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The Impact of Dialectical Behaviour Therapy on Aggression, Anger, and Hostility in a Forensic Psychiatric Population

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A thesis submitted in partial fulfillment of the requirements for the Master of Science degree in Psychology

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THE IMPACT OF DIALECTICAL BEHAVIOUR THERAPY ON AGGRESSION,
ANGER, AND HOSTILITY IN A FORENSIC PSYCHIATRIC POPULATION

(Thesis Format: Monograph)

by

Monica F. Tomlinson

Graduate Program in Clinical Psychology

A thesis
submitted in partial fulfillment of the
requirements for the degree of
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Abstract

Forensic psychiatric patients engage in more aggression than any other inpatient psychiatric population. Aggressive behaviour impedes rehabilitation, as aggressive individuals are often excluded from evidence-based therapies due to safety concerns. Dialectical behaviour therapy (DBT) is a group-based cognitive-behavioural psychotherapy designed to target maladaptive behaviours, such as aggression, in individuals who are behaviourally and emotionally dysregulated. The present study assessed whether six months of DBT is effective in reducing aggression, anger, and hostility in a representative, medium-security, forensic psychiatric population compared to treatment as usual. Participants ($N = 17$) suffered from a range of psychotic, personality, substance use, and mood disorders. Results suggest that DBT shows promise in reducing aggression, anger, and hostility in this population, however this is little evidence that the skills taught in DBT are responsible for those changes. The implications and future directions of this research are discussed.

Keywords: Dialectical behaviour therapy, evidence-based practice, empirically-supported therapy, forensic psychiatric patients, forensic psychiatry, aggression, anger, hostility, emotion regulation, mindfulness.

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List of Abbreviations

ANOVA: Analysis of variance

ASPD: Antisocial personality disorder

BPAQ: Buss-Perry Aggression Questionnaire

BPD: Borderline personality disorder

DBT: Dialectical Behaviour Therapy

DBT 1: The first DBT group during the DBT phase

DBT 2: The second DBT group during the DBT phase

ERQ: Emotion Regulation Questionnaire

IPAS: Impulsive/Premeditated Aggression Scale

ISAS: Inventory of Statements About Self Injury

KIMS: The Kentucky Inventory of Mindfulness Skills

NCRMD: Not Criminally Responsible On Account of a Mental Disorder

TAU: Treatment as usual

TAU 1: The second DBT group during the treatment as usual phase

TAU 2: The first DBT group during the treatment as usual phase

Introduction

1.1 Forensic Psychiatric Patients

The majority of individuals who suffer from mental disorders do not pose a threat to society (Peterson, Skeem, Kennealy, Bray, & Zvonkovic, 2014). Some individuals, however, suffer from mental disorders that impede their ability to appreciate the nature and consequences of their behaviour. Without the proper treatment, these individuals may come in contact with the criminal justice system (Antonius et al., 2010; Crocker, Braithwaite, Cote, Nicholls, & Seto, 2011). Once in this system, if these individuals are able to stand trial and there is sufficient evidence that they committed a criminal act (*actus reus*), criminal intent (*mens rea*) must be established. If an individual is found to be incapable of appreciating the nature, quality, and consequences of the crime, he or she will be declared Not Criminally Responsible on Account of a Mental Disorder (NCRMD; *Criminal Code*, R.S., 1985, c. C-46, s. 16), as criminal intent was not present. If an individual suffers from a mental disorder that significantly hinders him or her from understanding the processes of a trial, comprehending the potential consequences of a trial, or communicating with a lawyer, he or she will be designated “unfit to stand trial” (*Criminal Code*, R.S., 1985, c. C-46, s. 16). With this designation, the individual will be held in custody at a psychiatric hospital until he or she can be “made fit” (a process that usually involves pharmacotherapy, psychoeducation, and psychotherapy; Bettridge & Barbaree, 2008). Once this individual is “fit to stand trial”, he or she can be found either criminally responsible and would be transferred to the correctional system, or NCRMD and would remain within the forensic mental health care system. An individual who is either NCRMD or “unfit to stand trial” is considered a forensic

psychiatric patient within the forensic mental health care system (*Criminal Code*, R.S., 1985, c. C-46, s. 16)

