAPTER 12: CONCLUSION

The current study set out to answer three broad research questions:

1. Is TBI more common in the adolescent jail population than in the general adolescent population? Why? How do inmates talk about their head injuries?;
2. Do adolescent inmates who suffered a TBI experience unique custodial challenges in regards to fights, injuries and punitive segregation? Why? How do they feel about this?; and
3. Do adolescent inmates who suffered a TBI, have unique re-entry challenges that lead them to recidivate more frequently and more quickly?

Findings from the study found that there was a higher prevalence of TBI among the adolescent jail population in Rikers Island when compared to the general adolescent population in the community. In addition, results showed that while in the general population most TBIs among young males are from motor vehicle or contact sports-related injuries, in this population it was from assaults that occurred in the community. Many adolescents with TBIs in urban communities eventually intersect with the criminal justice system.

In custodial settings, findings from interviews with inmates suggested that inmates affected by TBI experienced unique challenges in regard to arguments, fights, injuries, punitive segregation, self-injury, suicide attempts, and anticipated difficulty with reentering their community. Although statistical analyses did not support this, two main areas for further exploration could validate these qualitative finding: (a) disaggregating cognitive behavioral difficulties and mental illness to better characterize and measure the effects of TBI, and (b) seeking out more reliable data on custodial arguments, fights, infractions, and punitive segregation. Because of the neurological impairments that inmates with a TBI may deal with

they may display maladaptive behaviors to the jail environment. This could pose additional difficulties for them, and result in frustration among correctional staff who are attempting to differentiate disobedience from misunderstanding.

Principles of neurocriminology and, more broadly, bio-social criminology, posit that it is the interaction between a person's biological make up and environmental stressors that can lead to certain behaviors. Accordingly, inmates who have suffered a brain injury display maladaptive behaviors to aversive environment (i.e., jail) as a result of struggling with cognitive impairments. The interplay between the individual's brain and their environment is a crucial role in understanding TBI in this population, and encouraging effective correctional management.

Inmates affected by TBI have absorbed the idea that they have to live in violence, have to take any and all measures to survive in jail, have normalized deprivation and shame as punishment, and experience ongoing feelings of hopelessness. Often times these feelings could be related to the confusing nature of their cognitive impairments that require treatment and care, but are being mislabeled as mental illness. This is important to consider, as treatment for brain injuries are most successful when they are therapy based and focused on social outcomes, rather than being medical as in the case of mental illness. Ensuring that inmates get the appropriate care to be able to navigate the jail and understand the rules, as well as to be able to function upon release into the community should be a main focus for developing effective correctional management strategies.

Correctional staff should be educated and trained in identifying TBI as well as understanding its symptoms, consequences and effective responses. Ongoing screening and assessment of cognitive functioning for those who have been identified as having a TBI could be important in informing their custodial treatment and release plans. Services in the facility should

be specialized based on the needs of each individual. Each individual will have a differential response to their injury, based other factors such as their enviornment and genetic make up. Therefore, they will each have unique needs. In addition TBIs that occur in the facility should receive immeidate attention and a plan for ongoing rehabiltiation should be developed.

Overall, there should be an increase in awareness of TBI in the general community. Understanding what it is, the life altering changes it can have, and the importance of seeking out medical attention can bring light to this growing health concern. Various people in the community are in positions of responsibility over young people in the community, and can help address TBI related problems. Pediatricians, school nurses, team coaches, and parents can all be better informed about TBIs to contribute to improving the health outcomes adolescents in the community.

