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Game and Train: A Targeted Game-Based Mobile Intervention for the Treatment of Incarcerated Psychopathic Offenders

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Game and Train:

A Targeted Game-Based Mobile Intervention
for the Treatment of Incarcerated Psychopathic Offenders

Senior Project submitted to
The Division of Science, Mathematics and Computing
of Bard College

by

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Abstract

The treatment of psychopathic offenders has been a neglected topic in the clinical field. Most interventions available have failed to address core psychopathic traits and instead, use generalized treatments that solely target criminal risk reduction. These current treatments have been shown to yield unsuccessful results related to behavior change and lead to recidivism. The proposed intervention, *Game and Train*, acts as a response to the inadequate treatments currently available. Two hundred male incarcerated psychopathic offenders will be recruited and asked to participate in an intensive 6-week intervention, *Game and Train*, that will be accessed via a smart mobile device. The proposed intervention will target the psychopathic specific deficits associated with empathetic response, response modulation and manipulative tendencies. *Game and Train* will incorporate gamified techniques in order to keep participants motivated to engage with the tasks and cognitive trainings. It is hypothesized that *Game and Train* will lead to superior outcomes, compared to existing treatments, associated with successful behavior change in three core deficits of psychopathy. The proposed work serves as a captivating alternative to traditional behavioral interventions which will hopefully evoke a transition in the clinical approach to incarcerated intervention methods.

Chapter 1: A Review of Psychopathy – Deficits and Treatment

Understanding Psychopathy

The term “psychopathy” has been a focus of scientific investigation, as well as a disorder, that captures the broader culture’s attention. One noted psychopath and convicted serial killer, with whom many are familiar, is Ted Bundy. Bundy began his murderous rampage in 1974. He targeted young women and girls across several states. He lured his victims into his car using manipulative maneuvers, either under the guise of injury and needing assistance or by impersonating an authority figure. Bundy has been officially linked to at least 36 murders; however, police officials speculate that he committed over 100. Bundy became the focus of the media’s attention during the span of his trial in 1978-1979. He was clearly guilty of numerous predatory, calculated and unforgiving crimes, yet his media presence depicted him as a charming character. Prior to his arrest, Bundy was well liked by his peers, participated in many political, academic and social groups, and was unsuspected of committing such offenses. Even during his trial, Bundy exuded confidence, acting as his own defense attorney and repeatedly attempting to appeal his case. Bundy demonstrated his calculating intelligence by his impressive working knowledge of the law. Even after his capture and sentencing, Bundy remained calm and controlled, displayed no remorse for his actions, and even admitted to deriving gratification from his crimes.

The impact that psychopathic individuals have on our society reaches far beyond this notorious case. It has been documented that psychopathy is present in only 1% of the general population, it is present in 20% - 30% of all criminal offenders (Forth, Brown, Hart & Hare, 1996); (Edens, 2006); (Hare, 1993). It has been concluded that offenders high in psychopathy are more likely to reoffend and subsequently receive probation sentences, and are much more

likely to reoffend violently (Hart, Kropp & Hare, 1988); (Pedersen et al., 2010). The cognitive dysfunctions of psychopathic offenders manifest themselves into reprehensible behaviors that do not solely affect their victims. Currently, the number of individuals with serious pathologies in prisons nationwide now exceeds the number in state psychiatric hospitals by tenfold (Torrey et al., 2014). The cost of supporting one incarcerated person with mental illness, including their intensive treatment, disability benefits and other services, is \$30,258 for only a 94-day incarceration and parole period (Szabo, 2015). Recently, many state legislative representatives nationwide have ignored the growing rate of mentally impaired individuals being forced into correctional systems. They choose not to provide any additional aid or funding to remedy this growing epidemic. For decades, psychopathic individuals were shown no sympathy nor given assistance from both clinical and correctional systems. As a result, research on the successful treatment of psychopathy is quite limited, and recidivism remains prevalent (Polaschek & Daly, 2013); (Torrey et al., 2014). By examining the history of treatment of psychopathic individuals, it will become clearer where the critical issues lie. This will ultimately aid in proposing a successful treatment program for this neglected population.

Though psychopathy was initially labeled as insanity in the early 19th century, it was later classified as a moral disability. Psychopathy was the first recognized personality disorder in psychiatry (Blair, Mitchell, Blair, 2005). While an official diagnoses has not been designated in the DSM, psychopathy is still a very useful clinical diagnosis in forensic contexts (Millon, Simonsen, Birket-Smith, & Davis, 1998). Hervey Cleckley was the first to clinically classify psychopathy by identifying 16 characteristics that are representative of psychopaths. These traits include superficial charm, lack of anxiety, lack of guilt, undependability, dishonesty, egocentricity, failure to form lasting, intimate relationships, failure to learn from punishment,

poverty of emotions, lack of insight into the impact of one's behavior on others, and failure to plan ahead (Cleckley, 1941). This structure of classifying a psychopath has impacted the more recent constructs of psychopathy. However, finding a single construct for psychopathy has proven to be a challenge in recent years. One instrument that has made significant progress in unifying the diagnosis of psychopathy is the Hare Psychopathy Checklist. The development of the Hare Psychopathy Checklist (PCL) and the Revised version (PCL-R) has allowed for replicable and meaningful empirical findings, and is currently the most popular assessment tool for psychopathy (Hare, 1991).

The original PCL was designed by Robert Hare based upon Cleckley's established characteristics. Since its initial construction in 1980, the PCL has been revised, as is known as the PCL-R. The PCL-R is the most widely used and validated measure of psychopathy (Polaschek & Daly, 2013). The assessment is administered in a semi-structured interview and also refers to extensive clinical file reviews. It is constructed to contain fairly correlated but distinctive subsets of items (Polaschek & Daly, 2013). These items are referred to as factors when they are correlated with each other to form a cluster of traits. Factors represent the more general aspects of psychopathy. Factor 1 includes interpersonal and affective facets. Factor 2 includes impulsive-irresponsible lifestyle and antisocial behavior facets. Factor 1 items include glib/superficial charm, grandiose sense of self-worth, pathological lying, conning/manipulative, lack of remorse or guilt, shallow affect, callous/lack of empathy and failure to accept responsibility for own actions. Factor 2 items include need for stimulation/proneness to boredom, parasitic lifestyle, poor behavior controls, early behavior problems, lack of realistic/long term goals, impulsivity, irresponsibility, juvenile delinquency and revocation of conditional release. The various items of this assessment represent unique characteristics of the

disorder, and it is possible for there to be overlap among the items. The PCL-R has become the leading instrument for assessment in psychopathy. However, deeming it as the ultimate ‘construct’ of psychopathy has resulted in some contention among researchers in the field.

Many researchers have recognized various issues when designating psychopathy as an exclusive construct. By measuring psychopathic traits using dimensional assessments, it is implied that all people may fall on the higher or lower degree of traits that are theoretically related to the construct (Moreia et al., 2014). Even applying the label ‘psychopath’ as a diagnosis has been deemed unfitting by some, as it aligns with the notion that psychopaths are an established category of people that are distinct from all others (Moreia et al., 2014). However, by using the label “psychopath,” even without its sharpened boundaries, “its existence and the permanence of its use in the scientific and forensic community show us that it is useful to discriminate behavioral and psychological frames that draw attention, and whose identification and understanding are relevant to human relationships” (Moreia et al., 2014). Psychopathy as a forensic diagnosis is still relevant in the clinical and correctional communities. With this in mind, it is crucial to investigate novel intervention methods for psychopathic individuals that can yield favorable outcomes.

History of Intervention: Psychopathy

Treatment and intervention of psychopathic populations has proven to be a great challenge to the field. Historically, psychopathic populations have been viewed to be untreatable. Early work in intervention produced unfavorable outcomes related to treatment of psychopathy. Hervey Cleckley reported that “psychopaths neither benefit from treatment, nor are they capable of forming the emotional bonds required for effective therapy” (as cited from Harris & Rice, 2006); (Cleckley, 1941). Cleckley’s influence discouraged many clinicians and researchers to

work with psychopathic populations for decades.

It was not until the 1960's that treatment evaluations and assessments began to emerge. The Oak Ridge Social Therapy Unit held a hospital treatment program that led to notable evaluations of its outcome. Based upon this treatment program, it was determined that hospital treatments made psychopaths worse, as it increased their risk of post-program violent convictions (Polaschek & Daly, 2013). The psychopaths studied in this treatment program demonstrated less compliant behavior, and were often written up for misbehavior, put in seclusion and administered drugs and alcohol. The Oak Ridge program was an involuntary program that promoted radical and harmful measures, and would not fit the ethical standards of current practice. Given the ethical violations of the Oak Ridge program, it is unable to be effectively compared to current treatment models; however, it still had a significant impact on the clinical perception of psychopathy. Researchers proposed that this treatment allowed psychopaths to learn how to "read" other people as a means to manipulate and exploit them (Harris & Rice). Following the publication of these findings, there was a significant reduction in treatment and intervention research for psychopathy.

Later work in psychopathy intervention examined the effect of specific treatment models on clinical outcomes. One of the most popular treatment models for psychopathy is the therapeutic community model, a group residential treatment program that targets drug abuse and addiction. A notable evaluation of this model by Ogloff, Wong and Greenwood suggested that psychopaths showed less motivation, were discharged earlier and showed less improvement, compared to non-psychopaths (Ogloff, Long & Greenwood, 1990). Seto and Barbaree reported negative findings of a cognitive behavioral treatment that targeted deviant sexual preferences and antisocial attitudes. They reported that offenders high in psychopathy who received high ratings

of improvement (based upon behavior during sessions, quality of work, therapist evaluation of motivation and change) were still likely to reoffend in particularly violent ways. Hughes, Hogue, Hollin and Champion assessed CBT treatment for psychopathic outcomes, and found that PCL-R scores were inversely correlated with therapeutic gain (Hughes et al., 1997). Furthermore, offenders scoring highly on the PCL-R have been shown to respond poorly to these past approaches (therapeutic community model and CBT), as they continue to reoffend.

Difficulties in Intervention Methods: Why Have They Not Worked?

Past research and evaluations of psychopathic intervention methods have identified specific problematic traits that interfere with beneficial treatment outcomes. It is critical to explore these difficulties further in order to attain a more comprehensive understanding of unsuccessful treatment designs and ultimately propose effective interventions. In reaction to psychopaths' response to treatment, Cleckley stated that he was "profoundly impressed by two difficulties that stood in the way of dealing effectively with the psychopath. One of these was his apparent immunity, or relative immunity, from control by the law. The other was his lack of response to psychiatric treatment of any kind" (as cited in Salekin, 2002); (Cleckley, 1981). This quote touches upon two important hindrances of psychopathic intervention. The first difficulty that Cleckley mentions concerns the successful psychopath (i.e., one who successfully avoids being incarcerated). The successful psychopath goes through the motions of his life without any correctional interruption. Without a history of incarceration, a successful psychopath is not likely to participate in any treatment program voluntarily. Robert Hare, a leader in psychopathy research, stated, "How many psychopaths go to a psychiatrist for mental distress, unless they're in prison? It doesn't happen....Psychopaths do think they're more rational than other people, that this isn't a deficit" (as cited in Chivers, 2014). Without the authority of the justice system to

implement treatment programs, a successful psychopath has no reason to participate in treatment, as they do not believe that they have a cognitive deficit that requires treatment. Stated simply, successful psychopaths possess the distorted belief that their psychopathic traits are not a problem. As such, they have limited motivation to voluntarily seek out treatment.

Cleckley's second noted difficulty with psychopathy treatment is likely attributed to the insufficient design of most interventions available. Most of the well-known treatment models commented upon in empirical research lack a design that encompasses and targets the main features of psychopathy. Many of the programs that yielded unsuccessful results are generalized treatments that do not effectively target specific psychopathic traits, and are more general interventions for offenders that focus on criminal risk reduction.

In response to the known difficulties of psychopathic intervention, a novel and effective treatment should incorporate a design that targets specific psychopathic traits. Rational therapy and personal construct psychotherapy are noted, successful interventions that have been shown to lead to a reduction in traits and characteristics (such as decrease in lying, increase in remorse/empathy, and improved relations with others), as well as a reduction in recidivism (Salekin, 2002). With this research in mind, it can be hypothesized that psychopathic intervention would result in more beneficial outcomes if the treatments are designed to target specific psychopathic traits and characteristics.

A proposed intervention design that targets psychopathic difficulties in response modulation, lack of empathy and manipulative tendencies has the potential to yield successful therapeutic outcomes. Difficulties in response modulation, lack of empathetic response and manipulative tendencies are three, noted core deficits of psychopathy (Berkout, Gross & Kellum, 2013). The following sections will address the functioning of these three traits in a psychopathic

context, and later, will illustrate why it is a well-founded choice to incorporate them into a novel treatment.

Understanding Deficits in Response Modulation

The inability to learn from experiences or to adjust behavior based upon prior unfavorable consequences is known as a difficulty in response modulation. This deficit is a significant dysfunctional trait in psychopathic individuals. Early research has claimed that when a deficit in response modulation is present, individuals become less likely to pause and reflect in order to assess their possible response strategies, and ultimately learn from corrective feedback.

(Newman & Lorenz). Behaviors associated with response modulation include insensitivity to changes in reward reinforcement schedules (i.e., extinction) and difficulties implementing behaviors that facilitate the avoidance of aversive consequences (i.e., passive avoidance) (Berkout et al., 2013).

Normative Response Modulation

Normative response modulation allows people to process stimuli effectively when they confront motivational or emotional stimuli. It allows people to integrate feedback in ways that improve the quality of their responses and further prime their responses for future experiences (Newman & Lorenz). Normative populations use reinforcement learning in order to interact with the environment to manage problems and ultimately achieve a goal. Reinforcement learning allows individuals to establish effective behaviors that maximize the probability of reward, as well as reduce the probability of punishment based on the consequences of prior actions within a given environment. This mechanistic process allows the individual to predict outcomes of rewards and punishments in the future. In order to achieve a state of long term reinforcement, the agent must learn to choose which actions are most advantageous in a given circumstance

(Maia, 2009). In normative populations, the individual must have a goal relating to their surrounding environment, and must be able to both sense the environment and take proper action. An individual must have had experiences in the past that influence them to have preference for the actions that are most effective for obtaining a reward (Maia, 2009).

Evidence in Deficits in Response Modulation: Psychopathic Populations

The 1970s and 1980s allowed for significant research and subsequent critical findings in response modulation. In 1978, Siegal developed a reward-based card game task that tested psychopathic patients ability to modulate their responses in reaction to it (Siegal, 1978). The participants were able to redeem poker chips at the end of the study for one cent each. Eleven decks of cards were used in the game, and reward cards varied from 100% to 0%. The cards were presented in 10% increments in random order. Participants were given the opportunity to stop the game at any point and move onto the next deck, or choose to play with the same deck until all of the cards were turned over. Results from this study indicated that psychopathy was associated with decreased responsiveness to uncertain punishment, which was deemed comparable in response to legal and criminal consequences. Psychopathic patients were more likely to continue playing the game, compared to non-psychopathic patients and controls. When a loss of reward was uncertain, it was found that psychopathic patients demonstrated differential psychopathic preservation, which led them to win less money than other groups. Siegal attributed this effect as evidence of maladaptive behavior (Siegal, 1978).

Earlier work also laid the foundation for understanding reward responsiveness and passive avoidance. Schmauk conducted a study in 1970 that was designed to examine the potency of various consequences to evaluate their potential in shaping psychopathic behavior (Schmauk, 1970). The study required participants to navigate a maze. As a result of incorrect choices, they

either received a shock, loss of money or were told that they were wrong. Results suggested that psychopathic patients responded normatively to a loss of money, yet they were less responsive to shock or negative social feedback responses, compared to controls (Schmauk, 1970). Another study that addresses reward responsiveness and delay discounting (the tendency to prefer smaller rewards that are delivered sooner rather than larger rewards that are delivered later) in psychopathic populations was conducted by Newman et al. in 1985 that involved a card game task with tangible rewards. Results of this study suggested that “psychopathic individuals may focus on the immediate desire to obtain a reward to the exclusion of further consideration of consequences” (Newman et al., 1985). Additional research has proven that psychopaths low in anxiety experience greater difficulties in delaying gratification, which can appear to be associated with their decreased sensitivity towards punishment (Berkout et al., 2013; Newman et al., 1992).

These historical results have been supported by recent investigations and have been corroborated by other mechanisms. In 2004, Blair, et. al., investigated how psychopathic individuals perform on passive avoidance learning tasks, and if ability is modulated by reinforcement and punishment. This study used a passive avoidance task (a psychological test used to assess the function of an individual's memory based on the association formed between an aversive stimulus and a specific environmental context) with a graded reinforcement schedule (response to rewarding numbers gained points, and response to punishing numbers lost points). Psychopathic individuals made more passive avoidance errors than the control individuals. Both groups responses were shown to be modulated by reward. However, responses in the psychopathy group were not modulated by the level of punishment, while the control groups responses were. These results suggest that psychopathic individuals have an emotional learning

impairment, specifically suggesting that “psychopathy is associated with particular dysfunction in the formation stimulus-punishment associations” (Blair et al., 2004).

Additional research on psychopathic reward responses was conducted by Buckholtz et al., of Vanderbilt University. These researchers conducted studies on psychopaths and mesolimbic system responses to monetary rewards, and have found that they may have a hypersensitive response to rewards (Buckholtz et al., 2010). Researchers used positron emission tomography (PET) to assess the relationship between psychopathic traits and dopamine binding potential following amphetamine administration. Participants with higher scores related to impulsive or antisocial characteristics demonstrated a higher dopamine binding potential, similarly. fMRI (define acronym) testing indicated that these same high scoring individuals on impulsive or antisocial characteristics had a greater neural response to the anticipation of monetary reward (Buckholtz et al., 2010).

Though research strongly suggests that psychopathic individuals have deficits in learning from feedback, particularly when the outcome probabilities are unknown, other findings indicate that psychopathic individuals may be capable of response modulation under certain circumstances. Some findings suggested that psychopathic individuals may have greater challenges shifting their behavioral pattern if consequences are not certain, yet they are still capable of doing so. Their perseverative response pattern has been known to be associated with their impulsivity and propensity to seek immediate gratification, and thus are less likely to choose a more frequent, yet delayed, rewarding response (Newman et al., 1992). A deficit in response modulation has been demonstrated when a loss of reward is evident as a potential consequence, compared to a reward on its own. While modifying behavior in response to aversive outcomes has been proven to be difficult for this population, it should be noted that

consistent results have not been demonstrated universally, resulting in much contention over this topic (Berkout et al., 2013).

Explaining Deficits in Response Modulation

In addition to problems integrating information about emotional cues into behavior, problems with response modulation affect the behavior of psychopathic individuals in other contexts. As a result of their weak processing of corrective feedback, they become less likely to correct their dysfunctional response inclinations. While it has been demonstrated that psychopathic individuals have the potential to learn from experiences, it is suggested that their deficiency in response modulation makes it difficult for them to put this acquired knowledge to any use (Newman & Lorenz).

In order to integrate findings on feedback learning in psychopaths, Patterson and Newman developed The Response Modulation (RM) Model as a theoretical framework for understanding why psychopathic individuals manifest deficiencies in modifying behavior in response to feedback (Patterson & Newman, 1993). Further, this model poses an explanation of how prior findings on response modulation deficiencies in the laboratory can account for core deficits in emotional processing in psychopathy. The model posits that psychopathic individuals' deficiency in emotional processing is due to their difficulty in allocating attention and emotional cues that lie outside of their attentional focus, which lead to poor information processing. According to this model, it is theorized that once a psychopathic individual has set their attention in a particular way, they are unable to process information that challenges their current attention state. This theoretical model predicts that psychopathic individuals will allocate less attention to emotional cues as emotional information likely falls outside the current attentional focus and will experience more challenges in altering their emotional response if it has already been established

(Malterer et al., 2008).