In Ontario, once individuals are declared NCRMD, the Ontario Review Board (ORB) presents them with a disposition order. This disposition order is typically reviewed annually and determines the level of restriction that will be placed on that individual for the next year (*Criminal Code*, R.S., 1985, c. C-46, s. 672.54). If the individual is seen to be a risk to himself, herself, or others, the ORB can place a custodial disposition on him or her. A custodial disposition indicates that the individual will be confined to a psychiatric facility. While in the psychiatric facility, the individual may or may not have access to the community depending on the stipulations of the disposition order and how the person functions socially and psychologically on a day-to-day basis (Crocker, Seto, Nicholls, & Côté, 2013). If the individual is seen to be low risk (as operationalized by standardized risk assessment tools, such as the Violence Risk Appraisal Guide or the Historical Clinical Risk-20; Douglas, Hart, Webster, & Belfrage, 2013; Quinsey, Harris, Rice, & Cormier, 2006), he or she may receive a conditional disposition and be able to live in the community as long as he or she complies with specific conditions (e.g., drug abstinence; Higgins, Weisberg, & Gug, 2012). If the individual is seen to be a minimal risk to himself, herself, or to others, the individual will receive an absolute discharge and will no longer be under the care of the forensic mental health care system (*Criminal Code*, R.S., 1985, c. C-46, s. 730). Being given an absolute discharge means that the individual is no more a risk to himself, herself, or to society than any other member of society (Crocker et al., 2013). To be sure, individuals within this system can

transfer back and forth between custodial and conditional dispositions, and may sometimes return to the hospital after receiving an absolute discharge if they recidivate. Above all else, the goal of this system is to rehabilitate patients and eventually reintegrate them into the community permanently (*Criminal Code*, R.S., 1985, c. C-46, s. 730). Thus, rehabilitation efforts must balance treating the individual's mental disorder and ensuring that they are a minimal risk to themselves and others (Crocker et al., 2013).

1.2 Barriers to Forensic Psychiatric Rehabilitation

Regrettably, there are several major barriers to effectively rehabilitating forensic psychiatric patients. Not only do these individuals have a history of antisocial behaviour, they often suffer from highly treatment-resistant mental disorders (Bader, Evans, & Welsh, 2014; Swanson, Swartz, Van Dorn, & et al., 2006). For example, the three most common diagnoses in forensic psychiatric hospitals are antisocial personality disorder (Howard, McCarthy, Huband, & Duggan, 2013), borderline personality disorder (Howard et al., 2013; van Dongen, Buck, & Van Marle, 2014), and schizophrenia (Dingfelder, 2004). Each of these disorders is typically associated with poor prognoses and high relapse rates (Howard et al., 2013; Reid, 2009; Salekin, 2002).

Antisocial personality disorder (ASPD) is a combination of personality traits (e.g., insensitivity, callousness) associated with a propensity to behave unlawfully or against societal norms (Alcorn et al., 2013; Johnson et al., 2000; Salekin, 2002). Individuals with ASPD may demonstrate a proclivity toward antisocial activities, such as theft, fraud, and aggressive behaviour (Stone, 2007). Of note, while these

individuals may have an increased tendency to behave in antisocial ways, under half of individuals diagnosed with ASPD come in contact with the criminal justice system. Past epidemiological studies in the community estimate that about 47% of individuals who meet diagnostic criteria for ASPD have significant arrest histories (Black, Baumgard, & Bell, 1995; Robins & Price, 1991). Nevertheless, the very behavioural tendencies that lead these individuals into the forensic mental health care system may continue to present a challenge when they are in the hospital, thus making these individuals challenging to manage and treat (Meloy & Yakeley, 2014).

Moreover, approximately one third of individuals diagnosed with ASPD present with psychopathic traits (Meloy, 2001; Ogloff, 2006). Psychopathy is represented by callous, unemotional, and remorseless behaviour that directly compromises the wellbeing of individuals (Cleckley, 1981; Douglas, Nikolova, Kelley, & Edens, 2015). Psychopathic traits are particularly associated with poor treatment adherence among individuals with ASPD, likely another reason why ASPD is often considered among the most treatment-resistant mental disorders (Meloy, 2001). In Hervey Cleckley's (1981) treatise on psychopathy, he boldly states that he was profoundly impressed by two difficulties that stood in the way of dealing effectively with individuals who have psychopathic traits. One of these "was [the psychopath's] apparent immunity, or relative immunity, from control by the law. The other was his lack of response to psychiatric treatment of any kind" (p. 275). Thus, diagnoses of ASPD and related psychopathic traits carry with them a long history of cynicism in the mental health care community, which has likely undermined research efforts on effective interventions for ASPD (Meloy & Yakeley, 2014).