APPENDICES

Appendix A. Traumatic Brain Injury Questionnaire (TBIQ)

Interviewer: Housing Area: Date: Client ID:

FK AH CF JG SGK

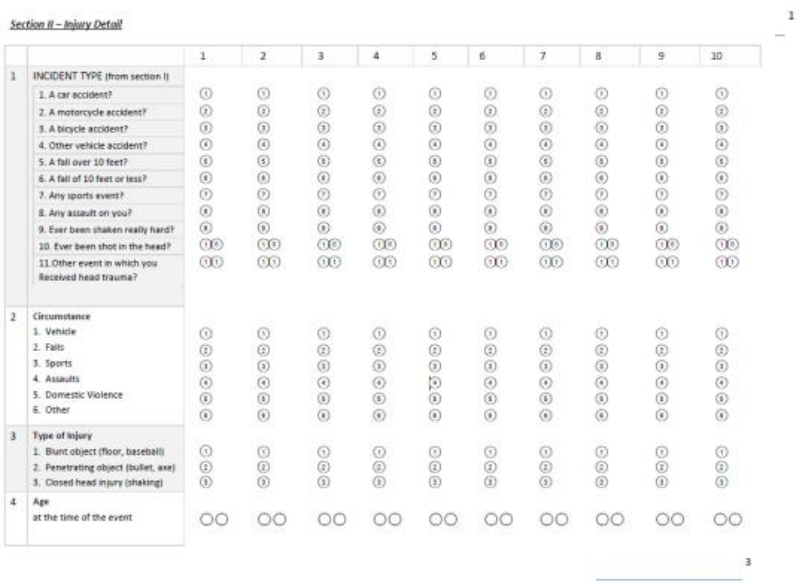
RNDC RMSC

Month/ Day/ Year

Comments

Introduction

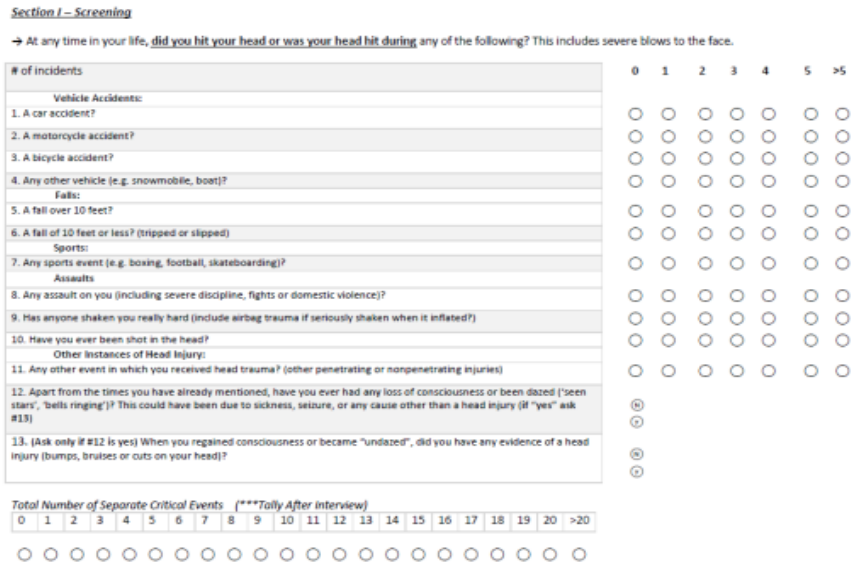
→ "We're asking some people about any head trauma they may have had, to try to get a sense of how big of a problem this is for our patients. The information you give us is confidential and voluntary as the rest of your medical record. It should take 15 minutes. OK?"



Section II – Injury Detail

		1	2	3	4	5	6	7	8	9	10
1	INCIDENT TYPE (from section I)										
	1. A car accident?	①	①	①	①	①	①	①	①	①	①
	2. A motorcycle accident?	②	②	②	②	②	②	②	②	②	②
	3. A bicycle accident?	③	③	③	③	③	③	③	③	③	③
	4. Other vehicle accident?	④	④	④	④	④	④	④	④	④	④
	5. A fall over 10 feet?	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
	6. A fall of 10 feet or less?	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
	7. Any sports event?	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
	8. Any assault on you?	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧
	9. Ever been shaken really hard?	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨
	10. Ever been shot in the head?	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩	⑩
	11.Other event in which you Received head trauma?	⑪	⑪	⑪	⑪	⑪	⑪	⑪	⑪	⑪	⑪
2	Circumstance										
	1. Vehicle	①	①	①	①	①	①	①	①	①	①
	2. Falls	②	②	②	②	②	②	②	②	②	②
	3. Sports	③	③	③	③	③	③	③	③	③	③
	4. Assaults	④	④	④	④	④	④	④	④	④	④
	5. Domestic Violence	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
	6. Other	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
3	Type of injury										
	1. Blunt object (floor, baseball)	①	①	①	①	①	①	①	①	①	①
	2. Penetrating object (bullet, axe)	②	②	②	②	②	②	②	②	②	②
	3. Closed head injury (shaking)	③	③	③	③	③	③	③	③	③	③
4	Age at the time of the event	○○	○○	○○	○○	○○	○○	○○	○○	○○	○○