Other theoretical assumptions link response modulation difficulties with difficulties in self-regulation. In psychologically-healthy populations self-regulation allows individuals both to respond to experiential circumstances using a range of emotions that are spontaneous yet socially appropriate and also to delay responses as needed. A deficit in response modulation strongly affects normative self-regulatory processing and subsequently modifies the automatic processing of motivational events. Without proper self-regulation techniques, these misguided reactions have the potential to repeat themselves and become automatic behaviors (Lorenz & Newman, 2002).

Understanding Empathetic Deficit

One of the many principle symptoms of psychopathic individuals is their inability to produce empathetic responses. This is demonstrated through various behaviors; they can lack feelings of remorse or guilt for the victims of their antagonistic exploitation, they demonstrate callousness, they can avoid aversive emotions upon their mistreatment of others, and/or they have a decreased emotional response to others distress. These defining characteristics are strongly related to a psychopath's inability to participate in normative socialization (Berkout et al., 2013).

Evidence of Empathetic Deficit: Psychopathic Populations

A variety of tasks have been used to characterize the empathetic deficits in psychopaths. Researchers have determined that psychopathic lack of empathy is developed from their inability to engage in cognitive perspective taking and their difficulty in identifying the expressions of distress of others. Research has shown that psychopathic individuals are impaired in their recognition of sad and fearful facial expressions, which results in a selective empathic deficit for

these emotions (Montagne et al., 2005). Additionally, a 2008 study demonstrated that individuals that scored highly on psychopathy assessments showed low levels of empathy on an emotional empathy questionnaire (EEQ; Mahmut et al., 2008).

Understanding empathy by moral socialization is a well-researched area of study, and has the ability to inform the structure of empathy deficit functioning in psychopathic populations. Moral socialization is defined as the ability to inhibit violent and antisocial behavior. This phenomenon is thought to be learned through instrumental conditioning using punishment. An action that does not meet the criteria of appropriate moral socialization is punished. Thus, as occurs through other forms of positive punishment in instrumental conditioning paradigms, the learned association between the act and the punishing outcome reduces the likelihood of an individual performing the act in the future. Critically, developing an instrumental learning in response to punishment is contingent upon one's ability to experience the punishment as emotionally aversive. Psychopathic individuals are less likely to feel fear and anxiety, which makes them less likely to respond to adapt their behavior in response to punishment and thereby demonstrate avoidance learning. One of the ways this deficit manifests is through a lack of moral socialization. If psychopaths are insensitive to punishment following their moral violations, they are unlikely to adapt their social and moral behaviors to conform to social norms. This model has raised questions and has led to alternative explanations.

While the deficit avoidance learning model has been posited as one explanation for poor moral socialization in psychopaths, some researchers believe that it is not the conditioned fear response that is responsible for moral socialization, but instead is the ability to feel empathy and to have empathic responses be fostered through the social environment. This theory is driven by the notion that moral socialization is achieved by focusing on the effects of one's wrongdoing in

order to increase their empathetic response; induction, rather than punishment. The violence inhibition mechanism (VIM) was proposed by Blair and his colleagues, and serves as an explanation for a human's control for aggression; the display of submission and distress cues towards the aggressor allows the aggressor to terminate their attacks. In normative circumstances, the distress cues would activate the VIM, and initiate arousal. This "arousal" period is demonstrated by the physiological responses that occur when witnessing the perceived distress of others. Blair proposed that a deficit to develop this mechanism may result in the development of further psychopathic behavior.

In the notable study conducted by Blair, Jones, Clark and Smith in 1997, it was concluded that psychopathic individuals have a damaged, but not inoperative, VIM. This study used psychopathic individuals and incarcerated controls as participants, and showed them slides of three different types of stimuli; distress cues, threatening images, and neutral cues. Electrodermal responses were recorded to measure the response of viewing these slides. Psychopathic individuals showed reduced electrodermal responses to distress cues, but did not differ from control to threatening or neutral cues. These results suggest that psychopaths may suffer from a general unresponsiveness to human expressions (Blair et al., 1997).

To further emphasize this general unresponsiveness in psychopathic populations, one study measured brain activity when psychopathic offenders and control subjects viewed video clips of emotional hand interactions (hands touching, stroking, etc) and while experiencing similar interactions. The conditions included love, pain, social exclusion, and neutral videos. Results demonstrated reduced brain activation in the insula and cingulate cortex which are involved with experiencing these interactions while viewing the clips. However, when asked to empathize with the actors in the videos, the brains regions of interest were activated in psychopaths. The

researchers suggested that their results provide further evidence of how psychopaths can be callous and manipulating, as they demonstrate spontaneous empathy when prompted to act accordingly. This finding also demonstrates that psychopaths may be capable of empathizing when they want to (Meffert et al., 2013).

Understanding Manipulative Tendencies

The use of manipulative and conning tendencies are a strong marker of psychopathic behavior. Manipulation and conning tendencies involve the use of deceit and deception to cheat or defraud other persons for the individuals own personal gain (Millon, Simonsen, Birket-Smith, & Davis, 1998). The schemes involved in psychopathic manipulative behavior are often achieved without any empathy or concern for the victim.

Evidence of Manipulative Tendencies: Psychopathic Populations

Psychopaths have been described as the traitors or defectors in social interactions, as they tend to exploit the cooperation of others and use it for their personal gain (Seto et al., 1997). There are various theoretical explanations for this abnormal behavior. One model of psychopathy, “The Cheater Hypothesis” posits that psychopaths act in cheating and manipulative ways because they have low levels of empathy but also harbor high levels of resentment when they are wronged (Coyne et al., 2008). This hypothesis, which accounts for the manipulative and cheating behavior in psychopathy, is best characterized within laboratory investigations by using game theory to study strategic decision making (Coyne et al., 2008). As one example, the “Prisoner’s Dilemma” has been used as a means of understanding cooperative and manipulative behavior. In the game, an individual is hypothetically convicted brought to to either betray their cohort and testify that the other committed the crime, or cooperate with the other and remain silent. If both players betray each other, they are both punished (2 years in prison). If player A

betrays player B, but player B remains silent (and vice versa), player A is given no punishment and player B is punished (3 years in prison). If both players remain silent, then both will only serve 1 year in prison (lesser charge). This game educates us on why individuals may choose to not cooperate, even if it is in their best interest, and choose to maximize his or her own benefit. Psychopaths have been documented to cheat and exploit other in the Prisoner's Dilemma (Coyne et al., 2008).

Another approach to understanding the manipulative and conning techniques of psychopaths is by understanding Machiavellian syndrome. Machiavellians use interpersonal strategies in order to promote the use of deception, manipulation and exploitation (Ali et al., 2009). Machiavellians are characterized by a "lack of interpersonal affect in interpersonal relationships, lack of concern with conventional morality, lack of gross psychopathology, and low ideological commitment (Ali et al., 2009). The Mach IV scale is the primary assessment used to classify an individual with Machiavellian syndrome (Christie & Geis, 1970). High Machs are characterized by their cool attitude, detached values of social norms, rationality and self interested behavior for personal gain. They behave more unethically and act more manipulatively than Low Machs. They also have a high tendency to lie convincingly and take advantage of trust that is extended to him or her (Gunnthorsdottir et al., 2002). Past research has noted the conceptual similarity of Machiavellians and psychopaths, and has suggested that they encompass a single construct. Others reject this notion, as they differ in their heritability, and suggest that they are distinct constructs with apparent overlaps (Ali et al., 2009). Both Machiavellians and psychopaths demonstrate low emotionality and are prone to deceitful behavior (Fehr, Samson & Paulhus, 1992). Research has also suggested that that psychopaths can score high on the Mach IV scale.

Next Steps

The previous sections which have outlined the mechanisms and function of *response modulation difficulties, lack of empathetic response and manipulative/conning tendencies* will serve as the basis for a proposed, novel intervention program, *Game and Train*, for psychopathic individuals. Recent work in therapy adherence and behavioral change has brought to light the use of mobile applications in intervention designs. The utilization of this technology has the potential to serve as a valuable interactive tool in psychopathic populations, a tool that may very well yield favorable behavioral changes. Mobile technologies have been proven effective in helping individuals monitor their behavior, providing content for relevant therapies and responding to time sensitive self report data (Vilardaga et al., 2014). They have allowed behavioral scientists to observe behavior in real world settings, as well as modeling, investigating, reinforcing and assessing the outcomes of an individuals behavior (Vilardaga et al., 2014). Applications have allowed researchers to gather contextual data on situational factors and private events (e.g: mood), individuals responses to them, and how the responses approach a descriptive functional analysis of a target behavior. This method of data collection has the advantage of being administered during the individuals daily activities, as well as avoids the issue of recall bias (Roth et al., 2014). Mobile technologies have proven to be useful support systems in behavioral intervention. The information provided by the application has the ability to be personalized to the patient and can be designed to be more persuasive or manipulating with each varying case. Mobile technologies also allow the patient to engage in self-management; they can monitor their own condition and can interact with the cognitive, behavioral and emotional responses that are necessary for normative reactions (Klein et al., 2014).

With this research in mind, the proposed intervention, *Game and Train*, will be administered completely through a mobile application that will be accessible via a smart phone or tablet. In order to ensure sufficient participant engagement with this intervention, elements of gamification, defined loosely as using game elements in non-game contexts, will be incorporated into the application design. Elements such as rewarding reinforcements, a consistent point system monitored by responses, various challenges and levels, and the use of simulated avatars will encourage participation and captivate the user.

Game and Train will target the three specific psychopathic deficits (response modulation difficulties, lack of empathetic response and manipulative/conning tendencies) using game-based tasks. The presence of each trait will, over time, will be evaluated using digitally converted versions of previously established, empirically valid, models and scales. It is hypothesized that the *Game and Train* intervention will instruct normative functioning in these given traits after the completion of this intensive, 6 week training.

This proposal for a mobile intervention for correctional use has the potential to influence a transition in how both the clinical and correctional communities approach the treatment of incarcerated offenders. The next chapter, Chapter 2, will lay the groundwork for the motivation to use a mobile intervention in behavioral treatment through a media theoretical lens. This chapter will examine the importance of how our user culture is now dictating the ways in which technology is designed, and how the clinical community can benefit from this impending shift. Chapter 3 will then provide the experimental framework for the proposed intervention, *Game and Train*, prompting an explanation for the importance of this work and the future implications in Chapter 4.

Chapter Two: The Use of Mobile Technologies and Gamification in a Psychological Intervention

Smart technology and modern application software has guided us into an age of renewed technological proficiency. The functional capabilities of smart devices has given the user the ability to streamline their networks of communication and entertainment. Smart devices are no longer “phone-centric”, they are “data-centric” (Luxton et al., 2011). We now value these devices for their integrated software, media functions and Internet access rather than just as devices to make phone calls. There are thousands of applications, or “apps,” available to download instantaneously. A mobile app is a computer program that is designed for use on smart devices such as phones, computers and tablets. Mobile applications were initially designed and marketed for the benefit of general productivity and information retrieval. In recent years, the app usage has become very popular among smart device users and has expanded to satisfy a wide variety of categories. Applications are being developed with every aspect of the human experience in mind. We are now able to organize and monitor our professional and personal lives via the use of mobile applications. Within seconds, we can check the current weather any place on the globe, navigate any route using GPS, check our bank statements, keep in touch with old connections and create new ones, all via the power of our mobile devices. Our device “dashboards” and home screens can be customized with apps that cater to our personal interests and needs. There are now over one million applications available to us, and the list continues to grow (Bonnington, 2012). We are able to download applications that improve business relations, serve educational purposes, help us make lifestyle decisions, keep us productive and, of course, keep us entertained.

This sense of user liberation fueled by a hyper-engagement with digital media and technology has not always been the norm. Media, as a means of producing and receiving information, is currently in the midst of a momentous transition. Old media channels - the broadcasting stations and the news sources - once dictated what kind of information would be publicly attainable. The genres, perspectives and styles of the information available via old media channels were determined by the producers of the content. Previous sources of media were strictly controlled by the bureaucratic old media industry. These traditional forms of media maintained a tight control over the flow of information and dictated how media was to be consumed (Jenkins, 2006b). The rise of the digital revolution and the expansion of the Internet profoundly broadened the amount of information available for consumption. As a result, the user culture was given the ability to communicate across mass networks, on a greater scale than ever before. Thus, a new “collective intelligence” was born; the Web was able to “facilitate rapid many-to-many communication, enabled broader participation in decision making, new modes of citizenship and community, and the reciprocal exchange of information” (Jenkins, 2006a). An increase in communication soon fueled collaboration among the user culture. Once the user culture started to generate their own opinions and broadcast themselves over mass digital networks, the media industry began to listen. In response, the accessibility to media content has become more efficient and the content itself has become more personalized to the users interests and needs.

The user culture has recently called for innovation. The software and technologies available currently are designed with the user in mind. We ask that digital technologies enhance our lifestyles. We require our interactions with technology to be entertaining and easily accessible. Our technology should reflect the convergence of interests that individuals of the

user culture possess. With the vast amount of media available, the current user culture is consuming media and information more rapidly than ever before. As a result, “the promises of this new media environment raise expectations of a freer flow of ideas and content” (Jenkins, 2006a). The current user culture has been described as a ‘participatory culture’, in that their interactions with technologies and media texts is now more evident than ever before. With the new tools available, consumers are now able to “archive, appropriate and recirculate media content” (Jenkins, 2006b). Some have also adopted a “do-it-yourself” mentality in regard to their utilization of these new technologies available and have also embraced the current economic trend of supporting “horizontally integrated media conglomerates” that promote movement of “images, ideas and narratives across multiple media channels” (Jenkins, 2006b). Users now have the opportunity to act as consumers and even producers of media content. By means of harnessing the power of the participatory culture, the consumers have been able to exert a significant amount of authority that, in turn, influence how technologies are developed and impact the kinds of content that are presented. The user culture has demonstrated the desire for their lifestyles to be more technologically monitored. Smart phones currently dominate the mobile phone industry, acting as the “Swiss Army Knife” of technological tools (Jenkins, 2006a). The user culture has the ability to “communicate, browse, create and amuse” via their smart devices (Rainie & Wellman, 2012). We are now witnessing a movement towards using smart devices as a means of regulating and monitoring our daily activities.

A recent movement of monitoring and maintaining optimal mental health has swept the application market. Applications such as Luminosity, Happify, WhatsMyM3, and MindShift have become popular options for those who are interested in their personal mental well-being. These applications can be customized to each user, establishing the application experience as a

personal journey to achieve optimal mental health. Many of the applications in this category use elements of clinical treatment programs such as Cognitive Behavioral Therapy (CBT) and Dialectical Behavioral Therapy (DBT) in order to enrich the experience. Users are able to self-assess using relevant clinical batteries, retrain their cognitive skills using games and workshops in response to their personal needs, and track their progress over a long duration.

With so many options available, the question - what makes an application successful - becomes quite pertinent. Application designers must keep their audience motivated to remain engaged with the software over a long duration. This is especially important for mental health based applications, as consistent engagement is essential for successful behavior change. One effective method for motivating engagement with an application is by way of gamification. The term itself has only been in use since 2008 by the digital media industry and has only been adopted for widespread use in 2010 (Deterding et al., 2011). Gamification is the integration of game elements in non-gaming contexts in order to improve user experience and promote engagement. Gamification has recently been used in the design of applications across a wide range, from finance, sustainability, health and behavior, new sources, social networking and beyond. By using points, badges, leaderboards, challenges and other reward incentives, application designers are able to provide their work with a higher level of motivation and excitement, to stay engaged in order to promote continuous use. By simply turning an experience into a game, adding reward incentives and achievement goals, exceptional behavior changes are produced (Zichermann & Cunningham, 2011). If we explore why we are motivated to play games in the first place, we will command a better understanding of why gamification works. From this understanding, it will become more apparent how the implementation of gamified techniques in mental health based applications can foster engagement and ultimately

lead to successful behavioral change.

Games are meant to capture our attention. We are all familiar with using games as tactics for making the most mundane tasks more engaging and attractive. We set internal goals for ourselves and reward our personal achievements. In a more concrete sense of the term, games are designed to allow for personal accomplishment; they give us the opportunity to fail through trial and error, but always harbors a sense of control. Games are exciting. They provide us with challenges to achieve a set of goals. Even when we do not reach our desired outcome, quality games will provide us with clear and instantaneous feedback in order to make corrections. Games work systematically. They are designed around a set of predetermined rules that work in harmony with our actions and behaviors within the game. We can attain a certain score if we follow the rules; our behavior is modified to strategize our decisions with the rules in mind, in order to attain the ultimate reward of winning.

Gamification takes the most crucial aspects of game play and positions them in a non-game, digital or non-digital, environment in order to promote learning and engagement. It is meant to promote participation in an activity that you might not be motivated to participate in otherwise. Gamification design is meant to target the intrinsic or internal motivations of the participants. In response, it uses game-style techniques (challenges, point systems, goal setting, feedback) to amplify those internal motivations in order to create learned skill sets (Deterding, 2012). When a system has a clear sense of its intrinsic value already, gamification can be incorporated into the system in order to aid the user in recognizing those values. Ultimately, the users will be motivated to engage themselves and their desire to participate will be heightened.

The use of game mechanics is a crucial element to ensure the success of gamification in a digital game system. A player's goals in a given system are reinforced using game elements.

Immediate feedback via on screen notifications allows the user to adjust their behaviors for long term success. Point systems give the user the opportunity to exchange their winnings for goods. They also act as a motivating factor, functioning as an immediate positive reinforcement; the more points one accumulates, the more attractive their winnings are. Competition and collaboration among players yields higher engagement. Players should be motivated to engage with their team members in order to reach their ultimate goal, but should also have an understanding of where they stand among the other players, so they will be personally motivated to work to the best of their abilities (Zichermann & Cunningham, 2011).

The integration of gamified elements in a mobile technology for the delivery of mental health services is a rather unexplored and understudied area. It is still largely unknown whether a game formatted treatment approach can lead to beneficial outcomes that are in line with previously established lab-based assessments (Dennis & O'Toole, 2014). Researchers participating in the games for health movement have begun to explore ways in which "effective interventions can be translated into a game format" by using gamified elements in their intervention design (Dennis & O'Toole, 2014). These measures have been taken in order to address and reduce problems related to treatment engagement and adherence to these intervention technologies. This research is still very new and currently, there is no empirical evidence that demonstrates successful behavior change resulting from engagement with a gamified intervention. Incarcerated psychopathic populations are notorious for their lack of motivation to engage with traditional treatment programs. Based upon the previously established suggestions, it can be surmised that gamified elements in a mobile intervention for incarcerated psychopaths could lead to increased engagement and successful behavioral outcomes.

In regard to the proposed study, gamified elements have been applied to the entire *Game*

and Train intervention. From the moment the participant opens the application, up until its 6 week completion, the participant will be motivated to stay engaged on various levels. As previously discussed, psychopathic populations are notorious for their difficulties in engaging with traditional treatments successfully. By incorporating gamification into the *Game and Train* mobile application intervention, the psychopathic participants will be determinedly motivated to complete the training as a way of fostering their hypersensitivity towards gaining rewards. The trait perspective of the principle psychological perspectives of motivation is clearly related to the current interventions and motivational tactics via gamification. The psychopathic participants in this proposed design are resolutely motivated by reward and achievement. Since these participants have such a strong achievement motive, they are likely to be encouraged to engage with this intervention, as it places great emphasis on achievement, success and progress (Sailer et al., 2013).