Borderline personality disorder (BPD) is defined by a pervasive and enduring pattern of emotional instability, behavioural dysregulation, and interpersonal dysfunction (Howard et al., 2013; Linehan, Korslund, Harned, & et al., 2015; McCann, Ball, & Ivanoff, 2000). While the majority of individuals with BPD are far more likely to harm themselves than others (Reid, 2009), the symptoms of BPD (e.g., unstable moods) sometimes increase an individual's vulnerability to poor decision-making, highly emotional reactions to stimuli, and significant interpersonal conflict. In rare cases, these vulnerabilities result in legal problems. Forensic psychiatric patients with BPD typically enter the forensic mental health care system due to crimes related to interpersonal aggression (e.g., domestic violence; Stuart, Moore, Gordon, Ramsey, & Kahler, 2006) or impulsive behaviour (e.g., property damage; Goodman & New, 2000). Individuals with this diagnosis present a significant challenge to mental health care professionals, as the symptoms of this disorder are often chronic, resistant to therapy, and associated with high suicide rates (Dingfelder, 2004; Hooley, Cole, & Gironde, 2012).

Beyond personality disorders, psychotic disorders are also prevalent among forensic psychiatric patients. It is important to note that the vast majority of individuals with psychotic disorders are not aggressive or antisocial. (González-Torres, Oraa, Arístegui, Fernández-Rivas, & Guimon, 2007). Rather, these individuals are far more likely to be victimized, live isolated lives, and avoid social interactions (Fitzgerald et al., 2005). While individuals with psychotic disorders are rarely antisocial, those who do enter the criminal justice system have typically engaged in illegal behaviours that are directly related to acute psychotic symptoms,

such as hallucinations or delusions (Almeida, Graca, Vieira, Almeida, & Santos, 2010). Research has shown that persecutory, paranoid, and grandiose delusions are more strongly associated with criminal behaviour, and, specifically, violent criminal behaviour, than any other symptoms related to schizophrenia (Silk, 2008). Therefore, the small percentage of individuals with schizophrenia who do come in contact with the criminal justice system are more likely to suffer from positive psychotic symptoms (e.g., hallucinations and delusions), and are often diverted into the forensic mental health care system to be rehabilitated. Thus, individuals with psychotic disorders, such as schizophrenia, are overrepresented in this system. In the recent National Trajectory Project of Individuals found Not Criminally Responsible on Account of a Mental Disorder in Canada, psychotic spectrum disorders were the most common diagnoses among forensic psychiatric patients (Crocker et al., 2015). Diagnostic profiles of forensic psychiatric patients suggest that 79.7% of patients in Ontario, 76.5% of patients in British Columbia, and 65.9% of patients in Quebec carry a psychotic spectrum disorder diagnosis, the majority of whom suffer from either delusions, hallucinations, or both (Crocker et al., 2015). These individuals are also challenging to treat, as they typically have poor insight into their disorders (Pijnenborg, van Donkersgoed, David, & Aleman, 2013), are subject to high levels of stigma (both in and out of psychiatric settings), and have high relapse rate (Penn, Waldheter, Perkins, Mueser, & Lieberman, 2005).

While ASPD, BPD, and schizophrenia are common diagnoses within the forensic mental health care system, they are not often diagnosed in isolation. In reality, the majority of forensic psychiatric patients carry multiple diagnoses (Palijan,

Muzinic, & Radeljak, 2009). Substance use disorders, for example, are among the most commonly comorbid conditions in this population (White, McCleery, Gumley, & Mulholland, 2007). Recent Canadian data suggest that one third of forensic psychiatric patients have a severe mental disorder and a concomitant substance use disorder (Crocker et al., 2015). Substance use disorders may have contributed to these individuals' antisocial behaviour by leading them into criminogenic environments (e.g., to gain access to illegal substances, or money to purchase illegal substances), into homelessness, or into the criminal justice system. Additionally, prolonged substance use is also associated with neurotoxic brain damage, which may also contribute to an increased likelihood of aggressive behaviour by neurobiologically altering an individual's ability to control his or her behaviour (Palijan et al., 2009; Paschall & Fishbein, 2002).