3



Section I – Screening

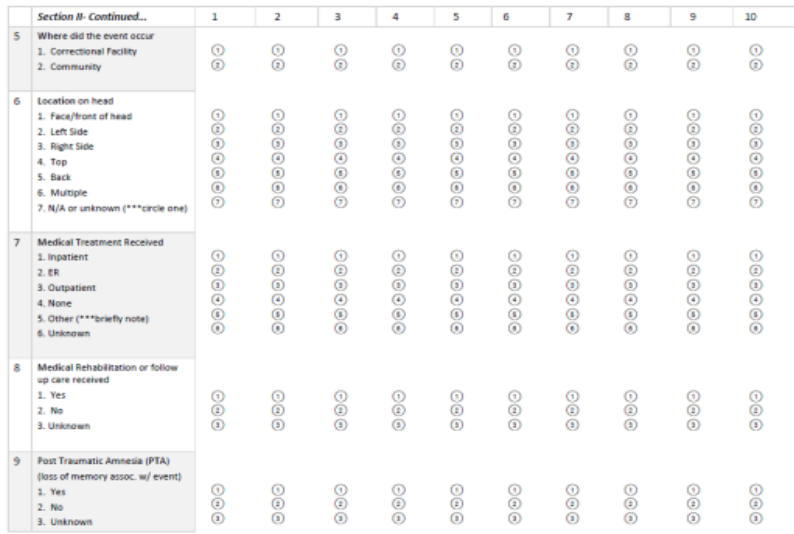
→ At any time in your life, did you hit your head or was your head hit during any of the following? This includes severe blows to the face.

# of incidents	0	1	2	3	4	5	>5
Vehicle Accidents:							
1. A car accident?	○	○	○	○	○	○	○
2. A motorcycle accident?	○	○	○	○	○	○	○
3. A bicycle accident?	○	○	○	○	○	○	○
4. Any other vehicle (e.g. snowmobile, boat)?	○	○	○	○	○	○	○
Falls:							
5. A fall over 10 feet?	○	○	○	○	○	○	○
6. A fall of 10 feet or less? (tripped or slipped)	○	○	○	○	○	○	○
Sports:							
7. Any sports event (e.g. boxing, football, skateboarding)?	○	○	○	○	○	○	○
Assaults							
8. Any assault on you (including severe discipline, fights or domestic violence)?	○	○	○	○	○	○	○
9. Has anyone shaken you really hard (include airbag trauma if seriously shaken when it inflated?)	○	○	○	○	○	○	○
10. Have you ever been shot in the head?	○	○	○	○	○	○	○
Other Instances of Head Injury:							
11. Any other event in which you received head trauma? (other penetrating or nonpenetrating injuries)	○	○	○	○	○	○	○
12. Apart from the times you have already mentioned, have you ever had any loss of consciousness or been dazed ('seen stars', 'bells ringing')? This could have been due to sickness, seizure, or any cause other than a head injury (if "yes" ask #13)	(N) (Y)						
13. (Ask only if #12 is yes) When you regained consciousness or became "undazed", did you have any evidence of a head injury (bumps, bruises or cuts on your head)?	(N) (Y)						

Total Number of Separate Critical Events (***Tally After interview)