Even further, participants will have the opportunity to acquire points for their achievements in each of the three tasks. These points can be exchanged for goods at the commissary. A running total of points will consistently be posted on the screen of the participant's mobile device, which will function as an immediate positive reinforcement (Sailer et al., 2013). They will be given immediate feedback, either positive or negative, depending on their correct or incorrect responses. Participants will also be given a total bi-daily score twice per day upon completion of their trainings. They will be shown a progress bar that symbolizes their progression towards certain completion goals throughout the training. Higher scores will result in an achievement badge in order to fulfill the participants' need for success.

Within the Manipulation Training, participants will engage with a simulated avatar in a series of digital sporting adventure games in order to promote cooperative behavior and dissuade

them from using manipulative tendencies for their own personal gain. The Manipulation Training is designed in its entirety with gamification in mind. The participant must keep track of their own running total of points, as well as the simulated avatars running total of points. Cooperative techniques are emphasized greatly during this part of the training; both players need to maintain a certain number of points to continue to the next round. If the participant uses manipulative techniques against the avatar for their gain, the avatar will lose points and will not be able to continue to the next round. Without the avatar companion, the participant will not be able to complete the training effectively. The participant must then go back to the last round that they played with the avatar and replay it successfully and cooperatively. This aspect of the Manipulation Training emphasizes two core gamification elements; avatar use and quests. The use of avatars have been shown to promote positive feelings via the developmental progress that the avatar exhibits (Zichermann & Cunningham, 2011). Quests (sporting adventure games) are the mini tasks that are directly linked to rewards. They clearly provide the goals of the task, the consequences that can arise, and emphasize the importance of ones actions within the given task (Sailer et al., 2013).

It will be very interesting to observe if gamified techniques have the same motivational force on psychopathic populations as they do on normative populations. The psychopathic hypersensitivity towards reward can be hypothesized to aid in great successes with engagement in this intervention. This possibility leads us to think about other ways that gamification's interaction with mobile applications can have an impact on clinical psychology beyond work with psychopathic populations. As smart devices have led us towards an age of technological proficiency, we have now become more reliant on the capabilities of our devices. We have reached an age whereby our devices have substituted many of the common tools that we have

relied on for centuries. Our technological community is fast-paced and constantly keeping itself up to date. It is possible to surmise that many non-technological systems will soon become digitalized in the coming years.

Using mobile technologies as a means for scientific research is a relatively new approach. We can more clearly understand the benefit of such an approach, by applying it in a wider philosophical frame. In his noted work, *Against Method*, philosopher of science Paul Feyerabend offers an unconventional perspective on how to approach research and methodology. Feyerabend's essay suggests that we acquire a more liberal, even anarchic, gaze when studying science. He argues that acquiring an "anything goes" mentality is crucial to the growth of knowledge; that without it, we are compromising our ability to build upon and expand the field (Feyerabend, 1993). We should not be restricted to the traditional forms of scientific methodology for research and data collection. In the past, we have taken a very objective approach to methodology in order to create some sort of uniformity and structure across research. Feyerabend argues that past efforts in methodology do not accurately represent the innate complexities of humanity. "The naive and simple rules" of past methodologies do not allow for any personal interactions to merge with this approach and consequently, ones imagination is restrained. Feyerabend claims that, historically, scientific research has taken a very exclusionary approach; scientific facts are separate from ones "opinion, belief and cultural background" (Feyerabend, 1993) By using mobile technologies as a means for scientific research, we are supporting the current movement of becoming a more technologically mediated culture. Scientific research will, in turn, benefit from a more inclusive and liberal approach to methodology by integrating mobile technologies to enhance data collection and promote interaction with the wider non-scientific population.

As Marshall McLuhan speaks of in his renowned essay, *Understanding Media*, we can understand technology as an extension of man and consciousness. He has introduced media studies to the profound idea, “the medium is the message” (McLuhan, 1994). The medium, how something is communicated and expressed, shapes and controls the forms of human association and action. It is not the machine, but what you do with the machine, that is the meaning or the message. The use of mobile applications in scientific research builds upon the expansion of ways by which mobile technologies are used by the public. Mobile technologies and applications are now designed to encompass a wide range of uses, including lifestyle, professional and social practices. We have already automated many frequently used systems and converted them to be accessed via mobile devices. We can make appointments, order products, keep track of our schedules, monitor weather and traffic, make payments, just to name a few services. The clinical community has already begun to adopt some of the changes of the technological age. Smart phones can rapidly collect vast amounts of valid data of real-world behavior from large global samples. They can run surveys, questionnaires, field observations and interactive experiments. Smart phones can also receive Bluetooth input from external analytical devices, act as hand-held controllers, maintain GPS functions, and record and store large capacities of audio, visual and textual data (Miller, 2012). The convergence of these two concepts, using smart devices to monitor our daily lives and as a means of improving psychological experimentation and data collection, suggests the possibility that clinical therapy and intervention will become digitalized in future years. Digital interventions could make clinical therapy more accessible. The current user culture leads a fast paced and structured lifestyle. If an individual seeks improvement in their mental well being but simply does not have

the time, interest or financial means of meeting with a clinician, a digitally accessed intervention application could offer similar services from the convenience of their smart device. The design of these mobile interventions would be regulated by licensed and experienced clinicians in order to ensure the psychological validity of these programs.

By examining how the current user culture has fostered their influence over the flow of media content and the development of new technologies, we are able to acquire a better vision of how a similar transition may occur within the clinical psychological sector. Research in the clinical community is becoming increasingly media orientated. The amplified use of clinical-based applications by the user culture demonstrates their collective enthusiasm over the importance of attending to their cognitive well-being. The proposed work, *Game and Train*, is an applicable paradigm for the clinical intervention of incarcerated offenders that satisfies the many elements of an engaging technology, which can plausibly lead to successful behavior change. Beyond its evident implications for correctional use, this work serves as a reasonable model that hopes to confidently inspire exploration towards expanding the channels through which media and technology can interact and promote the practice of engaging with mobile technologies for psychological use.

Chapter 3: Experimental Section

Introduction

Psychopathic individuals exhibit a variety of personality traits that make them extremely unwilling to engage with treatment. The institutionally mandated programs available have yielded detrimental outcomes in regard to behavior change. Recent research has demonstrated that psychopaths scoring high on the PCL-R possess traits that prevent them from responding well to treatment plans and intervention programs (Polaschek & Daly, 2013). Compared to psychopaths scoring lower on the PCL-R, they tend to be evasive, hostile, verbally combative, noncommittal, disruptive and less ready to change, less committed to activities such as school and work, and are ultimately more likely to be removed from or leave treatment prematurely (Polaschek & Daly, 2013).

In reference to treatment assessment, PCL-R scores have been associated with disruptive behavior in treatment, shorter periods of treatment attendance, and negative therapist perceptions of a patient's motivation and progress in treatment (Polaschek & Daly, 2013). Clinicians are used to patients that refer themselves for therapy and are generally compliant when receiving treatment. With the many noted difficulties of psychopathic intervention, clinicians may judge treatability of psychopaths "not on the basis of improved outcomes, but instead, on the experiences of a challenging therapy process with the client" (Polaschek & Daly, 2013). Additionally, the programs available for the incarcerated psychopathic population are predominantly focused on criminal risk reduction. These treatments are designed for all offenders who may not suffer from a severe cognitive deficiency and take a very general approach.

Very recently, Baskin-Sommers, Curtin and Newman (2015) have designed a cognitive remediation treatment approach for two antisocial subtype populations, individuals with psychopathy and individuals with externalizing traits (e.g., hostile, impulsive, risk taking associated with sexual behaviors and substance abuse, etc). This treatment is comprised of a series of computerized tasks that target specific cognitive dysfunctions of these populations; specifically, those with psychopathy fail to consider important contextual information and those with externalizing traits are unable to regulate affective reactions. The researchers' experimental design gave both populations an opportunity to participate in both types of trainings. The results determined that those who received deficit-matched training subsequently showed improvements on the pre/post assessment batteries. Individuals with psychopathy who participated in their deficit-matched training became more responsive to a variety of affective and non-affective information on both a broad measure of cognitive-affective functioning and on more specific measures. Individuals with externalizing traits who engaged with their deficit-matched training (i.e, attention to context training; focused on learning to attend to and integrate contextual cues present in the environment) were able to demonstrate a more enhanced ability to avoid over reacting to affective information. These findings have highlighted the importance of trait specific interventions, and its effectiveness on psychopathic populations.

The proposed intervention, *Game and Train*, will work to further explore the effectiveness of trait specific interventions by expanding the range of psychopathic traits targeted. Baskin-Sommers, Curtin and Newman failed to address two additional core features of psychopathy, the deficiencies in empathetic response and manipulative tendencies. A proposed intervention design that targets psychopathic difficulties in response modulation, lack of empathy and manipulative/conning tendencies has the potential to yield successful therapeutic outcomes. The

proposed design will be an intensive trait-specific behavioral intervention for incarcerated psychopathic populations. The intervention will use a series of game-based tasks developed specifically to remedy the known psychopathic deficits in response modulation, empathetic response, and manipulative tendencies. *Game and Train* will use gamification and game theory within the design. These features will incorporate cooperative techniques and decision making strategies in order to enhance abilities in normative response modulation and empathic response and diminish manipulative/conning tendencies. It is also important to mention that evaluations of past interventions have demonstrated difficulties in keeping psychopathic individuals engaged with the therapy. This proposed intervention design will use rewarding reinforcements as motivating factors for enhanced therapeutic response and engagement, as it has been proven that psychopathic individuals are motivated towards reward, rather than punishment.

This design will be administered in the form of a mobile application that can be accessed on a mobile device (such as a smart phone or tablet) outside of a clinical setting. These game-based tasks will be designed based upon research of the functioning of each of these traits. They will also be accompanied by previously established models and scales that will allow for the measurement of the presence of each trait over time, and will be used progressively as the application is administered. Over the 6 week training period, each participant in the experimental condition will complete a series of game-based tasks that will instruct mechanisms of normative functioning in these three given traits.

Method

Participants

The proposed study will recruit a total of two hundred potential incarcerated male inmates. All participants will be subjected to a pre-screening evaluation of their institutional files in order to determine their clinical status and mental impairment. Participants who are diagnosed with bipolar disorder, schizophrenia or psychosis, not otherwise specified will not be included in the study. As recommended by Baskin-Sommers, Curtin & Newman (2015) Participants must score above a 70 on a brief measure of IQ, the Shipley Institute of Living Scale, in order to be included in the study (Zachary, 1986). Participants scoring a 30 or above on the PCL-R will be included in this study as this is the recommended cutoff score to attribute a diagnosis of psychopathy (Hare, 1991). All other lower scoring participants who are screened will be excluded from the study.

Participants will provide informed written consent according to the procedures set by the Bard College Human Subjects Institutional Review Board. Participants will also be informed that their participation in this study will not affect their status within the correctional system. Participants will accumulate points over the course of the training and that will be able to be traded in for material items at commissary. This system will serve as their means of compensation.

After the initial assessment is complete, the participants will be randomly assigned into two conditions, either the experimental condition or the control condition. An equal number of participants will be assigned to each of the two conditions. Participants will be blind to the condition that they are in. Participants will be asked to refrain from communicating with others about their involvement in the study.

Survey Measures

Prior to beginning the 6 week intervention training program, all participants will be assessed using the Psychopathy Checklist-Revised (PCL-R) (Hare, 2003). This measure is the most widely used and validated measure of psychopathy, particularly in incarcerated samples (Polaschek & Daly, 2013). This measure has been demonstrated to have a good measure of reliability and predictive validity (Hare, 2003). The PCL-R will also be administered after the completion of the Game and Train intervention. The assessment will be administered in a semi-structured interview and will also refer to extensive clinical file reviews of the participant. The PCL-R is constructed to contain fairly correlated but distinctive subsets of items (Polaschek & Daly, 2013). These items are referred to as factors when they are correlated with each other to form a cluster of traits. The PCL-R contains 20 items that are rated on a numerical scale, depending on the degree to which a characteristic is present. A rating of 2 means that the characteristic is present significantly, 1 moderately and 0 not at all. Factors represent the more general aspects of psychopathy. Factor 1 includes interpersonal and affective facets. Factor 2 measures impulsive-irresponsible lifestyle and antisocial behavior facets. Some external variables, such as anxiety, correlate in opposite directions with each factor (Polaschek & Daly, 2013). Factor 1 items include glib/superficial charm, grandiose sense of self-worth, pathological lying, conning/manipulative, lack of remorse or guilt, shallow affect, callous/lack of empathy and failure to accept responsibility for own actions. Factor 2 items include need for stimulation/proneness to boredom, parasitic lifestyle, poor behavior controls, early behavior problems, lack of realistic/long term goals, impulsivity, irresponsibility, juvenile delinquency and revocation of conditional release. The various items of this assessment represent unique characteristics of the disorder; however, it is possible for there to be overlap among the items.

The PCL-R will be re-administered within two days after the completion of the 6 week intervention training program in order to determine a post assessment score of psychopathy.

The Interpersonal Reactivity Index (IRI), The Baratt Impulsivity Scale (BIS) and the Mach-IV Inventory will all be administered to measure empathy, response modulation difficulties and manipulative tendencies, respectively. Each measure will be administered prior to treatment and after the completion of the Game and Train intervention, in order to establish pre and post assessment measures of these three traits. These three measures will be administered during the same time periods (pre and post assessment) that the PCL-R is administered. These assessments will be converted to digital versions, and will be installed on the Intervention Application that will be accessible via the participants mobile device.

The IRI is a self report assessment that includes 28 items that are answered on a 5-point Likert scale. Refer to Appendix A for a full version of this assessment. This measure has demonstrated good intrascale and test-retest reliability for the four scales of empathy that it measures. Convergent validity is also demonstrated by correlations with other established empathy scales (Davis, 1980). The response scale ranges from “Does not describe me well” to “Describes me very well”. The IRI is split into four subscales that each consist of seven items. The four subscales include Perspective Taking, Fantasy, Empathetic Concern and Personal Distress. Perspective Taking assesses the ability to spontaneously adopt the psychological point of view of others. Fantasy assesses the ability to imaginatively transpose oneself into the feelings and actions of fictitious characters. Empathetic Concern assesses the ability to have feelings of sympathy and concern for unfortunate others. Personal Distress assesses the ability to have feelings of personal anxiety and unease in tense interpersonal settings (Davis 1980, 1996).

The BIS-11 is a self report assessment designed to measure the behavioral construct of impulsiveness. Refer to Appendix B for a full version of this assessment. The BIS is the most widely used instrument for the assessment of impulsiveness has been determined to have an internally consistent measure of impulsiveness for substance-abuse patients, general psychiatric patients and prison inmates (Patton, Stanford & Barratt, 1995). The assessment is composed of 30 items that describe common impulsive behaviors and preferences. The items are scored on a 4-point Likert scale, ranging in responses from 1 - Rarely/Never, 2 - Occasionally, 3 - Often, and 4 - Almost Always/Always. Non-impulsive behaviors and preferences are included in this assessment as well, in order to account for reverse scored items. (Patton, Stanford & Barratt, 1995).

The Mach-IV inventory is a self-report assessment designed to measure Machivellianism. Refer to Appendix C for a full version of this assessment. The assessment consists of 20 items rated on a 5-point Likert scale. Ten items refer to Machivellianism and the other 10 refer to non-Machivellianism for reversed scored items. The 5-point Likert scale ranges in responses from 1 - Strongly disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, and 5 - Strongly Agree. The assessment is divided into three subscales, Tactics, Morality, and Views, for further assessment. Scoring is based upon the mean score of the 20 items, after reverse scoring is implemented. The Mach-IV inventory has been determined to have a strong measure of external validity, as it matches well to the constructs to the theories suggested by Machivellian theory. The Mach-IV is thought to be the most reliable measure out of the multiple versions of the Mach inventory (Lee et al., 1974).

The Shiplet Institute of Living Scale (SILS) will be used as a pre-assessment measure of mental impairment. This assessment contains 60 items divided into 2 sub-scales; Vocabulary and Abstract Thinking (Zachary, 1986).

General Procedure

Participants will engage with and complete the Game and Train intervention for 6 weeks. Participants in the experimental condition will complete three trainings - Empathy Training, Response Modulation Training and Manipulation Training. Each training will include various sub-tasks, and each sub-task will have various levels or conditions. The Empathy Training will include the Emotion Recognition Task - ERT (Level 1 and Level 2), the Simple Scenario Task - SST (Level 1 and Level 2) and the Social Judgement Task - SJT (Level 1 and Level 2). The Response Modulation Training will include the Reversal Learning Task, the Divided Visual Field Task (Relative Focused Attention Condition and Equally Divided Attention Condition) and the Affective Gaze Task. The Manipulation Training will include the Part I Task and the Part II Task. Participants in the control condition will engage with and complete analogous trainings that will be administered along the same time line as the experimental trainings. The control tasks for the Empathy Training will include the Gender Identification Task (Level 1 and Level 2), the Reading Comprehension Task (Level 1 and Level 2) and the Memory Task (Level 1 and Level 2). The control tasks for the Response Modulation Training will be identical to the experimental group, in order to compare outcomes with the Baskin-Sommers, Curtin and Newman study. The control task for the Manipulation Training will include Adventure Sporting Games Level 1, Level 2 and Level 3. Figure 1 displays the experimental condition intervention schedule for Game and Train over 6 weeks. Figure 2 displays the control condition intervention schedule for Game and Train over 6 weeks. Text in blue indicate Empathy Training Tasks (or its comparable control tasks), text in green indicate Response Modulation Training Tasks and text in orange indicate Manipulation Training Tasks (or its comparable control tasks).