The diverse psychiatric profiles that characterize forensic psychiatric patients often make designing individual treatment plans extremely challenging (Palijan et al., 2009; van Dongen et al., 2014). Further, very little research has been conducted on effective methods of rehabilitating this population, and, thus, mental health professionals in these settings must heavily rely on pharmacotherapy and programs that are designed for specific diagnostic groups, or that target specific symptoms. Even when therapeutic approaches are available, however, patients may be excluded from them if they are highly disruptive or aggressive. Unfortunately, this often results in several patients being excluded from therapy and programming within the hospital, as aggression is prevalent in this population (Alcorn et al., 2013; Bowers et al., 2011).

1.3 Aggression Among Forensic Psychiatric Patients

A recent international literature review suggested that forensic psychiatric patients are the most aggressive of all inpatient psychiatric populations (Bowers et al., 2011). These findings hold true across North America, Europe, and Australia (Bowers et al., 2011). At the same time, while it has been estimated that between 25%-35% of forensic psychiatric patients commit physically aggressive acts in medium security hospitals and up to 45.6% of forensic psychiatric patients commit physically aggressive acts in maximum security hospitals, physical aggression only accounts for an estimated 21.3% of all aggressive incidences across mental health settings (Daffern, Mayer, & Martin, 2004). Thus, once verbal aggression and self-harm are included, rates over overall aggression are considerably higher (Bowers et al., 2011). While no prevalence rates were available for overall aggression in forensic psychiatric settings alone, there is substantial evidence that all forms of aggression are common and present a major impediment to treatment in these settings (Bowers et al., 2011; Kamphuis, Dijk, Spreen, & Lancel, 2014; Nicholls, Brink, Greaves, Lussier, & Verdun-Jones, 2009).

A possible reason for this reality is that three of the most prevalent disorders in forensic psychiatric populations (i.e., antisocial personality disorder, borderline personality disorder, and schizophrenia) are also the most highly associated with aggressive behaviour in this setting (Bader et al., 2014). In a recent study on aggression within a forensic psychiatric setting, 96% of all physically aggressive incidents were perpetrated by individuals with at least one of these three diagnoses (Bader et al., 2014). These figures do not include the impact of comorbid substance

use, which has consistently been found to further increase aggressive behaviour (Palijan et al., 2009). If forensic psychiatric institutions are to effectively address aggression, it is necessary to define this phenomenon and better understand the components that may contribute to the elicitation of aggression in the forensic psychiatric context.

1.4 A Conceptualization of Aggression

Aggression is a multifaceted phenomenon and should be appreciated as such if it is to be efficiently reduced (Anderson & Bushman, 2002). Factor analyses have suggested that aggression may be comprised of four factors; verbal aggression, physical aggression, anger, and hostility (Buss & Perry, 1992). Aggressive individuals may differ widely in their elicitation of each component of aggression, and some may be more prone to some types of aggression over others.

It is important to note that a multitude of definitions and conceptualizations of aggression exist in the literature. For example, dichotomous models of aggression have offered distinctions between physical and relational aggression (Crick & Dodge, 1996; Kawabata, Crick, & Hamaguchi, 2010) and overt and covert aggression (Olson et al., 2013; Willoughby, Kupersmidt, & Bryant, 2001). Other models have distinguished between different forms of aggression based on their underlying motivations. Specifically, many models have found that aggression to be either premeditated or impulsive (Barratt, Stanford, Dowdy, Liebman, & Kent, 1999; Gauthier, Furr, Mathias, Marsh-Richard, & Dougherty, 2009). Premeditated aggression, also referred to as instrumental aggression, is pre-planned and intended to

serve a secondary goal. Impulsive aggression, or reactive aggression, is emotionally-based and is elicited in response to external stimuli (Fontaine, 2007).

The form of aggression that an individual expresses and the motivation behind that aggression necessarily impact how it can be managed in a forensic system (Tapscott, Hancock, & Hoaken, 2012). For example, individuals who behave aggressively due to poor emotional and impulse control may benefit from treatment that focuses on mindfulness training and emotional regulation (which can help individuals become more aware of their surroundings, their reactions to their surroundings, and their ability to control those reactions; Fluttert, 2010; Fontaine, 2007). On the contrary, individuals who display premeditated aggression may only aggress in situations where they may gain access to resources (e.g., to purchase substances of abuse). For example, if the person is using aggression to access drugs, treatments for substance use disorders may be beneficial instead of, or in addition to, treatments for emotional regulation or behavioural control. Lastly, if an individual is engaging in aggression as a result of acute hallucinations or delusions, anti-psychotic medication may effectively relieve the symptoms that are causing said aggression.