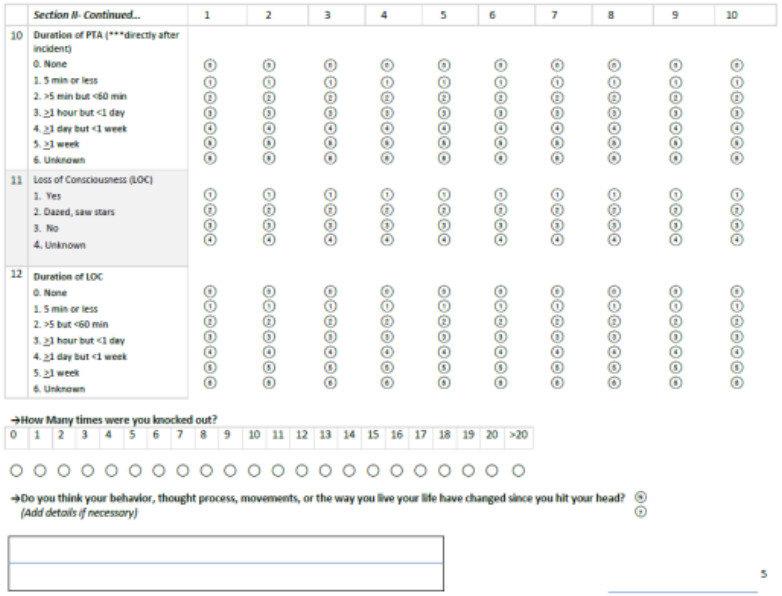
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	>20
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

2



	Section II- Continued...	1	2	3	4	5	6	7	8	9	10
5	Where did the event occur										
	1. Correctional Facility	①	①	①	①	①	①	①	①	①	①
	2. Community	②	②	②	②	②	②	②	②	②	②
6	Location on head										
	1. Face/front of head	①	①	①	①	①	①	①	①	①	①
	2. Left Side	②	②	②	②	②	②	②	②	②	②
	3. Right Side	③	③	③	③	③	③	③	③	③	③
	4. Top	④	④	④	④	④	④	④	④	④	④
	5. Back	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
	6. Multiple	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
	7. N/A or unknown (***circle one)	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
7	Medical Treatment Received										
	1. Inpatient	①	①	①	①	①	①	①	①	①	①
	2. ER	②	②	②	②	②	②	②	②	②	②
	3. Outpatient	③	③	③	③	③	③	③	③	③	③
	4. None	④	④	④	④	④	④	④	④	④	④
	5. Other (***briefly note)	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
	6. Unknown	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨
8	Medical Rehabilitation or follow up care received										
	1. Yes	①	①	①	①	①	①	①	①	①	①
	2. No	②	②	②	②	②	②	②	②	②	②
	3. Unknown	③	③	③	③	③	③	③	③	③	③
9	Post Traumatic Amnesia (PTA) (loss of memory assoc. w/ event)										
	1. Yes	①	①	①	①	①	①	①	①	①	①
	2. No	②	②	②	②	②	②	②	②	②	②
	3. Unknown	③	③	③	③	③	③	③	③	③	③

4



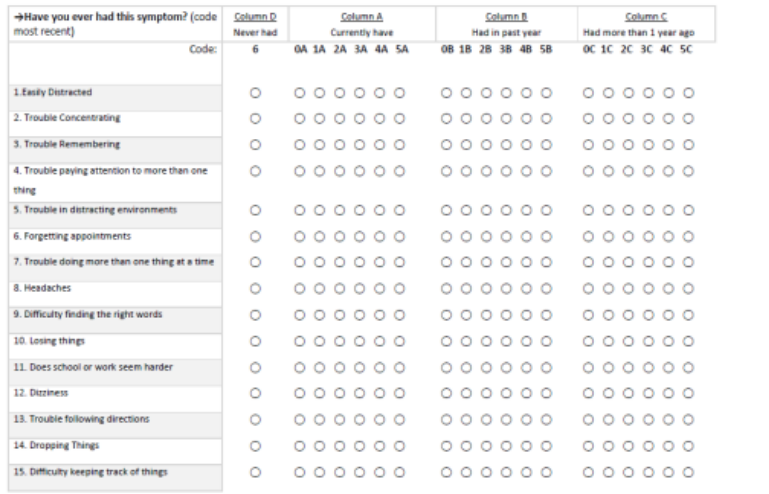
	Section II- Continued...	1	2	3	4	5	6	7	8	9	10
10	Duration of PTA (***directly after incident) 0. None 1. 5 min or less 2. >5 min but <60 min 3. ≥1 hour but <1 day 4. ≥1 day but <1 week 5. ≥1 week 6. Unknown										
11	Loss of Consciousness (LOC) 1. Yes 2. Dazed, saw stars 3. No 4. Unknown										
12	Duration of LOC 0. None 1. 5 min or less 2. >5 but <60 min 3. ≥1 hour but <1 day 4. ≥1 day but <1 week 5. ≥1 week 6. Unknown										