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Week 1	AM: ERT-1, MAN-1 RM TRAINING PM: ERT-1, MAN-1	AM: ERT-1, MAN-1 DVF CONDITIONS PM: ERT-1, MAN-1	AM: ERT-1, MAN-1 PM: ERT-1, MAN-1	AM: ERT-1, MAN-1 PM: ERT-1, MAN-1	AM: ERT-1, MAN-1 PM: ERT-1, MAN-1	AM: ERT-1, MAN-1 PM: ERT-1, MAN-1	AM: ERT-1, MAN-1 PM: ERT-1, MAN-1
Week 2	AM: ERT-2, MAN-1 RM TRAINING PM: ERT-2, MAN-1	AM: ERT-2, MAN-1 DVF CONDITIONS PM: ERT-2, MAN-1	AM: ERT-2, MAN-1 PM: ERT-2, MAN-1	AM: ERT-2, MAN-1 PM: ERT-2, MAN-1	AM: ERT-2, MAN-1 PM: ERT-2, MAN-1	AM: ERT-2, MAN-1 PM: ERT-2, MAN-1	AM: ERT-2, MAN-1 PM: ERT-2, MAN-1
Week 3	AM: SST-1, MAN-1 RM TRAINING PM: SST-1, MAN-1	AM: SST-1, MAN-1 DVF CONDITIONS PM: SST-1, MAN-1	AM: SST-1, MAN-1 PM: SST-1, MAN-1	AM: SST-1, MAN-1 PM: SST-1, MAN-1	AM: SST-1, MAN-1 PM: SST-1, MAN-1	AM: SST-1, MAN-1 PM: SST-1, MAN-1	AM: SST-1, MAN-1 PM: SST-1, MAN-1
Week 4	AM: SST-2, MAN-2 RM TRAINING PM: SST-2, MAN-2	AM: SST-2, MAN-2 DVF CONDITIONS PM: SST-2, MAN-2	AM: SST-2, MAN-2 PM: SST-2, MAN-2	AM: SST-2, MAN-2 PM: SST-2, MAN-2	AM: SST-2, MAN-2 PM: SST-2, MAN-2	AM: SST-2, MAN-2 PM: SST-2, MAN-2	AM: SST-2, MAN-2 PM: SST-2, MAN-2
Week 5	AM: SJT-1, MAN-2 RM TRAINING PM: SJT-1, MAN-2	AM: SJT-1, MAN-2 DVF CONDITIONS PM: SJT-1, MAN-2	AM: SJT-1, MAN-2 PM: SJT-1, MAN-2	AM: SJT-1, MAN-2 PM: SJT-1, MAN-2	AM: SJT-1, MAN-2 PM: SJT-1, MAN-2	AM: SJT-1, MAN-2 PM: SJT-1, MAN-2	AM: SJT-1, MAN-2 PM: SJT-1, MAN-2
Week 6	AM: SJT-2, MAN-2 RM TRAINING PM: SJT-2, MAN-2	AM: SJT-2, MAN-2 DVF CONDITIONS PM: SJT-2, MAN-2	AM: SJT-2, MAN-2 PM: SJT-2, MAN-2	AM: SJT-2, MAN-2 PM: SJT-2, MAN-2	AM: SJT-2, MAN-2 PM: SJT-2, MAN-2	AM: SJT-2, MAN-2 PM: SJT-2, MAN-2	AM: SJT-2, MAN-2 PM: SJT-2, MAN-2

Figure 1. Experimental condition intervention schedule for Game and Train

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Week 1	AM: GIT-1, ASG-1 RM TRAINING PM: GIT-1, ASG-1	AM: GIT-1, ASG-1 DVF CONDITIONS PM: GIT-1, ASG-1	AM: GIT-1, ASG-1 PM: GIT-1, ASG-1	AM: GIT-1, ASG-1 PM: GIT-1, ASG-1	AM: GIT-1, ASG-1 PM: GIT-1, ASG-1	AM: GIT-1, ASG-1 PM: GIT-1, ASG-1	AM: GIT-1, ASG-1 PM: GIT-1, ASG-1
Week 2	AM: GIT-2, ASG-1 RM TRAINING PM: GIT-2, ASG-1	AM: GIT-2, ASG-1 DVF CONDITIONS PM: GIT-2, ASG-1	AM: GIT-2, ASG-1 PM: GIT-2, ASG-1	AM: GIT-2, ASG-1 PM: GIT-2, ASG-1	AM: GIT-2, ASG-1 PM: GIT-2, ASG-1	AM: GIT-2, ASG-1 PM: GIT-2, ASG-1	AM: GIT-2, ASG-1 PM: GIT-2, ASG-1
Week 3	AM: RC-1, ASG-2 RM TRAINING PM: RC-1, ASG-2	AM: RC-1, ASG-2 DVF CONDITIONS PM: RC-1, ASG-2	AM: RC-1, ASG-2 PM: RC-1, ASG-2	AM: RC-1, ASG-2 PM: RC-1, ASG-2	AM: RC-1, ASG-2 PM: RC-1, ASG-2	AM: RC-1, ASG-2 PM: RC-1, ASG-2	AM: RC-1, ASG-2 PM: RC-1, ASG-2
Week 4	AM: RC-2, ASG-2 RM TRAINING PM: RC-2, ASG-2	AM: RC-2, ASG-2 DVF CONDITIONS PM: RC-2, ASG-2	AM: RC-2, ASG-2 PM: RC-2, ASG-2	AM: RC-2, ASG-2 PM: RC-2, ASG-2	AM: RC-2, ASG-2 PM: RC-2, ASG-2	AM: RC-2, ASG-2 PM: RC-2, ASG-2	AM: RC-2, ASG-2 PM: RC-2, ASG-2
Week 5	AM: MT-1, ASG-3 RM TRAINING PM: MT-1, ASG-3	AM: MT-1, ASG-3 DVF CONDITIONS PM: MT-1, ASG-3	AM: MT-1, ASG-3 PM: MT-1, ASG-3	AM: MT-1, ASG-3 PM: MT-1, ASG-3	AM: MT-1, ASG-3 PM: MT-1, ASG-3	AM: MT-1, ASG-3 PM: MT-1, ASG-3	AM: MT-1, ASG-3 PM: MT-1, ASG-3
Week 6	AM: MT-2, ASG-3 RM TRAINING PM: MT-2, ASG-3	AM: MT-2, ASG-3 DVF CONDITIONS PM: MT-2, ASG-3	AM: MT-2, ASG-3 PM: MT-2, ASG-3	AM: MT-2, ASG-3 PM: MT-2, ASG-3	AM: MT-2, ASG-3 PM: MT-2, ASG-3	AM: MT-2, ASG-3 PM: MT-2, ASG-3	AM: MT-2, ASG-3 PM: MT-2, ASG-3

Figure 2. Control condition intervention schedule for Game and Train

Experimental Point System

Responses will be recorded for each of the three training tasks. Feedback will be given for both correct and incorrect responses throughout the training; “Good Job!”, “Keep it Up!” for correct responses and “Incorrect”, “Try Again” for incorrect responses. All feedback screens will be displayed on blue background with black text. Points will be rewarded for correct answers (1 point increase) and deducted for incorrect answers (-1 point decrease) throughout the training. Following the completion of each AM and PM daily sessions, a final score will be calculated and revealed to the participant. At the end of a two-week period, once each of the three training tasks is completed in full, the participant will be given an overall task score based upon their achievements or deductions throughout the training. This score will be used in the final data analysis, and will ultimately be compared to pre and post assessment scores once the training is completed in full.

Experimental Method

Empathy training.

Empathy training overview.

Participants will begin the Empathy Training once they have completed the digital version of the IRI. Those in the experimental condition will engage with and complete three tasks; the Emotion Recognition Task, the Simple Scenario Task, and the Social Judgment Task. Each of the three empathy game-based tasks will be given a 2-week allotment for completion and will be required to be completed twice per day (AM and PM) in approximately 15 minute sessions. Once one task is completed in full over two weeks, the following task will commence. Each of the three tasks will have two levels of difficulty (Level 1 and Level 2). Each level of difficulty will last for 1 week.

Emotion recognition task (ERT).*Stimuli.*

The Emotion Recognition Task will use color photographs taken of eight individuals (4 males, 4 females) each displaying five emotions from a frontal view. The emotions displayed will be happiness, sadness, anger, fear and disgust. Each of the five emotion expressions, either male or female, will be presented equally throughout the ERT training and will be randomized. All facial stimuli and response screens will be presented on a gray background. These photos will be taken from the NimStem Face Stimulus Set. For each of the five emotions, a sequence of four photographs will be digitally animated as a GIF in order to display the progression from neutral (0% emotion) to full blown emotion (100% emotion). The GIF will loop itself continuously until the participant has selected one of the five emotions that they believes fits best.

Practice trial.

Each participant in the experimental condition will begin the Emotion Recognition Task by completing five practice trials in order to become familiar with the task. Each practice trial will display one of the five emotion animated GIFs progressing from 0% neutral emotion to the full-blown 100% emotion and will require the participant to select an emotion label that best fits the GIF on the bottom of their screen. This practice trial will only be administered once, prior to the first use of the Emotion Recognition Task. No points will be rewarded or deducted during the practice trial.

Experimental trial.

Following the practice trial, the experimental trial will begin. The experimental trial will increase in difficulty in two stages over the two week period, ERT-Level 1 and ERT-Level 2.

Participants will complete 20 trials in each bi-daily period (AM and PM) for both ERT Level-1 and ERT Level-2. ERT-Level 1 will be administered for the first half of the 2 week training period. ERT-Level 1 will require the participant to identify the emotion of the animation as it progresses from a neutral 0% emotion to a full-blown 100% emotion GIF, as they were required to do in the practice trial. The emotion face displayed will then revert from the 100% emotional expression to the 0% neutral expression. The participant will then be asked to identify which of the five emotion labels best fits the GIF. The GIF will cycle continuously until the participant has made a selection. Figure 3 displays an example screen shot image of ERT-1.



Figure 3. ERT-1. Photo stimuli will be presented as a GIF in Game and Train.

ERT-Level 2 will commence after ERT-Level 1 is completed. ERT-Level 2 will be more difficult and will require the participant to identify the emotion a facial stimuli in either its 0%, 33%, 66% or 100% phase. Initially, the participant will be given two emotion label options to choose from. Over the progression of the week, the task will become increasingly more difficult, and will progress to either three, four or five emotion labels to choose from. Figure 4 displays an example screen shot image of ERT-2. The facial stimuli displayed in this example is in its 66% phase.

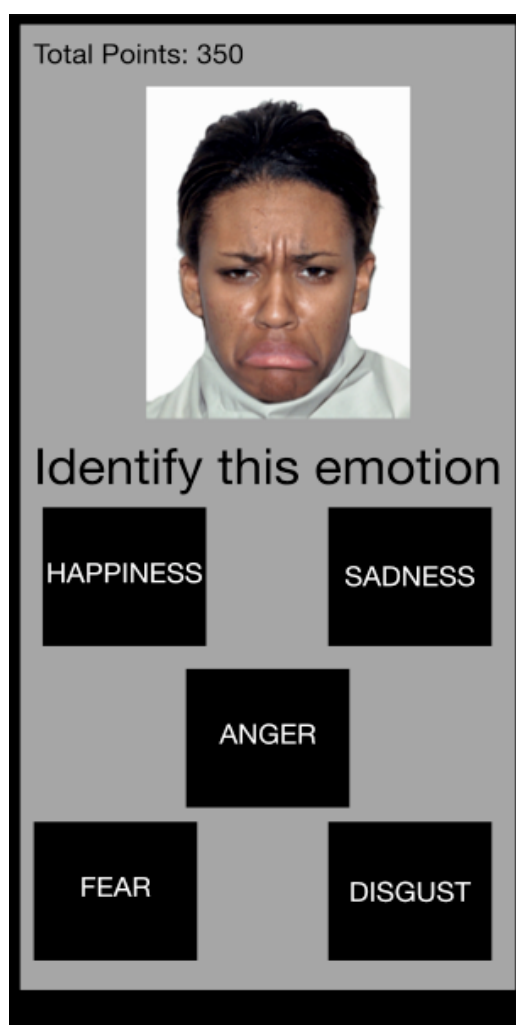


Figure 4. ERT-2. Photo stimuli is presented in 66% phase, expressing sadness.

Simple scenario task (SST).*Stimuli.*

The Simple Scenario Task will use color photographs from the same NimStim Face Stimulus Set of eight new individuals (4 males, 4 females) displaying the same five emotions used in the ERT from a frontal view. All facial stimuli and response screens will be presented on a gray background. Each of the photographs will only display the full blown emotion (100%).

Practice Trial.

Each participant will be asked to complete five practice trials in order to become familiar with the task. This practice trial will only be administered once, prior to the first use of Simple Scenario Task. Each practice trial will require the participant to read a scenario and then choose one of the five labeled emotion stimuli photos that they believe is the most appropriate emotional response to the circumstance. For example, the scenario would read: “Lucy received an A on her biology final. Which face would best fit Lucy’s mood?” Correct answer: Happiness. No points will be rewarded or deducted during the practice trial.

Experimental Trial.

The SST will increase in difficulty over the two week training period, SST Level-1 and SST Level-2. The participant will complete 20 trials in each bi daily period (AM and PM). SST Level-1 will require the participant to read scenarios, and then choose one of the five labeled emotion stimuli photos that they believe is the most appropriate emotional response to the circumstance. Scenarios displayed during SST Level-1 will have a lower rating of difficulty. For example, “Trevor lost his favorite book. Which face would best fit Trevor’s mood?” Correct answer: Sadness. Figure 5 displays a screen shot image of SST-1.



Figure 5. SST-1. Photo stimuli are labeled. Correct answer is happiness.

Scenarios displayed during SST Level-2 will have a higher rating of difficulty as the photographs will not be labeled. Each of the five emotion expressions, either male or female, will be presented equally and will be randomized.

Social judgment task (SJT).*Stimuli.*

The Social Judgment Task will use the same emotional stimulus words (happiness, sadness, anger, fear, disgust) presented in both the ERT and SST, but color photographs will not be used. All scenario and response screens will be presented on a gray background.

Practice Trial.

Participants will complete four practice trials in order to become familiar with the task. This practice trial will only be administered once, prior to the first use of the Social Judgment Task. The practice trial will require the participant to read four different scenarios of two individuals interacting (2 first person perspective scenarios, 2 third person perspective scenarios) and then choose one of the five emotion labels that they believe is the most appropriate emotional response to the circumstance.

Experimental Trial.

The SJT will increase in difficulty over the 2 week training period, SJT Level-1 and SJT Level-2. The participant will complete 20 trials in each bi-daily period (AM and PM). SJT-1 will require the participant to read scenarios, either first person perspective scenarios or third person perspective scenarios, and then choose one of the five emotion stimuli labels that they believe is the most appropriate emotional response to the circumstance. The scenario type (first or third person perspective) and genders of the characters involved will be presented equally throughout the task and in random order. The first person perspective scenarios will include the participant in the interaction. For example, the participant will read: "You lost your headphones. Your friend Matt left his pair on the table and you decide to take them without asking. How would you expect Matt to react?" Correct answer: Anger. The third person perspective scenarios will

require the participant to put themselves in the character's perspective. For example, the participant will read: "Ray hit his girlfriend Jen because she ruined his favorite shirt in the laundry. How would you expect Jen to react?" Correct answer: Fear. Figure 6 displays an example screen shot of SJT-1 third person perspective scenario.

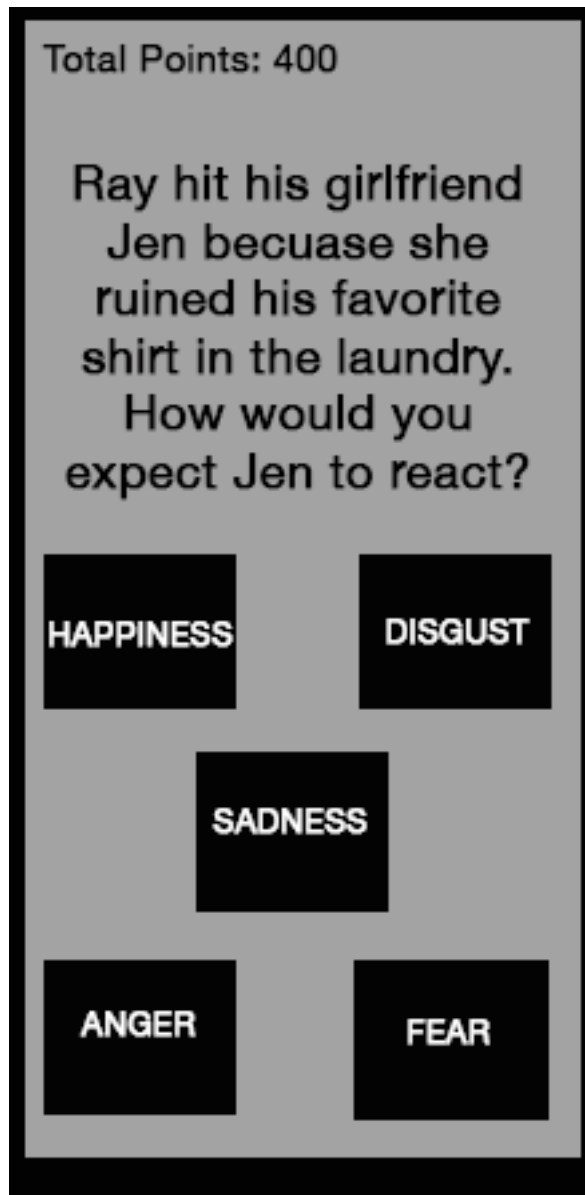


Figure 6. SJT-1. Third person scenario. Correct answer is fear.

The scenarios will increase in difficulty during SJT Level-2. An example of a difficult scenario in SJT Level-2 will read: “You decided to blackmail your co-worker, Sam, in order to have them fired. How would you expect Sam to react?” Correct answer: Anger.

Response modulation training.

Response modulation training overview.

Participants in both the experimental and control conditions will engage with and complete three computerized cognitive remediation training tasks taken from Baskin-Sommers, Curtin and Newman’s 2014 treatment approach: Reversal Learning (Budhani, Richell & Blair, 2006), Divided Visual Field (Kosson, 1998; Llanes & Kosson, 2006), and Affective Gaze (Baskin-Sommers & Newman, 2014), over the course of the 6 week training period. All tasks will replicate the procedure of their original study with minor variations in order to satisfy proposed study’s design and parameters. These tasks were designed to address the psychopathic attention to context (ATC) deficit. The implementation of this training will attempt to teach psychopaths how to attend to context, notice important interpersonal and situational cues and notice changes in their environment (Baskin-Sommers, Curtin & Newman, 2015). The Reversal Learning task, the single baseline task of the Divided Visual Field task, and the Affective Gaze task will all be administered once per week for 6 weeks in a one-hour session. The two dual block conditions of the Divided Visual Field task will be administered once per week for 6 weeks as well; however, it will be administered on the day following the other Response Modulation Trainings.

Points will be rewarded and deducted throughout the training in order to calculate a final RM Training score. Two points will be rewarded for correct responses and two points will be deducted for incorrect responses for all of the training tasks. All participants will begin their training with 0 points. Total points will be calculated throughout the 6-week training period and

will be displayed at the top of each screen. Trials will be self-paced.

Reversal learning task.

Stimuli.

The stimuli will be comprised of 12 line drawings of animals taken from Snodgrass & Vanderwart's 1980 battery of images. Each of the animals will be shaded in a different color. The stimuli will be presented on a gray background. The stimuli will be randomly assigned into pairs at the beginning of each weekly task-training period and will remain the same until the weekly task is completed. The order of the test pair presentation will be randomized.

Experimental Trial.

The participant will be given a set of instructions prior to their weekly completion of the Reversal Learning Task. This will appear on their mobile device screen and will read:

Pairs of animals will appear on the screen. On each go you have to choose one of these animals and the application will tell you if your choice was correct or incorrect. If it is correct you will win 100 points. If it is incorrect you will lose 100 points. Each animal will sometimes be correct and sometimes be incorrect, but one of the animals will tend to be correct more often than the other animal in the pair. Find out which animals is usually correct, and choose that animal every time. Stick with it even if it is occasionally wrong. At some point it may change so that the other animal is usually correct, in which case you should choose that one every time.

At the beginning of each trial, a pair of stimuli will appear on the screen. The participant will be asked to choose one of the stimuli by touch selecting it on their mobile device. Once one of the stimuli is chosen, they will receive either positive feedback ("You win 100 points") or negative feedback ("You lose 100 points"). The feedback that they receive will be based upon the reinforcement contingency of that given pair. One of the animals in each pair will always be

more likely than the other to be rewarded rather than punished. There will be 6 different pairs of stimuli: two test pairs (reversing pairs) that will change their contingency and four “dummy” pairs that will not change their contingency. The two reversing pairs will have contingencies of 100-0 and 80-20. For example, the correct stimulus in an 80-20 pair will be rewarded on 8 out of every 10 trials and punished 2 out of every 10 trials. The incorrect stimulus will be punished on 8 out of every 10 trials and rewarded on 2 out of every 10 trials. The reinforcement contingency of the reversing pairs will remain constant for 40 trials. After completion of 40 trials, the contingency of the reversing pairs will be switched; the correct stimulus will become the incorrect stimulus and the incorrect stimulus will become the correct stimulus. Three of the four dummy pairs will have the contingency of 100-0, and the fourth will have the contingency of 80-20. The contingency of the dummy pairs will remain constant for the entire 40 trials that they will be presented for.

In line with the 2006 study, the reinforcement contingencies will be based upon chance and variation; the “correct” stimulus in each pair will not always be rewarded and the “incorrect” stimulus in each pair will not always be punished. The “correct” stimulus in each pair will always have a greater ratio of reward-punishment.