All forms of aggression have been found to impede treatment in these settings, and thus, all forms must be targeted in treatment (Fluttert, 2010). To address aggressive behaviour among forensic psychiatric patients, efforts should be expended to assess the different forms of aggression, how they relate to each other, and what the motivations behind them are. It is important to note, however, that individuals within forensic psychiatric hospitals have a greatly reduced opportunity to be aggressive compared to those living out in the community. These individuals are

closely monitored and there are many rules in place to prevent aggression (e.g., individuals at risk for aggressive behaviour have fewer privileges and more supervision than those who have no history of aggressive behaviour). Thus, rates of aggression within this population may under-represent their overall propensity for aggressive behaviour. Further, individuals who have committed premeditated aggressive crimes (e.g., to access drugs or money) may elicit no aggressive behaviour within the hospital, since the opportunities to attain these resources are limited. Thus, it is expected that incidents of impulsive aggression will be more common than premeditated aggression in forensic psychiatric hospitals.

1.5 A Definition of Aggression

For the present purposes, aggression is defined as any form of intended verbal or physical behaviour directed toward another living being or the self that proactively or reactively causes (or could reasonably cause) unwanted psychological or physical harm to the target of this behaviour. This definition was inspired by a number of formal definitions (e.g., Anderson & Bushman, 2002; Baron & Richardson, 1994) and adapted to the forensic psychiatric context. While a broad definition, it provides an inclusive framework with which to conceptualize aggressive behaviour and incorporates behaviours that are inconsistently defined within the aggression literature, such as sexual aggression and self-harm. All “aggressive” behaviours that are included in this study (i.e., all behaviours that are considered aggressive and included in data analysis) fall under the definition laid out above.

It is important to note that the words “aggression” and “violence” are often used interchangeably in the literature and in the media (Hoaken et al., 2012). The

word “violence”, however, owns a connotation of being predominately physical in nature, whereas aggression is a more all-inclusive term. Anderson and Bushman (2002) suggest that the term violence is often used to denote more extreme forms of aggression. Given that violence would be subsumed within the definition above, the term aggression will be used exclusively from this point forward.

1.6 Treatments for the “Untreatable”

The safety of patients and staff is of paramount priority. Until aggression can be effectively managed within forensic psychiatric settings, it is not necessarily safe for mental health care practitioners to provide empirically-based psychotherapeutic approaches to help treat this population. Forensic mental health professionals and supporting institutional staff have voiced important trepidations regarding the practicability of both group therapy and individual therapy sessions across therapeutic modalities with aggressive patients. Indeed, while regular individual therapy sessions would be ideal for a population characterized by such severe, treatment-resistant, and pervasive mental disorders (McCann et al., 2000), the available resources in many forensic psychiatric hospitals are limited and simply cannot support that level of individualized care (Bowers et al., 2011). Further, individual therapy sessions with highly aggressive individuals may not be safe or productive for either the patient or the mental health professional.

Inpatient group therapy, while far more cost-effective and time-efficient than individual therapy (Kösters, Burlingame, Nachtigall, & Strauss, 2006), also presents some notable issues. In forensic psychiatric settings, patients with a history of aggressive and impulsive behaviour are often considered by institutional staff to be

too unpredictable to participate in group therapy (Dickens, Piccirillo, & Alderman, 2013; Nicholls et al., 2009). These individuals may also be excluded from group activities within the institution, which could further increase their feelings of frustration and defeat (Evershed et al., 2003). The increased security concerns associated with conducting research within these settings have hampered program evaluations of the psychotherapeutic treatments currently being implemented (Evershed et al., 2003). Thus, it is challenging to determine what outcome variables these therapies are targeting and whether they are effective.

Due to the challenges associated with psychotherapeutic approaches, pharmacotherapy is often the frontline treatment for aggressive forensic psychiatric patients, especially those with personality disorders and/or highly disruptive behaviours (Black, 2013; Tyrer, Duggan, & Coid, 2003). While pharmacotherapy is often an important element of an effective treatment package, it is neither sustainable nor practical on its own, as many individuals cease taking their medication or take it incorrectly upon release from their psychiatric institution (Tyrer et al., 2003). Arguably more importantly, pharmacotherapy does not offer individuals any concrete skills (e.g. coping, emotion regulation) with which to function in society. Skills that promote improved executive functioning (e.g., planning, working memory), for example, have been consistently negatively associated with antisocial behaviour and aggression (Alfred & Heilbrun, 1985; Henry & Moffitt, 1997; Morgan & Lilienfeld, 2000; Sprague, Verona, Kalkhoff, & Kilmer, 2011). Thus, therapeutic approaches targeting the skills deficits from which forensic psychiatric patients suffer are expected to promote rehabilitation in this population (Chambers, Eccleston, Day,

Ward, & Howells, 2008; Hoaken, Allaby, & Earle, 2007; Levi, Nussbaum, & Rich, 2010). To ensure that these interventions are being safely implemented, however, aggression needs to be targeted and reduced. Encouragingly, intensive therapeutic approaches that focus on both psychiatric symptoms and maladaptive behaviours exist.