→How Many times were you knocked out?

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	>20

→Do you think your behavior, thought process, movements, or the way you live your life have changed since you hit your head?
(Add details if necessary)

5



→Have you ever had this symptom? (code most recent)	Column D Never had	Column A Currently have	Column B Had in past year	Column C Had more than 1 year ago
Code:	6	0A 1A 2A 3A 4A 5A	0B 1B 2B 3B 4B 5B	0C 1C 2C 3C 4C 5C
1.Easily Distracted				
2. Trouble Concentrating				
3. Trouble Remembering				
4. Trouble paying attention to more than one thing				
5. Trouble in distracting environments				
6. Forgetting appointments				
7. Trouble doing more than one thing at a time				
8. Headaches				
9. Difficulty finding the right words				
10. Losing things				
11. Does school or work seem harder				
12. Dizziness				
13. Trouble following directions				
14. Dropping Things				
15. Difficulty keeping track of things				

6

Response Card for Participant Symptoms Frequency List

0 Less than once a month

1 At least once a month

2 At least once a week

3 At least once a day

4 Several Times a day

5 All the Time

Never Had

Appendix B: Assent form for Participants

CITY UNIVERSITY OF NEW YORK

John Jay College of Criminal Justice

Department of Criminal Justice

CONSENT TO PARTICPATE IN A RESEARCH PROJECT

Project Title: Traumatic Brain Injury and Antisocial Behavior Among Adolescent Jail Inmates in New York City: A Mixed Methods Study.

Principal Researcher: Cassandra Ramdath
Criminal Justice Doctoral Student
John Jay College of Criminal Justice
524 West 59th Street Suite 605B
New York, NY 10019
917.587.2461

Faculty Advisor: Dr. Hung-En Sung
Professor
John Jay College of Criminal Justice
524 West 59th Street Suite 422.23T
New York, NY 10019
212.237.8412

Site where study is to be conducted: Interviews will be conducted in a medical clinic on Rikers Island administered by the Bureau of Correction Health, New York City's Department of Health and Mental Hygiene. Medical clinics that will be used are located in Robert N. Davoren Complex for male participants and in Rose M. Singer Center for female participants.

Introduction/Purpose: You are invited to participate in a research study being conducted by me, Cassandra Ramdath, a PhD student at John Jay College of Criminal Justice. The purpose is to understand the difficulties young people are facing in Rikers and to explore how their needs can be The results of this study may increase awareness of the challenges youth have in jail so that the health and safety of inmates and staff can be improved in the facility and in the community.

Procedures: Approximately 40 adolescents are expected to participate in this study. Each will be interviewed for 45-60 minutes, and each session will take place here on Rikers Island. If you agree, audio recording will be used so that you have my full attention, and so that I can go back to your answers.

Possible Discomforts and Risks: Your participation in this study will not involve any physical harm, though some of the topics may be sensitive for you. You may experience some psychological discomfort such as feelings of anxiety, embarrassment or stress. To minimize this, you are free to come back to or skip questions that make you uncomfortable, or to stop the interview and/or withdraw from the study at any point. If you are bothered or upset after this interview, please let me know and I will direct you to someone at the medical center who will help you your concerns.

Benefits: Although you will not directly benefit from taking part in this study, your participation will be extremely beneficial. The answers you provide will help us understand difficulties that youth have in the in Rikers and in the community, as well as how we can help them stay out of trouble in the future.