The participants will be given experience with the two different pairs of stimuli at various phases during each weekly training period. One of the pairs will always be a test pair in which the contingencies are reversed. The other will be a dummy pair in which the contingencies will not be reversed. The participant will receive a test pair on 66% of the trials and will receive a dummy pair on 33% of the trials, in order for it to be more difficult to predict the contingency patterns. All participants will receive 270 trials per weekly training. Figure 7 displays an example screen shot of the Reversal Learning Task.

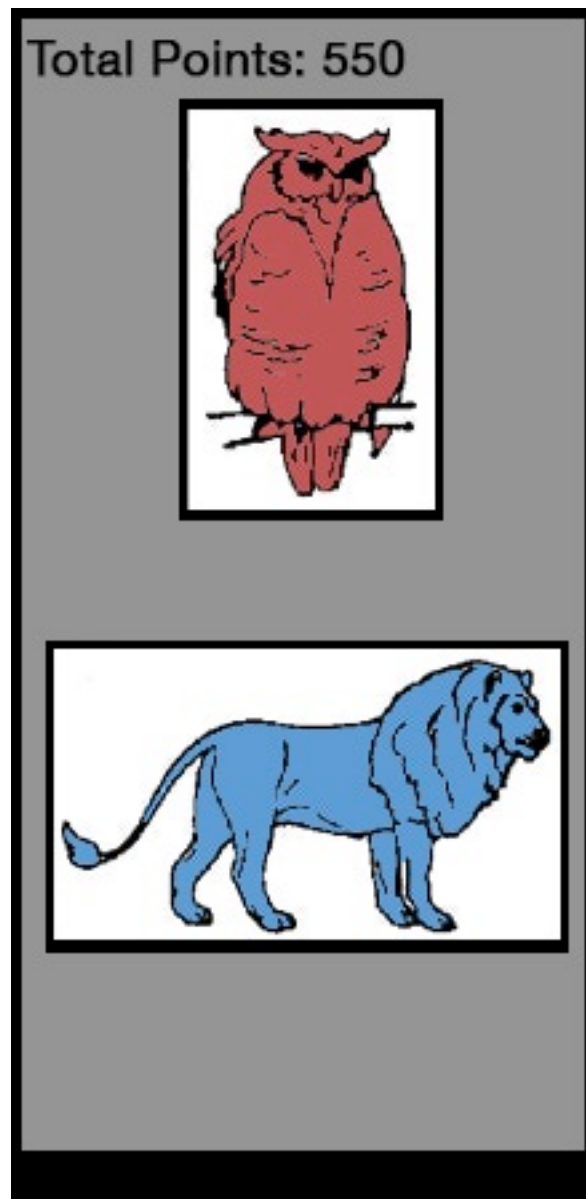


Figure 7. Reversal learning task. Photo stimuli will be able to be touch selected on the participants mobile device.

Divided visual field task.*Stimuli.*

Each stimulus will consist of a string of eight symbols arranged in a horizontal line on either the top half or the bottom half of the mobile device screen. Half of the stimuli strings will contain all letters or all numbers. The other half of the stimuli strings will contain 6 or 7 symbols from one of these categories (letters or numbers) and one or two of the other. The strings will appear in green or yellow. Green strings represent target stimuli. Yellow strings represent distractor stimuli. Using button icons available at the very bottom of the mobile interface, participants will be asked to classify all of the targets in green into one of the three categories (i.e., letters, numbers, or letters and numbers) and to ignore the distractors in yellow. Responses recorded under 40 ms and over 3040 ms will be ignored.

This task will encourage the participant to use speed and accuracy when completing this task. Participants will have the opportunity to earn one to three points per correct target classification, depending on their response speed. Participants will lose one point for errors and responses to distractors.

Experimental Trial.

Participants will begin the Divided Visual Field Task training by completing the single baseline task of 96 trials with one stimulus per trial, displayed for 350 ms. Following, two dual blocks of 144 trials each with two stimuli per trial, displayed between 250 ms and 500 ms varying equiprobably in this within-subjects design, will be administered on the following day of the weekly Response Modulation Training.

The two dual block tasks will include 2 conditions; The Relative Focused Attention condition and the Equally Divided Attention condition. Participants will respond to the target

stimuli by touch selecting one of three button options displayed on the top and bottom of the mobile device screen labeled all letters, all numbers, mixed. In the Relative Focused Attention (RFA) condition, approximately 67% of the strings on one half of the screen (either top or bottom) will be targets, compared with 36% of the strings on the other half of the screen (either top or bottom). The stimulus set consisting of 67% targets will be considered the participant's primary task, and the stimulus set consisting of 36% targets, their secondary task.

Relative focused attention condition (RFA).

Each trial block in the RFA condition will contain 96 primary task targets, 48 primary task distractors, 52 secondary task targets, and 92 secondary task distractors. Half of the participants will complete the primary task using the top screen buttons and the secondary task using the bottom screen buttons. The other half of the participants will complete the RFA tasks with the opposite buttons (top or bottom). The single task will be completed with the buttons (top or bottom) that classified the primary task stimuli. This procedural component is meant to use any residual effects of the single-task practice in order to strengthen the focusing manipulation.

Equally divided attention condition (EDA).

In the Equally Divided Attention (EDA) condition, 50% (72) targets and 50% (72) distractors will appear in either the top or the bottom half of the screen. The EDA condition will be referred to as task one and task two, as the two stimulus sets are equivalent. For the task one stimulus set, half of the participants will be randomly assigned to the top half response and the other half will be randomly assigned to the bottom half response. The task two visual set will be presented in the opposite half response. For both conditions, the targets will still appear in green and the distractors will still appear in yellow. Figure 8 displays the figure for the sample sequence of events from Kosson's original method (1998). Figure 9 displays an example screen

shot of the Divided Visual Field Task.

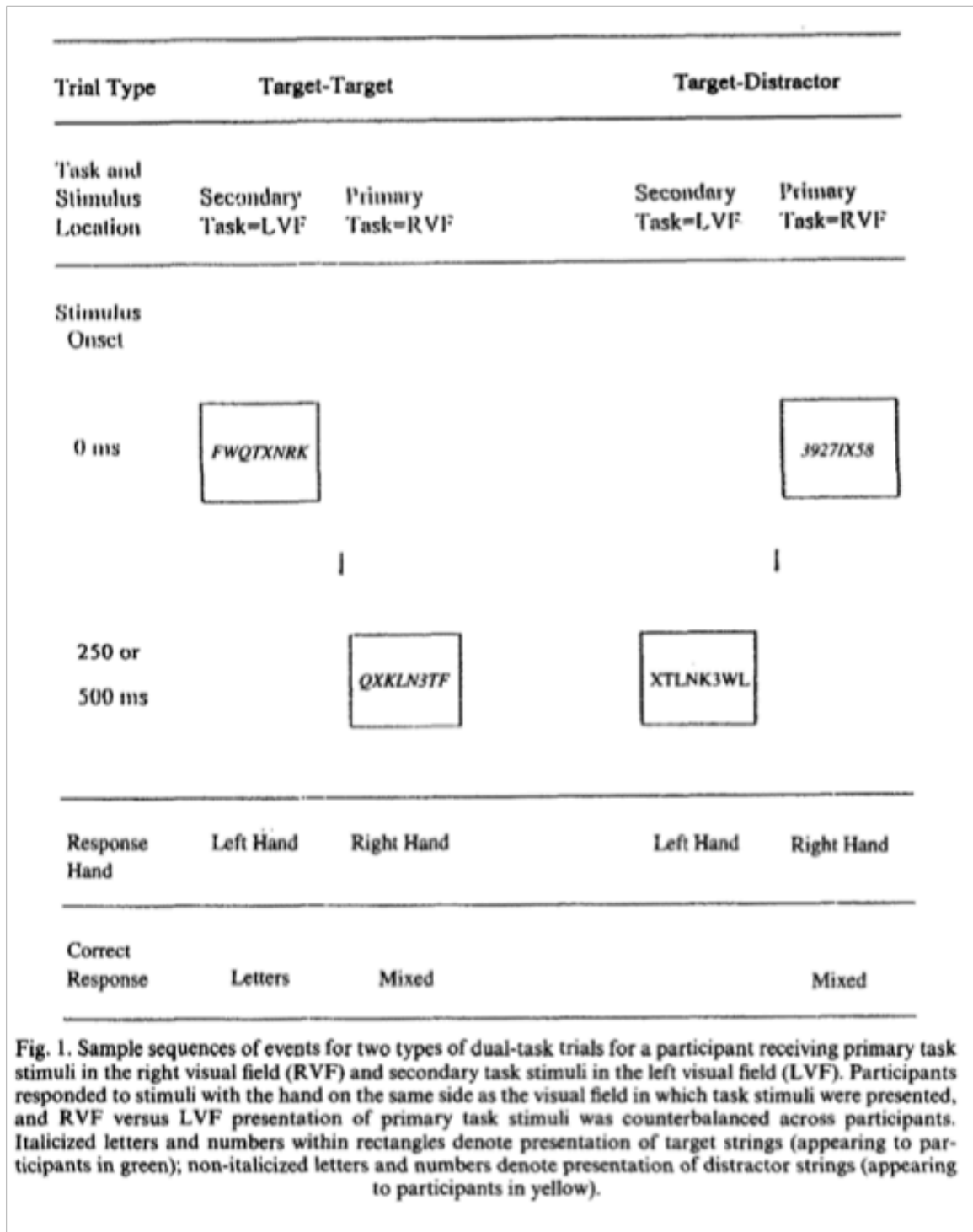


Figure 8. Taken from (Kosson, 1998). Disregard RVF and LVF. In the proposed study, RVF refers to “top half of screen” and LVF refers to “bottom half of screen”.



Figure 9. Divided visual field task.

Skier game: As a motivating and rewarding element, participants will be given the opportunity to play a downhill skier video game whenever they earn a predetermined number of points. The skier game will interrupt the visual task, and will be played for rewarding points that will be added to their total RM Training score. In this game, the participant will tilt their mobile device in order to alter the direction in which a “skier” progresses down a “ski slope”. They will avoid “trees” on the slope and “barriers” at each side of the slope. Extra points will be rewarded by skiing through and into various reward objects that appear on the slope i.e. snowmen, soda cans, etc. Crashes will result in the loss of one point, and successful navigation and completion of the slope will earn three points.

*Affective gaze task.**Stimuli.*

The stimuli used in this task will comprise of 32 pictures created from the Ekman Pictures of Facial Affect (Ekman, 1993). These pictures will be black and white photographs of a female and a male model displaying 4 expressions - happy, angry, fear, neutral - with 2 directions of eye-gaze - right, left. All pictures will be cropped to display the face in frontal view and will exclude the neck and haircut of the model. All stimuli will be presented on a gray background of the mobile device screen.

32 practice trials and 384 experimental trials will be administered during each weekly training period. Each picture type (four emotions, two genders, two gaze directions) will be displayed an equal number of times - once during practice sessions and twelve times each during experimental trials.

Practice trial.

Participants will complete a practice trial before each weekly Affective Gaze training period. The participant will be shown standard slides of happy, angry, fearful and neutral faces and subsequently will be asked to identify the emotion.

Experimental trial.

Each experimental trial will begin with a fixation cross that will be presented for 200 ms. The stimulus, the face looking either left or right, will then be presented for 1600 ms or until a response is registered. All trials will be separated by a 1500 ms inter-stimulus interval.

Two types of intermixed trials (gaze-congruent and gaze-incongruent) will be used in this task. Gaze-congruent trials will require the participant to indicate if the eyes are looking left or looking right by touching either “LEFT” or “RIGHT” in a two button response box displayed on

the bottom of the mobile device screen. These trials will occur 75% of the time in order to establish the dominant response.

In the gaze-incongruent trials, one of three affective faces (happy, fear, angry) will be selected as the target facial affect which will signify a change in response demands. When the target affect is present, the participant will be instructed to press the button that is opposite to the displayed eye gaze. These trials will establish the affective set and represent the 25% of the trials. The target emotion will change throughout the course of each weekly training period. Each participant will engage with each of the three affective faces as the target face multiple times. All participants will be informed of their relevant emotion (target face) each time the application is opened weekly, and will be selected randomly.

Manipulation training.

Manipulation training overview.

Participants in the experimental condition will engage with and complete a series of simple adventurous sporting games (mini games) in two levels. The Manipulation Training Task Part 1 and Part 2 will be required to be completed twice daily, AM and PM, for 15 minute sessions each.

Manipulation training: part one.

Overview.

Level 1 will be administered for the first three weeks of the 6 week training period. The participant will complete the series of games with an another gamer. The participant and the gamer will be encouraged to work with each other cooperatively via the directions given throughout the game. The directions given for the games will encourage the use of cooperative techniques in order for both the participant and the avatar to successfully complete each game.

The participant will assume that the gamer is another human, yet it is actually a computer simulated avatar that will respond to the participants actions and behaviors. The avatar will take full physical form on the screen and will interact with the participant via the game interface. The participant and the avatar will engage in interactions via “live chatting” in the game. The avatar will consistently communicate cooperative strategies to the participant. Throughout the gaming experience, both the participant and the avatar will participate in variations of the Prisoner’s Dilemma Game and the \$10 Trust Game. Both experimental games will be administered repeated times and at random occasions throughout Level 1 of the training.

Manipulation training: part two.

Overview.

Level 2 will be administered for the last three weeks of the 6 week training period. The participant will continue to play the mini games, however, they will be playing with multiple gamers instead of the Level 1 avatar. The participant will only play with one gamer at a time and will only get to play with each gamer for the span of one bi-daily period. Interactions will be limited between the participant and the anonymous gamer; there will be no “live chat” feature in this level of the training. The directions will still encourage the participant to work with the other gamer cooperatively. Throughout the gaming experience as with Level 1, the participant and the various gamers will participate in variations of the Prisoner’s Dilemma Game and the \$10 Trust Game. Once again, both games will be administered repeatedly and at random occasions throughout Level 2 of the training.

The choice to use a consistently present avatar in Level 1 and multiple, less interactive gamers in Level 2 will hopefully train the participant to act cooperatively in various circumstances. The participant will be able to develop a digital relationship with the Level 1

avatar; they will interact for a 3 week span and will be able to communicate directly using the “live chat” feature. The participant will not be able to develop the same relationship with the Level 2 gamers, however, they will still be instructed to work cooperatively.

Point system.

Participants will be rewarded with points when they use cooperative techniques and be deducted points when they use manipulative techniques throughout the gaming experience. The use of cooperative techniques will include successfully navigating a mini game by following the instructions given, and making cooperative decisions in the experimental games. The use of manipulative techniques will include the participant completing a mini game to their own advantage, and making uncooperative decisions in the experimental games. Points will always be rewarded and deducted after the completion of each mini game and each experimental game. Throughout the training, points will be able to be cashed out for use at commissary. The participant’s and the other gamers’ running total of points will always be recorded on top of each screen throughout the training.

Mini games.

The mini games will be completed in both Level 1 and Level 2. The participant will complete these games with the avatar in Level 1 and with various gamers in Level 2. There will be four mini games used in the Manipulation Training and will be randomly, yet equally, cycled throughout the course of the 6 week training. The four mini games will be divided into two categories: 2 Role Playing Games and 2 Incentive Games. The Role Playing Games will have two roles, Player 1 and Player 2, that will be randomly predetermined before each game begins. The participant will have the opportunity to play as Player 1 and Player 2 throughout the course of the Manipulation Training. In the Role Playing Games, Player 1 will be the target player.

Their cooperative or uncooperative behaviors will affect Player 2's outcome. The Level 1 avatar and the Level 2 gamers will always act cooperatively as Player 1 in the Role Playing Games. If successfully completed, Player 1 and Player 2 will both be rewarded 100 points to their total score. If Player 1 does not act cooperatively, leading to Player 2's removal from the mini game, Player 1 does not gain any additional points, and Player 2 will have 100 points deducted from their total score. In the Incentive Games, both players are instructed to navigate themselves independently of each other, but are still instructed to work towards the mutually beneficial outcome of successfully completing the game together. The Incentive Games will be designed to include various incentives. If a player chooses to take the incentive, they will see a gain in their total number of points, but will affect the other player consequentially. The Level 1 avatar and the Level 2 gamers will always act cooperatively and will not take the incentives in the Incentive Games. If successfully completed, Player 1 and Player 2 will both be rewarded 100 points to their total score. If the participant does not act cooperatively and takes the incentives for their own personal gain, Player 2 loses the game and has 100 points deducted from their total score. Player 1 will not gain any additional points, besides the bonus incentive points that they gained while playing the game.

A list of the various types of mini games with their directions are as follows:

- Kayaking game - Role Playing:

Both players will kayak down the river in order to reach the campsite. The river is filled with logs that need to be cleared out of the way. Player 1's task will be to clear the logs out of the way in order for Player 2 to successfully navigate down the river. Player 1 will drop their kayak in first and will be given a 10 second head start. Player 1 will drag the logs out of the river by touch selecting

them individually. Only one log may be moved at a time. After the 10 second head start, Player 2 will navigate down the river by avoiding the logs left in their way. Player 2 will tilt their mobile device left and right in order to navigate their kayak. Player 2 will be given 3 strikes; a maximum of 3 times that they can hit a log that is in their way. After 3 strikes, Player 2 will sink and will be unable to reach the finish line. This game will be able to be successfully completed only if both Player 1 and Player 2 reach the finish line.

- Downhill mountain biking game - Incentive:

Both Player 1 and Player 2 must navigate their mountain bikes down the mountain trail. The object of this game will be for Player 1 and Player 2 to match each others speed. The speed of both Player 1 and Player 2 will be recorded at the top of each mobile device. Both players will be given a 3 mph range to stay within; 3 mph higher or lower than the other player. If a player increases their speed above 3 mph higher than the other player, their bike will kick up too much gravel and the other player's tires will begin to flatten. In this case, the faster player should slow their speed down in order to let the other player catch up to them. Both players will be given 3 strikes until their tires are completely out of air. The amount of strikes for both players will be recorded next to the speed. Players will also be given the opportunity to earn bonus points by collecting star coins along the trail. Each player can collect the star coins individually and gain its full amount of bonus points. Each star coin will be worth 50 points. The star coins can also be collected if both players pass the star at exactly the same speed. In this cooperative case, the value of the star coin

will be split between both players.

- Campfire game - Role Playing:

Player 1 and Player 2 must work together to keep their campfire lit. Player 1's task will be to gather the wood from around the campsite. The pieces of wood that can be used will be marked with a blue diamond hovering above it. Player 1 must touch select a piece of wood and drag it to the cart at the bottom right corner of their screen. Once a piece of wood is in the cart, Player 2 can use it to light the campfire. Player 2 will touch select a piece of wood from the cart and drag it to the campfire to keep it burning. One piece of wood will burn for 10 seconds. Another piece of wood added to the fire will keep the fire burning for an additional 10 seconds. A running total of time left until the campfire is completely out will be kept at the top center of the screen. If the fire fails to stay lit, Player 2 will be left in the dark and given a strike. Player 2 can accumulate up to 3 strikes until they are removed from the game. Thus, Player 1 must consistently be gathering wood for Player 2. The game will be successfully completed if the campfire stays lit and both players remain in the game.

- Berry picking game - Incentive:

Both Player 1 and Player 2 must collect berries from the bushes for their collective use. Player 1 and Player 2 will work independently from each other to find as many berries as possible for both of them to eat for a snack. The berries that are safe to eat will be marked with a gold diamond hovering above it. Each player must touch select a berry and drag it to the basket located the the bottom right corner of the screen. Each player also has the option of eating the berries

that they find as they pick them. If a player decides to eat a berry, they will gain an energy, which will be converted to a half point increase to their total running amount of points. In this case, the player will touch select the berry and drag it to the mouth icon at the top left corner of the screen. Each time a player eats a berry, one berry is deducted from the other players basket. Once the sun begins to set (after a 5 minute period of gathering), both players will be cut off from picking berries. In order to successfully complete this game, both players must have at least 20 berries in their individual baskets.

In both Level 1 and Level 2 of the Manipulation Training, the participant must work cooperatively with the simulated gamer in order to successfully complete each mini game. Points will be rewarded equally to both the participant and the simulated gamer for cooperative play. The Manipulation Training will require each player to have a minimum total of 300 points in order to advance to higher levels. If the participant repeatedly betrays or defects the simulated gamer in the experimental games and uses uncooperative techniques in the mini games, resulting in a running total of points lower than 300, the simulated gamer will be denied access to higher levels of the mini games. The participant will be denied access to higher levels as well, as two players are needed to complete the mini games. In this case, the participant will be given the opportunity to cooperatively replay the mini game with the simulated gamer in order to mutually gain points. This aspect of “denied access” will not be revealed to the participant until they happen to reach that outcome. Ultimately, this training will motivate the participant to play cooperatively in both the mini games and the experimental games.

Variation of the prisoner’s dilemma game:

The Prisoner’s Dilemma Game will follow a similar procedure to Lice and Raiffa’s

original 1957 paradigm. However, the setting will satisfy the adventurous sporting scenario. At random points throughout the Level 1 and Level 2 training, the games will be interrupted and the PDG will commence. Both the participant and the other player (either Level 1 avatar or the Level 2 gamers) will be taken into custody at “National Park Security”. They will be informed of a mock scenario in which they both are being convicted for a crime. These crimes will vary for each trial of the PDG and will include: leaving a campfire unattended and starting a forest fire, leaving trash at a campsite, unlicensed hunting, etc. The participant and the other player will not be able to interact during this trial. The participant will be offered a bargain. They can, (A) Betray the other player by testifying against them or (B) Cooperate with the other player and remain silent. If the participant and the other player both betray one another, they will both get a 200 point deduction. If the participant betrays the other player and the other player remains silent, the participant will be sent free without penalty and the player will get a 300 deduction. If the participant and the other player both remain silent, they will both get a 100 point deduction. The participant will always have the opportunity to choose which bargain they would like to take. The simulated opponents (Level 1 avatar and Level 2 gamers) will play the strategy two-tit-for-tats. In this strategy, the computer simulated opponent will always cooperate with the participant until the participant defects twice. Only in this situation, after two defections by the participant, will the simulated opponent defect in retaliation. It has been determined that if one player is playing tit-for-tat, the other is more likely to cooperate (Kuhlmann and Marshello, 1975). Figure 10 displays an example screen shot of The Manipulation Training: Part One after a round of the Prisoner’s Dilemma.

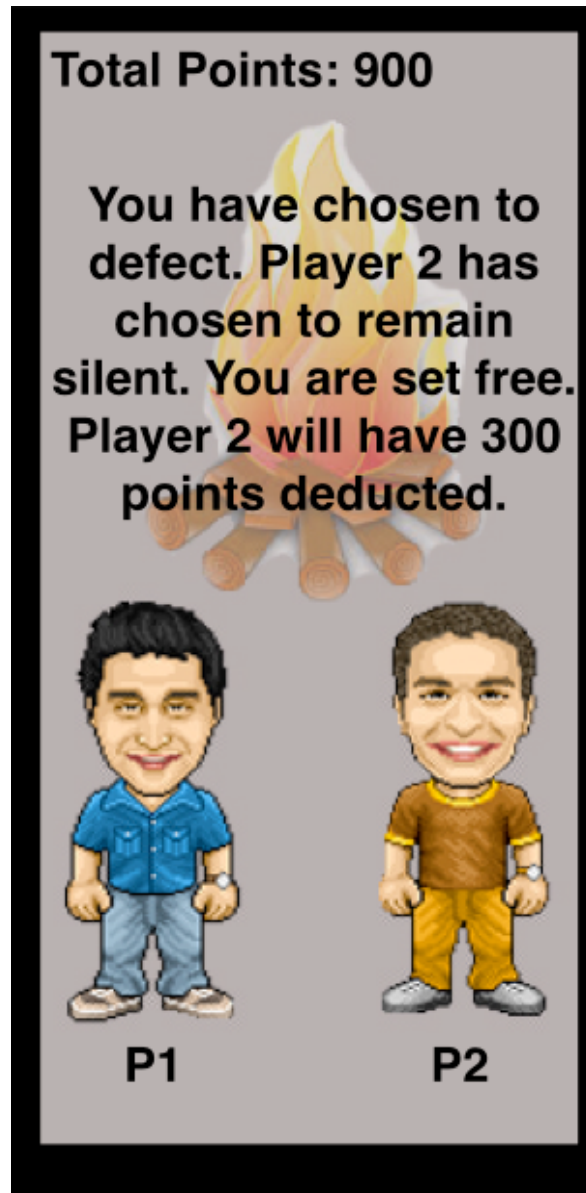


Figure 10. The Manipulation Training: Part One. P1 represents the participant and P2 represents the Level 1 avatar.

Control Method

Overview.

Participants in the control condition will engage with and complete a 6 week training that will follow a similar timeline as the experimental condition. The point system will remain consistent from the experimental tasks.

Control tasks for empathy training.

Overview.

Instead of completing the Empathy Training, participants in the control condition will complete a training that will include three analogous tasks. Each of these three tasks will be administered for two weeks each, following the same schedule as the Empathy Training Tasks.

Gender identification task (level 1 and level 2).

The first task will be a Gender Identification Task that will increase in difficulty in two stages over the two week period, GIT-Level 1 and GIT-Level 2. GIT-Level 1 will be administered for the first week of the two week period. In GIT-1, participants will be asked to identify the gender of an animated GIF progressing from 0%-100%, either male or female. GIT-Level 2 will be administered for the second week of the two week period. In GIT-2, participants will be asked to identify the gender of the photograph in its 0%, 33%, 66% and 100% phase, either male or female. The gendered photographs and morphs will be digitally generated to become more ambiguous. There will be 40 photograph stimuli used. The photographs of the faces will be presented in a frontal view. The faces will not have any facial hair, jewelry or makeup, and will all be draped in a white cloth to cover shoulders and chest areas.

Reading comprehensions task (level 1 and level 2).

Following the Gender Identification Task, participants in the control condition will complete a Reading Comprehension Task that will increase in difficulty in two stages over a two week period, RC-Level 1 and RC-Level 2. RC-1 will be administered for the first week of the two week period. In RC-Level 1, participants will be asked to read emotionally neutral scenarios. Each scenario will be no more than 10 sentences each. The participants will be given 3 minutes to read each scenario. Following the presentation of the scenario, the participants will be asked to answer 2 simple comprehension questions related to the scenario. Participants will be given 4 multiple choice answers for each follow up question. For example, a scenario would read: “Annie went to the grocery store on Thursday. She was preparing for a dinner party that she is planning on hosting on Friday. The dinner party was planned in celebration of her friend Tim’s recent job promotion. She planned to invite seven friends. She bought a full chicken, salad ingredients, mixed fruit and soda. Annie paid for purchase in cash.” An example of the follow up comprehension questions would be “When is Annie planning on hosting her dinner party?” and “What is the dinner party for?”

RC-Level 2 will be administered for the second week of the two week period. In RC-Level 2, participants will read similar emotionally neutral scenarios and answer follow up comprehension questions, however, the scenarios and questions will increase in difficulty as there will be more information. The scenarios will remain the same length, yet the participants will only be given 2 minutes to read each scenario. An example of a more difficult RC-Level 2 scenario would read: “Joey woke up at 7:30 am on Tuesday morning and decided to make himself a cup of coffee. He went to the kitchen and realized that he was out of coffee. Joey decided to have tea instead. He then took a shower in his downstairs bathroom. After his

shower, he fed his dog Rex and took him on a walk. Once Joey got home, he read his local newspaper and ate a banana. He then got dressed for work and left his house at 9:30 am”. An example of the follow up comprehension questions would be: “What was Joey planning on having to drink when he woke up?” and “Did Joey shower first or did he walk his dog?”. The follow up comprehension questions will not be multiple choice in RC-Level 2.

Memory task (level 1 and level 2).

Following the Reading Comprehension Task, participants in the control condition will complete a Memory Task that will increase in difficulty in two stages over a two week period, MT-Level 1 and MT-Level 2. MT-1 will be administered for the first half of the two week period. In MT-Level 1, participants will be asked to memorize 15 neutral words in a 90 second period. The words will be presented in three columns of five words each. After 90 seconds, the words will disappear and the participants will be asked to recall the words they remember and type them out on their mobile device. MT-2 will be administered for the second half of the two week period. In MT-Level 2, participants will be asked to memorize 15 pictures of neutral objects in a 90 second period. The pictures will be presented in three columns of five pictures each. After 90 seconds, the pictures will disappear and the participants will once again be asked to recall the pictures they remember and type out their names on their mobile device.

Control tasks for manipulation training.

Adventure sporting games (level 1, level 2 and level 3).

Participants in the control condition will engage with and complete the adventure sporting games described in the Manipulation Training Task. Control participants will not complete the Prisoner’s Dilemma Game or the \$10 Trust Game. Instead, they will complete a gambling game where they decide whether or not to invest their points with the potential of gains and losses.

This gambling game will be based on randomness, and not cooperation. They will complete the adventure sporting games without a computer simulated companion, and the use of cooperative techniques will not be implemented. The adventure sporting games will be modified to be one player games. The only goal in the control adventure sporting games will be to reach the end point of each mini game. The mini games will increase in difficulty in three, two week levels (over the 6 week training); the courses will be digitally designed to become more difficult over the course of the training.

Control tasks for response modulation training.

Participants in the control condition will engage with and complete the Response Modulation Training Tasks as they are outlined in the experimental condition.

Data Analysis

This study's independent variable is the treatment group that the participants will be divided into. The IV will have two levels (Experimental Condition and Control Condition). This study's dependent variables are the change in score of all diagnostic assessments used; PCL-R, IRI, BIS-11 and Mach-IV. In order to determine the change in score (outcome score) for the pre and post assessments, the BIS-11, Mach-IV and PCL-R will be reverse coded because higher scores in these measures reflect worse outcomes. IRI outcome scores will be the change in score from pre to post assessments because higher scores on this measure reflect better outcomes.

A multivariate analysis of variance (MANOVA) will be used in order to determine if Game and Train can improve psychopathy symptoms, compared to the control condition. The MANOVA will use the change in IRI score, BIS-11 score and the Mach-IV score of all participants in both experimental and control conditions as the outcome measure. The absolute values of the change in score for all three assessments will be used, as each individual measure is

scored differently.

If the overall MANOVA is significant, a separate ANOVA, with group as the independent variable, will be performed on each dependent variable entered in the MANOVA. An analysis of variance (ANOVA) will be used in order to determine if the intervention application can improve scores on the PCL-R, compared to the control condition. The ANOVA will use the mean change in PCL-R score from pre assessment to post assessment of all participants in both experimental and control conditions.

Results

It is hypothesized that the MANOVA will reveal that there is a statistically significant difference in the change of assessment scores based upon the condition that the participants were assigned to. Follow up ANOVAs will indicate a main effect of group on the change of IRI score such that participants in the experimental condition had more successful IRI score changes than those in the control condition. Refer to Figure 11 in Appendix D. A follow up ANOVA will also reveal main effects of groups on change in Mach-IV scores. Refer to Figure 13 in Appendix F. A follow up ANOVA will reveal no main effect of groups on change in BIS-11 scores. Refer to Figure 12 in Appendix E. Participants in the experimental group will show greater improvements in IRI and Mach-IV than control participants. It is also hypothesized that the outcome scores of the PCL-R will correlate highly with each independent variable.

The ANOVA for the PCL-R will determine that there is a statistically significant difference in the mean change of PCL-R score based upon the condition that the participants were assigned to. A significant effect will be expected to be seen of the change on PCL-R scores on the experimental condition; however, there will be no main effect seen of the change on PCL-R scores on the control condition.

Discussion

The proposed study, *Game and Train*, is a response to the inadequate programs that are presently available for the treatment of psychopathic populations. The proposed intervention described the design of an intensive, 6 week behavioral intervention that targets the psychopathic specific traits of empathetic deficiency, difficulties in response modulation and manipulative tendencies. This intervention is designed to be administered in an correctional facility that can be accessed via a “smart” mobile device.

Game and Train has implications that can potentially bring about significant advancements in the clinical treatment of incarcerated populations. The current employment of clinical treatment for psychopathic offenders is limited, and the programs that are available are ineffective (Polaschek & Daly, 2013). Past research has asserted that the treatments available for incarcerated psychopathic populations are too generalized (Polaschek & Daly, 2013). Many of these treatments are focused solely on criminal risk reduction which, in cases, has yielded unsuccessful behavior changes and fails to affect recidivism rates (Polaschek & Daly, 2013). The proposed intervention takes a different approach by targeting specific psychopathic traits. This design has been suggested lead to positive behavioral outcomes for psychopathic populations; thus, it can be hypothesized that the proposed study will yield successful results (Polaschek & Daly, 2013).

Not only does psychological intervention for psychopathic populations in the correctional sector suffer from improper clinical design, the imprisonment and treatment of criminal offenders is extremely expensive. *Game and Train* is almost exclusively accessible via a mobile device. The devices themselves are vastly inexpensive in comparison to the costs of clinical therapy sessions. ‘Smart’ mobile devices have immense storage capacities for data collection,

and possess capabilities that can easily transfer scores and digital activity to other analytical tools for further examination. Of course, as with the use of any technology, there is the potential for there to be technology related glitches and software complications that could lead to insufficient data collection and data loss. In response, it is important to reiterate that the current population has demonstrated severe difficulties with traditional clinical therapy adherence and engagement. The proposed intervention interface is highly controlled, pre-programmed and grants the participants the ability to engage with it independently. Additionally, Baskin-Sommers, Curtin and Newman's recent work has already laid the foundation for success regarding psychopathic intervention via a mobile device. These persuasive advantages outweigh the possibility of technologically induced complications.

The proposed intervention is an intensive program; 6 full weeks of bi-daily training sessions. It will be important to explore the duration of time that the effects of the training last. A longitudinal assessment should be implemented in order to evaluate if the participants continue to show improvement in their scores weeks, months, and years after their participation in the study. Following this assessment, we will be able to make changes to the proposed intervention in order for it to be a reliable training for clinical use; possibly lengthen or shorten its duration as needed or periodically implement a shorter version of the intervention monthly.

It should be noted that an intensive program, such as the proposed study, can only be realistically implemented in a correctional setting. The participants of this study are unsuccessful psychopaths - inmates who are able to be regulated and have plenty of time to complete a series of training tasks for upwards of two hours per day. While this intervention is specifically designed with this institutionalized lifestyle in mind, it is important to note that not all people who exhibit psychopathic traits are institutionalized. A future direction that this

research can take would be to explore ways that this style of intervention could reach those who are not institutionalized but are still in need of the training. As noted before, many “successful” psychopaths rarely seek treatment for themselves as they do not believe that they need to be remedied. This could make this task very difficult, but it is important to explore other ways that this intervention can be made accessible outside of the clinical setting. The employment of gamification in this intervention provides its design with aspects of playfulness and entertainment. Gamification has been suggested to be a successful tool for learning and engagement; gamified systems utilize patterns of behavior management, feedback loops, and reward mechanisms that have the potential to alter the user’s behavior (Patton, Stanford, Barratt, 1995). Additionally, engagement with this application is possible anywhere that the user has access to a mobile device. Creating an online or App Store version of this intervention could possibly facilitate engagement with a wider, un-incarcerated population. Modifying this proposed intervention to be used in clinical work with children diagnosed with conduct disorder may also be a beneficial direction that this work can take. Implementing a trait-specific approach in clinical work with CD children may lessen the possibility of these children acquiring a diagnosis of antisocial personality disorder or psychopathy later in life.

The successful implementation of the *Game and Train* intervention program has the potential to lead psychopathy research to new directions. If, in fact, this intervention program leads to positive, significant changes in psychopathy assessment scores, then psychopathy as a clinical construct will have the potential to be viewed as a treatable disorder. These potential findings will encourage other researchers and clinicians alike to begin thinking about the treatment of psychopathy differently. The importance of this proposed design lies in its ability to target multiple cognitive deficits in order to retrain the individual to behave normatively. Using

interactive computerized game-based tasks with rewarding incentives, as the *Game and Train* design employs, is one possible intervention option. Future research is required to expand the variety of traits that are targeted.

Chapter 4: Conclusion

The aim of the proposed novel intervention, *Game and Train*, is to address the challenges of the treatment of psychopathy. The treatment of psychopathic populations has a difficult history. For decades, the psychopathic population was considered to be untreatable. Currently, there are a limited number of treatments available for psychopathic individuals that yield successful outcomes. The Game and Train intervention addresses the inadequacies of past treatment methods. Game and Train also employs the use of mobile technologies with a gamified approach; an approach that has only begun to be adopted by the clinical community in recent years (Dennis & O'Toole, 2014). Recent research on the importance of mobile technologies has highlighted the suggested benefits of incorporating digital, smart technology into psychological research and clinical intervention (Paredes, Tewari & Canny, 2013). The use of gamification techniques in unconventional, non-game systems has proven to heighten engagement among participants (Baranowski, T., Buday, Thompson, Barasnowski, J., 2008). Psychopathic populations have demonstrated difficulties in participation when subjected to traditional clinical programs, leading to unsuccessful behavioral outcomes (Salekin, 2002). Past research has demonstrated that PCL-R scores are inversely correlated with therapeutic gain (Hughes et al., 1997). Additionally, psychopathic individuals who received high ratings of improvement in a traditional CBT program are still likely to reoffend in particularly violent ways (Seto & Barbaree, 1999). The employment of gamified elements in this proposed intervention is hypothesized to remedy this critical issue in psychopathic intervention. It is important to reflect upon the pivotal aspects of this project in order to understand the meticulous process of developing a successful intervention, and for the benefit of future research.

Past research on the treatment of psychopathic populations clearly demonstrates that

generalized treatments do not yield successful results. Psychopathic individuals exhibit traits that are very problematic in regard to their response to treatment. Additionally, psychopathic individuals deny that they are cognitively deficient. This distorted belief discourages these individuals to engage in treatment. Successful psychopaths (those not incarcerated) are unlikely to ever seek the help of a psychiatrist (as cited by Chivers, 2014). Though unsuccessful psychopaths may be court mandated to participate in a treatment program, their uncooperative personality traits and their unwillingness to engage with the program ultimately leads to unsuccessful outcomes. Past treatment programs have focused on criminal risk reduction (Polaschek & Daly, 2013). These programs focus on the prevention of criminal recidivism and fail to recognize the trait specific defects of this population. Psychopaths innately exhibit many disruptive personality traits that make them difficult subjects for treatment. Several past treatments have failed to recognize the importance of targeting these psychopathic specific traits. If these traits are not properly recognized and effectively incorporated into the treatment, there will not be any successful behavior change. A program that focuses on criminal risk reduction will not encourage change for a criminal who believes that they have done no wrong.

A trait specific approach has been proven to lead to a reduction in psychopathic traits and characteristics (Baskin-Sommers, Curtin & Newman, 2015). Additionally, these trait specific approaches have also lead to a reduction in recidivism among participants. The noted research conducted by Baskin-Sommers, Curtin and Newman is limited in that they only target the psychopathic “attention to context deficit”, otherwise classified as a response modulation deficit (Baskin-Sommers, Curtin & Newman, 2015). The *Game and Train* intervention uses a trait specific approach by targeting psychopathic lack of empathy, difficulties with response modulation and psychopathic manipulative tendencies. This builds on the prior 2015 trait

specific approach, expanding the range of core psychopathic deficits that are targeted. A successful intervention for psychopathic individuals must encompass and target the main features of psychopathy in order to yield any type of behavior change.