Voluntary Participation: Your participation is voluntary which means that you can choose not to participate without any consequences, penalty, or loss of benefits. You may stop and withdraw from the study at any time, and can contact me at the information below, even after the interview to inform me of your decision to withdraw.

Financial Considerations: Participation in this study will not cost you anything, but as a token of appreciation for your time and valuable information you will be compensated with $10. I will put this into your commissary once the interview is over.

Confidentiality: The answers you give will be audio recorded if you permit, and will only be accessible to myself, Cassandra Ramdath, medical personnel at the New York City Department of Health and Mental Hygiene, and to professional transcription services which will convert the audio recordings to a written format. We will maximize your confidentiality, which means that we will make every effort to prevent the information you provide from being connected back to you. This will be done by removing your name and assigning your interview a random number. In addition, all collected information will be stored in a password protected folder on a locked computer or file cabinet at a secure location. All documents will be destructed and unrecoverable once the study is finished.

Contact Questions/Persons: If you have questions about your rights as a research participant, or you have comments or concerns that you would like to discuss with someone other than the researchers, please call the CUNY Research Compliance Administrator at 646-664-8918. Alternately, you can write to:

CUNY Office of the Vice Chancellor for Research
Attn: Research Compliance Administrator
205 East 42nd Street
New York, NY 10017

Statement of Consent:

"I have read the above description of this research and I understand it. I have been informed of the risks and benefits involved, and all my questions have been answered to my satisfaction. Furthermore, I have been assured that any future questions that I may have will also be answered by the principal investigator of the research study.I voluntary agree to participate in this study. By signing this form I have not waived any of my legal rights to which I would otherwise be entitled. I will be given a copy of this statement."

Audio Recording – Please check **ONE** box.

- ☐ I give permission for my answers to be audio recorded
- ☐ I DO NOT give permission for my answers to be audio recorded

_____	_____	_____
Printed Name of Participant	Signature of Subject	Date Signed
_____	_____	_____
Printed Name of Witness	Signature of Witness	Date Signed

Appendix C: Interview Instrument

Date of Interview: _____

1. Demographics

First we are going to start with a few questions so I can get to know a little bit about you.

Main Question #1: Is this your first time in Rikers?

- *Probes:* Have you ever been admitted to this correctional facility or another facility before?
- *Follow up:* How many times have you been here? What was your longest period of stay?

Main Question #2: For this admission, how long have you been in Rikers?

- *Probes:* Days? Weeks? Months?
- *Follow up:* Do you know how long you will be here? Next court date? Release date? Sentence date? Going upstate?

Main Question #3: Can you tell me a little bit about yourself?

- *Probes:* age, race, ethnicity, neighborhood
- *Follow up:* How old were you when you came in? When is your birthday? Will you be going back to your neighborhood upon your release? Who were you living with? What do they do (school/work)? Do you know what level of education your parents might have completed? Other family? Kids?

Main Question #2: What was your life like before you came to Rikers?

- *Probes*: school, work, friends, hobbies
- *Follow up*: What is the last grade that you completed? How were you doing in school/did you go? Did you like it? Were you working? Did you like it? How much time did you spend with your friends? What did you do when you were hanging out? Drugs? Mental illness? What do you like to do on your spare time?

2. CHALLENGES IN JAIL- VERBAL ARGUMENTS & PHYSICAL FIGHTS

Now I am going to ask you about challenges that you may be facing in Rikers. In particular, I'm going to ask you about arguments, fights, injuries and infractions that you may have either witnessed or been a part of during this specific stay in Rikers.

Main Question #3a: Since you have been in Rikers, have you seen any verbal arguments/people arguing/yelling?

- *Probes*: inmates? guards? other corrections staff? anyone else?
- *Follow ups*: Can you tell me about the most memorable instance? What was the argument about? What happened during and after the argument (fight/infraction/injury?)

Main Question #3b: Since you have been in Rikers, have you gotten into any verbal arguments?

- *Probes*: with who? inmates? guards? other corrections staff? anyone else?
- *Follow ups*: Can you tell me about the most memorable instance? What was the argument about? What happened during and after the argument (fight/infraction/injury?)