Yet, utilizing a trait specific approach alone does not guarantee successful treatment outcomes. As previously stated, high PCL-R scoring psychopaths have been documented to be hostile, evasive, unwilling to change, and verbally combative during therapy sessions. Successful and engaging patient-clinician interactions are built upon trust and respect from both parties. In order for a treatment to yield successful outcomes, the patient must be willing to engage in the treatment. Thus, a traditional clinical approach is not a suitable choice for this challenging population. In response, the current intervention limits patient-clinician interaction by delivering treatment training tasks via a mobile device interface. By using a mobile device as the interface for this intervention, participants are able to engage with the intervention independently. All assessment batteries (excluding the clinical review portion of the PCL-R) will be digitally converted, self-administered and accessible via the mobile device. All training tasks will be completed via the mobile device, as well. As a result, participants will assume a sense of autonomy. They will have the ability to complete the training tasks independently and at their own pace. The application will be pre-programmed to respond to correct and incorrect responses and will record all relevant activity for further review and data analysis. The choice to use a pre-programmed mobile application as the interface for the current intervention prevents the possibility of any unmanageable patient-clinician interactions.

While using a trait specific approach and limiting patient-clinician interactions are two essential aspects of a successful intervention for psychopathic populations, there must be another element that encourages engagement. The proposed intervention, *Game and Train*, will

incorporate gamification as a technique to promote motivation to participate and engage with the treatment. By incorporating gamified elements in the design of the intervention, participants are less likely to feel as if they are participating in a clinical program. Participants will be given consistent feedback on their responses and progress with each use. Feedback responses will give the participant the ability to monitor their progress, heightening their sense of autonomy even further. The current intervention includes three training tasks, each with various levels and challenges. Participants will complete all three training tasks simultaneously over the 6 week training period. The variation of levels and challenges in each training task will keep the participants engaged even further and will add an entertaining element to the intervention. Most importantly, it has been proven that psychopathic individuals are motivated by rewards (Berkout et al., 2013). The current intervention will employ a point system - points will be rewarded for correct responses and successful progress and will be deducted for incorrect responses and inadequate engagement. The participants running total of points will always be visible on screen while the application is in use. Moreover, points can be exchanged for goods at commissary. This rewarding element will encourage participants to deeply engage themselves with the training and will act as a positive reinforcement for appropriate responses.

As previously noted, the treatment and support of an incarcerated offender is extremely costly for the correctional institutions, the tax paying citizens and for the offender himself. Unfortunately, these exorbitantly expensive treatments do not yield successful behavior change or lessen recidivism, as is the institution's goal. There is a significant disregard for the well being of incarcerated individuals in the current approach to treatment of this offender population. The blame for this institutional neglect can be placed on the deinstitutionalization movement of the 1970's, and yet, unimaginably, the issue still persists today. Since 1970, government funding

for the institutionalization of mentally ill individuals has significantly decreased. Psychiatric institutions have closed “due to insurance pressures and a desire to provide more care outside of institutions” (Szabo, 2015). As a result, the amount of patients committed to state psychiatric institutions decreased by 92% between 1955 and 1994 (Boyd, 2014). Following the continuous mass closure of these institutions, mental health policy makers failed to provide appropriate aftercare for these released patients (Torrey et al., 2014). Patients with severe mental illness, who refuse treatment and fail to recognize that they are cognitively deficient, have been critically neglected by this flawed institutional system. Even if these individuals did seek treatment, they are left with very minimal resources and services for their mental health. From 2009 - 2012, states cut \$5 billion in mental health services and eliminated nearly 10% of public psychiatric beds (Szabo, 2015). Subsequently, these severely mentally ill individuals are left to do without the proper care they require. Their untreated deficiencies leads them to commit offenses and be placed in correctional institutions. In 2012, there were an estimated 356,268 inmates with severe mental illness in prisons and jails. In the same year, there were approximately 35,000 patients with severe mental illness in state psychiatric hospitals. Thus, the number of incarcerated mentally ill individuals was 10 times the number remaining in state hospitals. (Torrey et al., 2014). Mentally ill individuals have suffered greatly from their inadequate treatment in correctional facilities. As previously discussed, the treatment programs available do not lead to successful behavioral change. This current system yields a disproportionate rate of recidivism which in turn, leads to increased taxpayer costs for recurring incarceration. The current institutional model for the treatment of individuals with mental illness in prisons and jails has fallen into a harmful cycle that is a result of restricted policy and neglectful approaches.

Psychopathic offenders are a particularly sensitive community to examine in regard to

incarcerated treatment. Their offenses and behaviors are particularly violent and their concern for their own treatment is exceptionally low. The general population has feared the psychopathic population for decades. Past research on the treatment of psychopathic populations has suffered greatly from discouraging outcomes and the general disregard for their livelihood. The recent work conducted by Baskin-Sommers, Curtin and Newman (2015) demonstrates that successful treatment outcomes of psychopathic offenders are feasible with a trait-specific approach (Baskin-Sommers, Curtin, Newman, 2015). The proposed intervention could extend the number of traits targeted for behavior change, which can be hypothesized to lead to even more successful outcomes.

Mental health policy makers must address the ineffective measures that are currently being implemented in correctional institutions nationwide. The current model for intervention in the correctional sector has fallen victim to the flawed approaches that have driven mental health regulation for decades. By adopting the proposed interventions model for treatment, there is the potential for decreased rates of recidivism and crime which would significantly decelerate the cycle of incarceration, thus, leading to an overall decrease in mental health service expenses. The *Game and Train* model, and others similar to it, have the potential to be implemented beyond the correctional sector, as it is easily accessible outside of the clinical setting and offer an engaging alternative to traditional cognitive training. Once the clinical community begins to consider the the use of mobile technologies for intervention and behavior change, a profound transition will transpire, leading to successful outcomes across psychological sectors and a renewed perspective for maintaining optimum mental health.

Works Cited

- Ali, F., Amorim, I. S., & Chamorro-Premuzic, T. (2009). Empathy deficits and trait emotional intelligence in psychopathy and Machiavellianism. *Personality and Individual Differences, 47*, 758-762.
- Baranowski, T., Buday, R., Thompson, D. I., & Baranowski, J. (2008). Playing for real: video games and stories for health-related behavior change. *American journal of preventive medicine, 34*(1), 74-82.
- Baskin-Sommers, A. R., Curtin, J. J., & Newman, J. P. (2015). Altering the Cognitive-Affective Dysfunctions of Psychopathic and Externalizing Offender Subtypes With Cognitive Remediation. *Clinical Psychological Science, 3*(1), 45-57.
- Berkout, O. V., Gross, A. M., & Kellum, K. K. (2013). Behaving badly: A perspective on mechanisms of dysfunction in psychopathy. *Aggression and Violent Behavior, 18*, 620-629.
- Blair, J., Mitchell, D., & Blair, K. (2005). *The Psychopath: Emotion and the Brain*. Malden, MA: Blackwell Publishing.
- Blair, R. J. R., Mitchell, D. G. V., Leonard, A., Budhani, S., Peschardt, K. S., & Newman, C. (2004). Passive avoidance learning in individuals with psychopathy: modulation by reward but not by punishment. *Personality and Individual Differences, 37*(6), 1179-1192.

Bonnington, C. (2012). Report: Over 1 Million Apps Have Been Submitted to iOS App Store. Retrieved from Wired website: <http://www.wired.com/2012/11/report-1-million-apps/>

Boyd, N. (2014). Deinstitutionalization Movement of the 1960s and Other Mental Health Issues.

Buckholtz, Treadway, Cowan, Woodward, Benning, Ansari, . . . Zald. (2010). Mesolimbic Dopamine Reward System Hypersensitivity in Individuals with Psychopathic Traits. *National Neuroscience*, 13(4), 419-421.

Chivers, T. (2014, April 6). Psychopaths: how can you spot one? [Editorial]. Retrieved from The Telegraph website: <http://www.telegraph.co.uk/culture/books/10737827/Psychopaths-how-can-you-spot-one.html>

Christie, R. & Geis, F. (1970) "Studies in Machiavellianism". NY: Academic Press.

Cleckley, H. (1941). *The mask of sanity*. St. Louis, MO: Mosby.

Cleckley, H. (1981). *The mask of sanity* (4th ed.). St. Louis, MO: Mosby.

Coyne, S. M., & Thomas, T. J. (2008). Psychopathy, aggression, and cheating behavior: A test of the Cheater-Hawk hypothesis. *Personality and Individual Differences*, 44, 1105-1115.

Davis, M. (1996). Interpersonal reactivity index. *Empathy: A Social Psychological Approach*, 55-6. [deinstitutionalization-movement-of-the-1960s-and-other-mental-health-issues.html](http://www.deinstitutionalization-movement-of-the-1960s-and-other-mental-health-issues.html)

Deterding, S. (2012). Gamification: designing for motivation. *interactions*, 19(4), 14-17.

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: defining gamification. In *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments* (pp. 9-15). ACM.

Edens, J. F., Marcus, D. K., Lilienfeld, S. O., & Poythress Jr, N. G. (2006). Psychopathic, not psychopath: taxometric evidence for the dimensional structure of psychopathy. *Journal of abnormal psychology*, 115(1), 131.

Fehr, Samson, & Paulhus. (1992). *The Construct of Machiavellianism: Twenty Years Later* (Speilberger & Butcher, Eds.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Feyerabend, P. (1993). *Against method*. Verso.

Forth, A. E., Brown, S. L., Hart, S. D., & Hare, R. D. (1996). The assessment of psychopathy in male and female noncriminals: Reliability and validity. *Personality and Individual Differences*, 20(5), 531-543.

Fras-Navarro, D. (2009). *Davis' Interpersonal Reactivity Index (IRI)*. Manuscript not published. Universidad de Valencia. Spain. (<http://www.uv.es/~friasnav/unidinves.html>)

Gunthorsdottir, A., McCabe, K., & Smith, V. (2002). Using the Machiavellianism instrument to predict trustworthiness in a bargaining game. *Journal of Economic Psychology*, 23(1), 49-66.

- Hare, R. D. (1991). *The psychopathy checklist-revised*. Toronto: Multi-Health Systems, 23.
- Hare, R. D. (1996). Psychopathy a clinical construct whose time has come. *Criminal justice and behavior*, 23(1), 25-54.
- Harris, G. T., & Rice, M. E. (2006.). *Treatment of Psychopathy: A Review of Empirical Findings*. In *Clinical and Applied Issues* (pp. 555-572).
- Hart, S. D., Kropp, P. R., & Hare, R. D. (1988). Performance of male psychopaths following conditional release from prison. *Journal of consulting and clinical psychology*, 56(2), 227.
- Hughes, G., Hogue, T., Hollin, C., & Champion, H. (1997). First-stage evaluation of a treatment programme for personality disordered offenders. *Journal of Forensic Psychiatry*, 8(3), 515-527.
- Jenkins, H. (2006a). *Convergence culture: Where old and new media collide*. NYU press.
- Jenkins, H. (2006b). *Fans, bloggers, and gamers: Exploring participatory culture*. NYU Press.
- Lorenz, A. R., & Newman, J. P. (2002). Deficient Response Modulation and Emotion Processing in Low-Anxious Caucasian Psychopathic Offenders: Results from a Lexical Decision Task. *Emotion*, 2(2), 91-104.

- Luxton, D. D., McCann, R. A., Bush, N. E., Mishkind, M. C., & Reger, G. M. (2011). mHealth for mental health: Integrating smartphone technology in behavioral healthcare. *Professional Psychology: Research and Practice*, 42(6), 505.
- Mahmut, M. K., Homewood J., & Stevenson, R. J. (2008). The characteristics of non-criminals with high psychopathy traits: Are they similar to criminal psychopaths? *Journal of Research in Personality*, 42, 679-692.
- Maia, T. V. (2009). Reinforcement learning, conditioning, and the brain: Successes and challenges. *Cognitive Affective Behavioral Neuroscience*, 4, 343-364.
- Malterer, M. B., Glass, S. J., & Newman, J. P. (2008). Psychopathy and Trait Emotional Intelligence. *Personality and Individual Differences*, 44, 735-745.
- McLuhan, M. (1994). *Understanding media: The extensions of man*. MIT press.
- Meffert, H., Gazzola, V., den Boer, J. A., Bartles, A. A. J., & Keysers, C. (2013). Reduced spontaneous but relatively normal deliberate vicarious representations in psychopathy. *Brain: A Journal of Neurology*, 136, 2550-2562.
- Miller, G. (2012). The smartphone psychology manifesto. *Perspectives on Psychological Science*, 7(3), 221-237.
- Millon, T., Simonsen, E., Birket-Smith, M., & Davis, R. D. (1998). *Psychopathy: Antisocial, Criminal, and Violent Behavior*. New York: Guilford Press.
- Millon, T., Simonsen, E., Birket-Smith, M., & Davis, R. D. (Eds.). (2002).

Psychopathy: Antisocial, criminal, and violent behavior. Guilford Press.

Montagne, B., van Honk, J., Kessels, R. P. C., Frigerio, E., Burt, M., van Zandvoort, M. J. E., et al. (2005). Reduced efficiency in recognizing fear in subjects scoring high on psychopathic personality characteristics.

Personality and Individual Differences, 38, 5-11.

Moreira, D., Almeida, F., Pinto, M., & Favero, M. (2014). Psychopathy: A comprehensive review of its assessment and intervention. *Aggression and Violent Behavior*, 19, 191-195.

Newman, J. P., & Lorenz, A. R. (2006). Response Modulation and Emotion Processing: Implications for Psychopathy and Other Dysregulatory Psychopathy. In *Emotion and Psychopathy* (pp. 904-929).

Newman, J.P., Kosson, D.S., & Patterson, C.M. (1992). Delay of gratification in psychopathic and nonpsychopathic offenders. *Journal of Abnormal Psychology*, 101(4), 630-636.

Newman, J. P., Widom, C. S., & Nathan, S. (1985). Passive avoidance in syndromes of disinhibition: psychopathy and extraversion. *Journal of personality and social psychology*, 48(5), 1316.

Ogloff, J. R., Wong, S., & Greenwood, A. (1990). Treating criminal psychopaths in a therapeutic community program. *Behavioral Sciences & the Law*, 8(2), 181-190.

Paredes, P., Tewari, A., & Canny, J. (2013). Design Principles for the Conceptualization of Games for Health Behavior Change. CHI 2013.

- Patterson, C. M., & Newman, J. P. (1993). Reflectivity and learning from aversive events: toward a psychological mechanism for the syndromes of disinhibition. *Psychological review*, 100(4), 716.
- Patton, J. H., Stanford, M. S., & Barratt, E. S. (1995). Factor structure of the Barratt impulsiveness scale. *Journal of clinical psychology*, (51), 768-74.
- Pedersen, L., Kunz, C., Rasmussen, K., & Elsass, P. (2010). Psychopathy as a risk factor for violent recidivism: Investigating the Psychopathy Checklist Screening Version (PCL: SV) and the Comprehensive Assessment of Psychopathic Personality (CAPP) in a forensic psychiatric setting. *International Journal of Forensic Mental Health*, 9(4), 308-315.
- Polaschek, D. L.L., & Daly, T. E. (2013). Treatment and psychopathy in forensic settings. *Aggression and Violent Behavior*, 18, 592-603.
- Rainie, H., & Wellman, B. (2012). *Networked: The new social operating system* (p. 358). Cambridge, MA: Mit Press.
- Sailer, M., Hense, J., Mandl, H., & Klevers, M. (2013). Psychological Perspectives on Motivation through Gamification. *Interaction Design and Architecture(s)*, 28-37.
- Salekin, R. T. (2002). Psychopathy and therapeutic pessimism. Clinical lore or clinical reality? *Clinical Psychology Review*, 22, 79-112.
- Schmauk, E. J. (1970). Punishment, arousal, and avoidance learning in sociopaths. *Journal of Abnormal Psychology*, 76, 325-335.

- Seto, M. C., & Barbaree, H. E. (1999). Psychopathy, treatment behavior, and sex offender recidivism. *Journal of interpersonal violence*, 14(12), 1235-1248.
- Seto, M. C., Khattar, N. A., Lalumiere, M. L., & Quinsey, V. L. (1997). Deception and Sexual Strategy in Psychopathy. *Personality and Individual Differences*, 22(3), 301-307.
- Siegel, R. A. (1978). Probability of punishment and suppression of behavior in psychopathic and nonpsychopathic offenders. *Journal of Abnormal Psychology*, 87(5), 514.
- Szabo, L. (2015). Cost of not caring: Nowhere to go. *The Financial and Human Toll for Neglecting the Mentally Ill*. USA Today. Retrieved from <http://www.usatoday.com/story/news/nation/2014/05/12/mental-health-system-crisis/7746535/>
- Torrey, E. F., M.D., Zdanowicz, M. T., Esq., Kennard, A. D., M.P.A., Lamb, H. R., Eslinger, D. F., Biasotti, M. C., & Fuller, D. A. (2014). *The Treatment of Persons with Mental Illness in Prisons and Jails: A State Survey*. The Treatment Advocacy Center, pp. 1-14. Retrieved from <http://www.tacreports.org/storage/documents/treatment-behind-bars/treatment-behind-bars-abridged.pdf>
- Vilardaga, Bricker, & McDonell. (2014). The promise of mobile technologies and single case designs for the study of individuals in their natural environment. *Journal of Contextual Behavioral Science*, 3, 148-153.

Zachary, R. A., & Shipley, W. C. (1986). Shipley institute of living scale: Revised manual. WPS, Western Psychological Services.

Zichermann, G., & Cunningham, C. (2011). Gamification by design: Implementing game mechanics in web and mobile apps. " O'Reilly Media, Inc."

Appendix A

Davis' Interpersonal Reactivity Index (IRI)

The following statements inquire about your thoughts and feelings in a variety of situations. For each item, indicate how well it describes you by choosing the appropriate letter on the scale at the top of the page: A, B, C, D, or E. When you have decided on your answer, fill in the letter on the answer sheet next to the item number. **READ EACH ITEM CAREFULLY BEFORE RESPONDING.** Answer as honestly as you can. Thank you.

ANSWER SCALE:

A	B	C	D	E
DOES NOT DESCRIBE ME WELL				DESCRIBES ME VERY WELL

1. I daydream and fantasize, with some regularity, about things that might happen to me. (FS)
2. I often have tender, concerned feelings for people less fortunate than me. (EC)
3. I sometimes find it difficult to see things from the "other guy's" point of view. (PT) (-)
4. Sometimes I don't feel very sorry for other people when they are having problems. (EC) (-)
5. I really get involved with the feelings of the characters in a novel. (FS)
6. In emergency situations, I feel apprehensive and ill-at-ease. (PD)
7. I am usually objective when I watch a movie or play, and I don't often get completely caught up in it. (FS) (-)
8. I try to look at everybody's side of a disagreement before I make a decision. (PT)
9. When I see someone being taken advantage of, I feel kind of protective towards them. (EC)
10. I sometimes feel helpless when I am in the middle of a very emotional situation. (PD)
11. I sometimes try to understand my friends better by imagining how things look from their perspective. (PT)
12. Becoming extremely involved in a good book or movie is somewhat rare for me. (FS) (-)
13. When I see someone get hurt, I tend to remain calm. (PD) (-)
14. Other people's misfortunes do not usually disturb me a great deal. (EC) (-)

15. If I'm sure I'm right about something, I don't waste much time listening to other people's arguments. (PT) (-)
16. After seeing a play or movie, I have felt as though I were one of the characters. (FS)
17. Being in a tense emotional situation scares me. (PD)
18. When I see someone being treated unfairly, I sometimes don't feel very much pity for them. (EC) (-)
19. I am usually pretty effective in dealing with emergencies. (PD) (-)
20. I am often quite touched by things that I see happen. (EC)
21. I believe that there are two sides to every question and try to look at them both. (PT)
22. I would describe myself as a pretty soft-hearted person. (EC)
23. When I watch a good movie, I can very easily put myself in the place of a leading character. (FS)
24. I tend to lose control during emergencies. (PD)
25. When I'm upset at someone, I usually try to "put myself in his shoes" for a while. (PT)
26. When I am reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me. (FS)
27. When I see someone who badly needs help in an emergency, I go to pieces. (PD)
28. Before criticizing somebody, I try to imagine how I would feel if I were in their place. (PT)

NOTE: (-) denotes item to be scored in reverse fashion
 PT = perspective-taking scale
 FS = fantasy scale
 EC = empathic concern scale
 PD = personal distress scale

A = 0
 B = 1
 C = 2
 D = 3
 E = 4

Except for reversed-scored items, which are scored:

A = 4
 B = 3
 C = 2
 D = 1
 E = 0

Appendix B
BIS 11_A TO BIS-11: SCORING

Name: _____ *Date:* _____

Directions: People differ in the ways they act and think in different situations. This is a test to measure some of the ways in which you act and think. Read each statement and darken the appropriate circle on the right side of the page. Do not spend too much time on any statement. Answer quickly and honestly.	RARELY/NEVER	OCCASIONALLY	OFTEN	ALMOST ALWAYS / ALWAYS
1. I plan tasks carefully	4	3	2	1
2. I do things without thinking	1	2	2	4
3. I am happy-go-lucky	1	2	2	4
4. I have “racing” thoughts	1	2	2	4
5. I plan trips well ahead of time	4	3	2	1
6. I am self-controlled	4	3	2	1
7. I concentrate easily	4	3	2	1
8. I save regularly	4	3	2	1
10. I am a careful thinker	4	3	2	1
11. I plan for job security	4	3	2	1
12. I say things without thinking	1	2	2	4
13. I like to think about complex problems	4	3	2	1
14. I change jobs	1	2	2	4
15. I act “on impulse”	1	2	2	4
16. I get easily bored when solving thought problems	1	2	2	4
18. I act on the spur of the moment	1	2	2	4
19. I am a steady thinker	4	3	2	1
20. I change where I live	1	2	2	4
21. I buy things on impulse	1	2	2	4
25. I spend or charge more than I earn	1	2	2	4
27. I have outside thoughts when thinking	1	2	2	4
28. I am more interested in the present than the future	1	2	2	4
29. I am restless at lectures or talks	1	2	2	4
30. I plan for the future	4	3	2	1

Prorating score to BIS-11 Total Impulsiveness: (score/24)*30

Appendix C

MACH IV SCALE

1	2	3	4	5
<u>strongly</u> <u>disagree</u>	disagree	neutral	agree	<u>strongly</u> <u>agree</u>

- _____ 1. Anyone who completely trusts anyone else is asking for trouble.
- _____ 2. Most people who get ahead in the world lead clean moral lives.
- _____ 3. It is safest to assume that all people have a vicious streak and it will come out when they are given a chance.
- _____ 4. One should take action only when sure it is morally right.
- _____ 5. Generally speaking, people won't work hard unless they're forced to do so.
- _____ 6. It is wise to flatter important people.
- _____ 7. It is hard to get ahead without cutting corners here and there.
- _____ 8. People suffering from incurable diseases should have the choice of being put painlessly to death.
- _____ 9. Most people are brave.
- _____ 10. The best way to handle people is to tell them what they want to hear.
- _____ 11. The biggest difference between most criminals and other people is that criminals are stupid enough to get caught.
- _____ 12. Honesty is the best policy in all cases.
- _____ 13. Barnum was very wrong when he said there's a sucker born every minute.
- _____ 14. Most people are basically good and kind.
- _____ 15. When you ask someone to do something for you, it is best to give the real reasons for wanting it rather than giving reasons which might carry more weight.
- _____ 16. It is possible to be good in all respects.
- _____ 17. Most people forget more easily the death of a parent than the loss of their property.

- _____ 18. Never tell anyone the real reason you did something unless it is useful to do so.
- _____ 19. There is no excuse for lying to someone else.
- _____ 20. All in all, it is better to be humble and honest than to be important and dishonest.

Key

The Mach IV comprises three subscales: Tactics, Morality, and Views.

A minus sign (-) indicates that the item is reverse scored

- T+ 1. Anyone who completely trusts anyone else is asking for trouble.
- V- 2. Most people who get ahead in the world lead clean moral lives.
- V+ 3. It is safest to assume that all people have a vicious streak and it will come out when they are given a chance.
- T- 4. One should take action only when sure it is morally right.
- V+ 5. Generally speaking, people won't work hard unless they're forced to do so.
- T+ 6. It is wise to flatter important people.
- V+ 7. It is hard to get ahead without cutting corners here and there.
- M+ 8. People suffering from incurable diseases should have the choice of being put painlessly to death.
- V- 9. Most people are brave.
- T+ 10. The best way to handle people is to tell them what they want to hear.
- V+ 11. The biggest difference between most criminals and other people is that criminals are stupid enough to get caught.
- T- 12. Honesty is the best policy in all cases.
- V- 13. Barnum was very wrong when he said there's a sucker born every minute.
- V- 14. Most people are basically good and kind.
- T- 15. When you ask someone to do something for you, it is best to give the real reasons for wanting it rather than giving reasons which might carry more weight.
- T- 16. It is possible to be good in all respects.
- V+ 17. Most people forget more easily the death of a parent than the loss of their property.
- T+ 18. Never tell anyone the real reason you did something unless it is useful to do so.
- T- 19. There is no excuse for lying to someone else.
- M- 20. All in all, it is better to be humble and honest than to be important and dishonest.

Overall Mach score is the mean of the 20 items (after reversing the appropriate items).

Appendix D

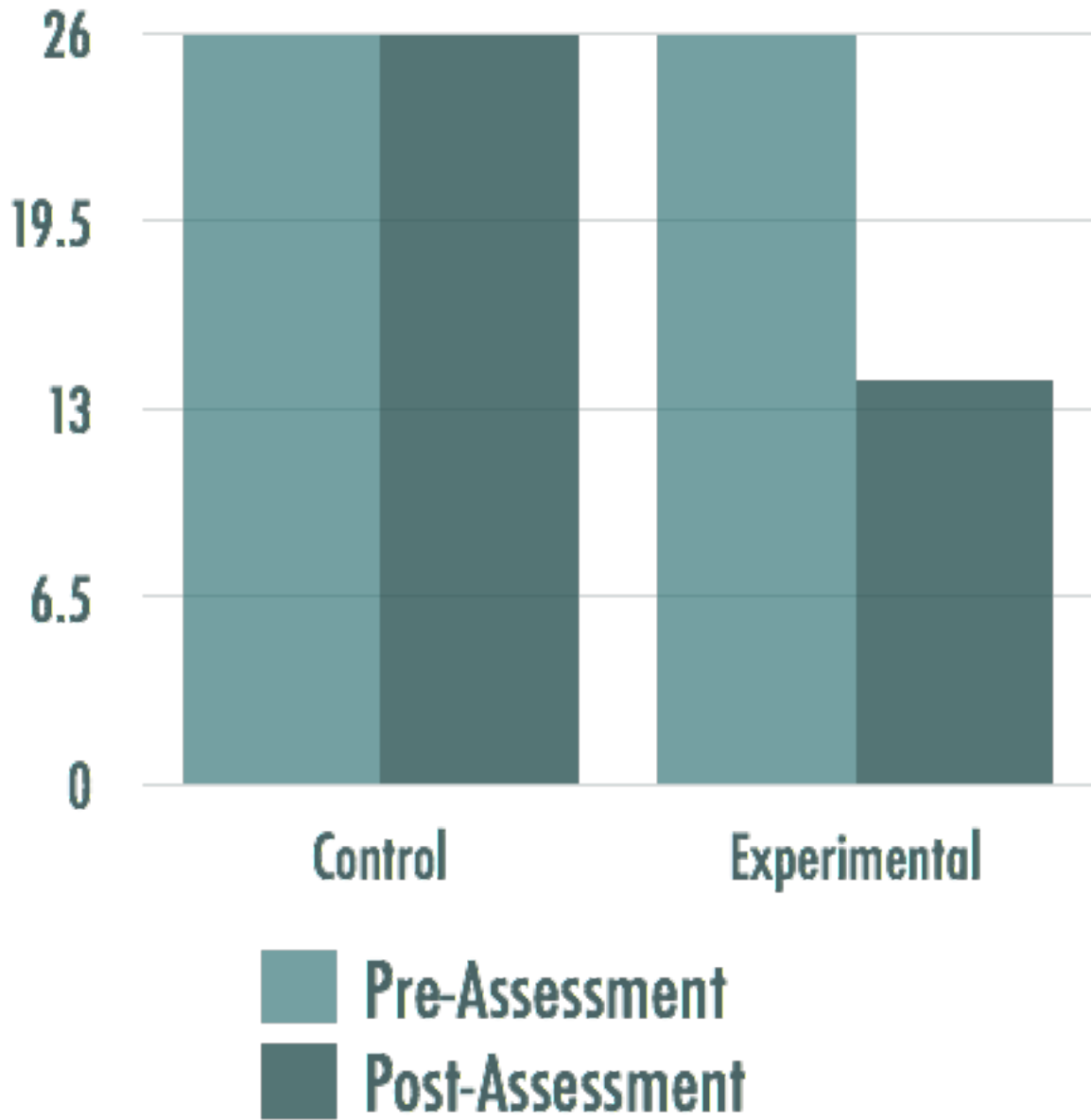


Figure 11. Change in IRI scores from pre-assessment to post-assessment.

Appendix E

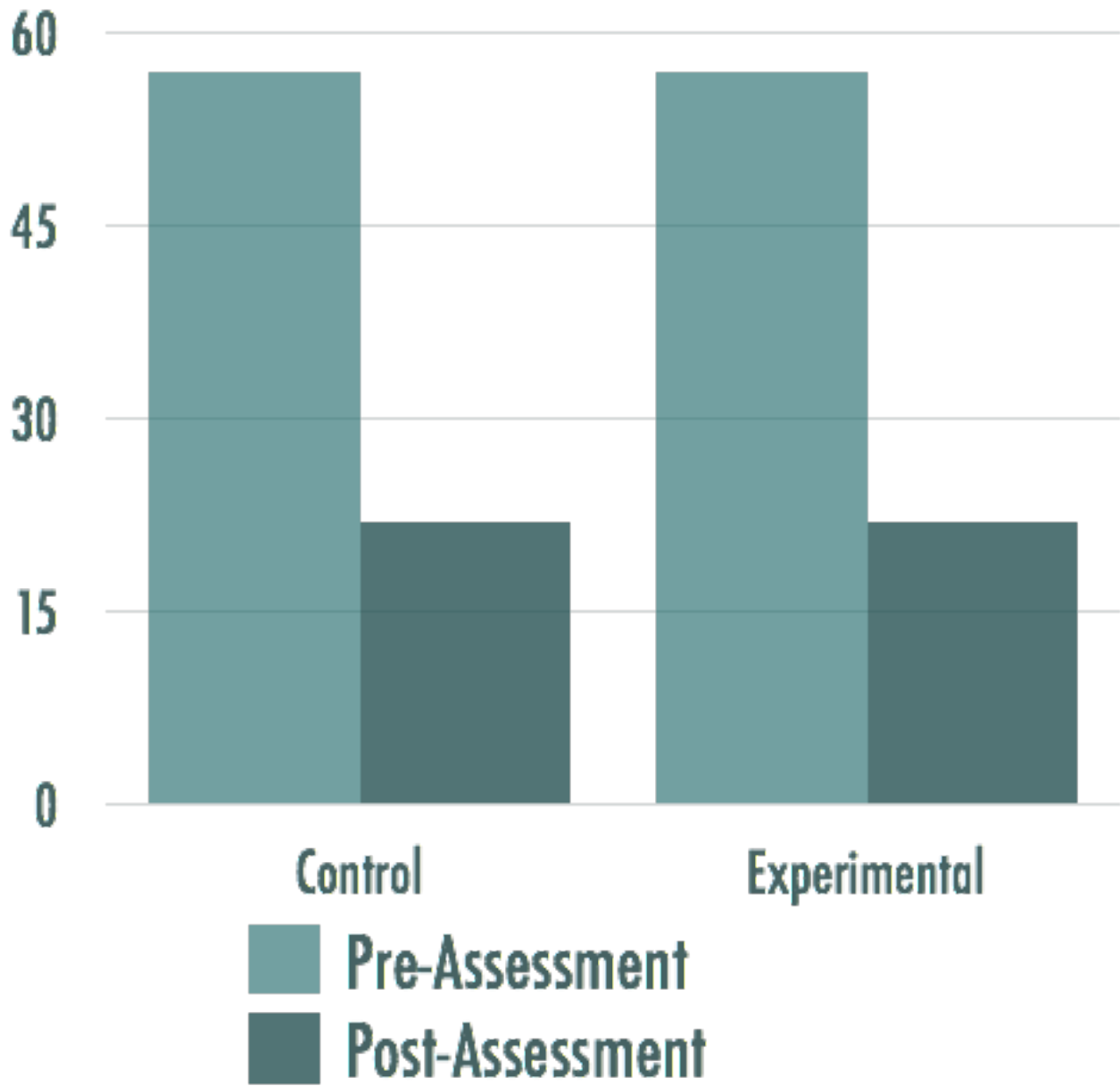


Figure 12. Change in BIS-11 scores from pre-assessment to post-assessment.

Appendix F

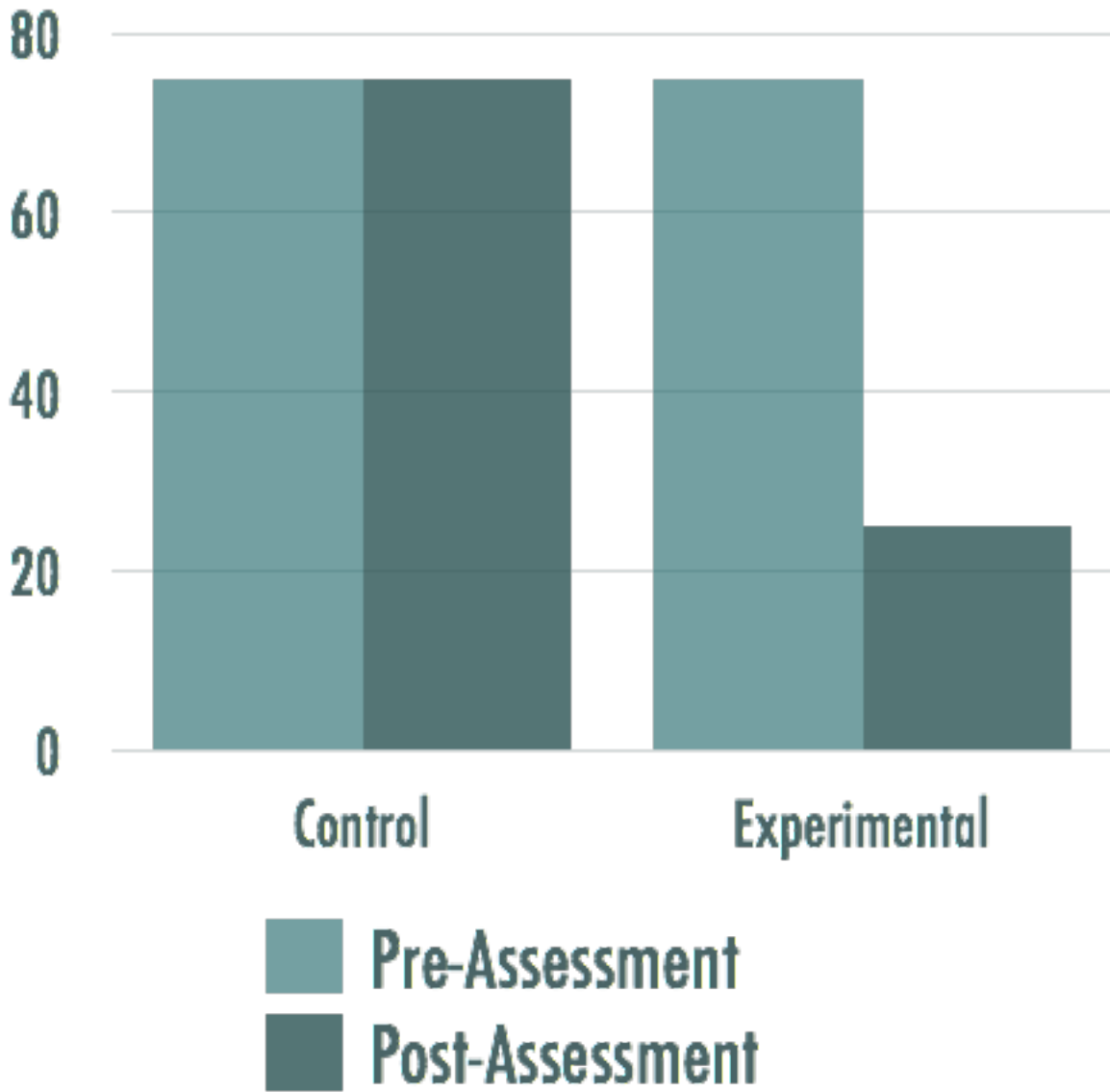


Figure 13. Change in Mach-IV scores from pre-assessment to post-assessment.

Appendix G

Consent Form:

You are being asked to take part in a research study at a New York State Correctional Facility to study the behavioral outcomes of a mobile intervention for incarcerated populations that is administered via a smart device.

Please review the risks and benefits of this study in order to make an informed judgment about whether or not to participate. This consent form gives you information about the study. If you choose to participate, please sign this document and return it to the experimenter. You can choose not to participate, and you can choose to end your participation at any point during the study.

The purpose of this study is to help us learn how mobile technologies and game based trainings can be used in psychological interventions. In this study, you will be asked to participate in a 6-week intensive behavioral training. Before the training begins and after its completion, you will be asked to complete four psychological assessments that will be used for data analysis of behavioral outcomes. You will be asked to engage with and complete various tasks daily, anywhere from two or three times per day. Cumulatively, you will be required use the application anywhere from 2 - 3 hours per day. You will be asked not to communicate with anyone about your participation in the study. Throughout the training, you will acquire points for correct answers that will be able to be exchanged for goods at commissary. This element will serve as your compensation for participating in the study.

There are no health risks associated with this study. Some of the scenario's presented in the training tasks may cause some stress, as they describe situations associated with violence. Your data will be kept on a password-protected database in order to ensure the confidentiality of your responses. You will be assigned a Subject ID number in order to sign into the *Game and Train* application. Your name will not be connected to your response data.

If you have any questions about this research, please contact the investigator, Sydney Abualy (sa7530@bard.edu)

Statement of Consent

"The purpose of the study, the general procedure, and risks and benefits of my participation have been explained to me. I have been given an opportunity to ask questions, and my questions have been answered. I have been given the contact information of the investigator if I have any additional questions or concerns. I have read this consent form and agree to participate in this study. I understand that I may withdraw my participation at any time".

Name _____

Date _____

Appendix H

Debriefing Form:

Thank you for your participation. The current study was a 6-week intensive intervention for psychopathic offenders, which targeted the psychopathic specific deficits of lack of empathy, difficulties with response modulation and manipulative tendencies. Past interventions developed for incarcerated psychopathic populations have been shown to yield unsuccessful behavioral outcomes and consequential recidivism. These past interventions were too generalized in their design – they did not target psychopathic specific traits and were focused solely on criminal risk reduction. *Game and Train* was designed in response to these inadequacies. Your participation will help inform what we understand about the behavioral treatment of psychopathy and how the use of a mobile intervention can potentially lead to successful behavioral outcomes. If you have any additional questions, please ask the experimenter or contact Sydney Abualy at sa7530@bard.edu.