Main Question #4a: **Since you have been in Rikers, have you seen any fights?**

- *Probes*: inmates? guards? other corrections staff? anyone else?
- *Follow ups*: How often does this happen? Why does it usually happen? How does it usually end (getting hurt/staff)? What usually happens after the fight (infractions, medical care?) Can you tell me about the most memorable fight you've seen since you've been here? What was it about? What happened (how did it end, did anyone get hurt, did anyone go to medical?)what happened after?/was there punishment/?

Main Question #4b: **Since you have been in Rikers, have you gotten into any fights?**

- *Probes*: with inmates? with guards? with other corrections staff? With anyone else?
- *Follow ups*: How often do you get into fights while you are in here? Can you tell me about the most memorable instance? What was the fight about? What happened (how did it end, did anyone get hurt? Did anyone go to medical? Do you still have any scars/bruises/damages from the fight? what happened after?/was there punishment?) Looking back, how do you feel about the fight/what happened?

3. CHALLENGES IN JAIL- INFRACTIONS

Main Question #5a: Other than the arguments and fights that we have already spoken about, have you been written up for any infractions for anything else since you've been here?

- *Probes*: not following instructions, rebelling, contraband
- *Follow up:* How often/How many times? Can you tell me what happened? How did you feel about it?

Main Question #6: Can you tell me more about what happened when you got infractions?

- *Probes*: Days added? Solitary? Other outcomes?
- *Follow up:* What was it like? How did you feel about/cope with it (self-harm – hang up/mutilation/head banging/other?) Did you request/receive any services?

4. CHALLENGES IN JAIL- INJURIES

Main Question #6: Other than fights that we have already spoken about, have you gotten hurt from anything else since you've been here?

- Probes: Restrains (stun-guns, chemical agents) /Self Injury? Slips/Falls, Occupational, other?

- *Follow up:* How often/How many times? Can you tell about the most memorable instance? What happened? Did you go to medical? What happened/what did they do? Do you still have any bruises/scars/damage/pain from this?

Main Question #7: Do you think that while you are in Rikers there is anything that might lead to more fights/injuries?

- *Probes*: fights, falls, lack of staffing, lack of contraband control, inadequate segregation, mixing ages together?

- *Follow up:* Is there a way that fights and injury can be prevented? How? By staff? By you? By others?

5. CHALLENGES IN JAIL- GENERAL

Main Question #8: Other than what we have already spoken about, what other things have been difficult for you here in Rikers?

- *Probes*: access to programs (education, vocational programs), access to medical care (physical health, mental health), meals, showers, trouble in school/work, family, friends, substance abuse

- *Follow ups*: Was there anything helpful about being in Rikers? What do you consider to be the one hardest thing for you to deal with right while you are here in Rikers? Why? How does it make you feel? What would you tell others you care about to prevent them from coming here? What can be done differently in Rikers to help you with this? What can you do differently to make this easier to deal with**?** Based on your experience**,** what can be done differently to help other young people like yourself in Rikers?

6. CHALLENGES IN JAIL- POST RELEASE

Now we are going to shift our focus to your release from Rikers. I am going to ask you about how you think things will be when you are released and return home to your neighborhood.

Main Question #9: When you are released from Rikers, what do you think your life will be like?

- *Probes*: Will it be the same? What will be different?
- *Follow up:* What will be difficult/challenging? Why? What will you do to stay out of trouble?

Main Question #10: Do you think that there in anything or anyone in the community that can help keep you out of trouble when you are released?

- *Probes*: school, employment, family, neighborhood, peers, physical health, mental health, incarceration/prison, substance abuse
- Follow up: How will they help you? How can the community or services in your neighborhood help you stay out of trouble?

Main Question #11: How do you feel when you think about your release into the community? What sort of emotions/thoughts do you have?

- *Probes*: happy, scared, confident, determined, worried, stressed, etc

Main Question #12: What are you looking forward to the most about going home?

- *Probes*: family member, friend, food, bed, home, etc

That is all the questions that I have for you today. Thank you for participating in our study, your answers are extremely important in helping us understand difficulties in jail and in the community that youth are facing. Do you have any questions for me?

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