Dialectical behaviour therapy (DBT) is the most empirically-supported treatment for both reducing maladaptive behaviours and increasing adaptive behaviours in challenging psychiatric populations. DBT has been widely supported for use with forensic psychiatric patients diagnosed with borderline personality disorder (Evershed et al., 2003; Linehan et al., 2015; Neacsiu, Lungu, Harned, Rizvi, & Linehan, 2014; O'Connell & Dowling, 2014; van den Bosch, Hysaj, & Jacobs, 2012) and is now being implemented to treat individuals with antisocial personality disorder (McCann, Ivanoff, Schmidt, & Beach, 2007; Pein et al., 2012; Vitacco & Van Rybroek, 2006). Importantly, DBT has also been deemed one of the most promising therapies for reducing treatment-interfering behaviours, such as physical aggression among individuals with borderline personality disorder in forensic settings (Evershed et al., 2003; Long, Fulton, Dolley, & Hollin, 2011; Sakdalan, Shaw, & Collier, 2010; Shelton, Sampl, Kesten, Zhang, & Trestman, 2009).

While DBT is currently being used in several forensic settings around the world with patients suffering from personality disorders (Evershed et al., 2003; McCann et al., 2000), psychotic disorders (e.g., McCann et al., 2000; McCann, Comtois, & Ball, 2006; McCann et al., 2007), and psychopathy (Galietta & Rosenfeld, 2012; Harris & Rice, 2006), no studies have evaluated DBT's

effectiveness in reducing aggressive behaviours among forensic psychiatric patients with a range of psychiatric diagnoses. McCann and colleagues (2000) did assess DBT in a forensic psychiatric population with multiple diagnoses, however they did not specifically evaluate aggressive behaviour. Thus, it is currently unclear whether DBT is an effective approach for reducing aggression among forensic psychiatric patients in general.

Assessing whether DBT is effective in a general forensic psychiatric population is imperative, as comorbidity is the rule rather than the exception in this population (Palijan et al., 2009). Recent data suggest that forensic psychiatric patients often suffer from personality disorders, mood disorders, psychotic disorders, and most patients suffer from a comorbid substance use disorder (Crocker et al., 2015; Palijan et al., 2009). Thus, focusing treatments on specific disorders may not be effective, as they neither account for comorbid diagnoses nor the general behaviours that hinder therapy.

If DBT can be shown to reduce aggression and promote rehabilitation in forensic psychiatric hospitals, it could reduce the length of hospitalization, reduce the financial costs associated with treating this population, help individuals successfully reintegrate into society, and protect public safety.

1.7 Dialectical Behaviour Therapy

Marsha Linehan developed DBT in the 1980s to treat highly emotionally, cognitively, and behaviorally-dysregulated women, many of whom met diagnostic criteria for borderline personality disorder (Linehan, 1993). This therapy is a cognitive behavioural approach that incorporates eastern mindfulness practices and

typically involves individual psychotherapy, group skills training, telephone coaching, and a therapist consultation team (Linehan, 1993, 2014). DBT is now considered the front-line treatment for borderline personality disorder (Linehan et al., 2015; O'Connell & Dowling, 2014) and has been consistently shown to significantly reduce symptoms such as self-injurious behaviour, anger, and hopelessness among women with borderline personality disorder (Knabb, Welsh, & Graham-Howard, 2011; Linehan et al., 2015; Neacsiu, Lungu, et al., 2014). DBT reduces these symptoms by focusing on the improvement of skill sets involving mindfulness, interpersonal effectiveness, emotion regulation, and distress tolerance (Fluttert, 2010; Linehan, Comtois, Murray, & et al., 2006; Linehan, Heard, & Armstrong, 1993). Each of these skill sets is captured within a “module” that is taught to the group by a DBT leader and co-leader. Each module is then discussed by the group to determine how it applies to the group members, and how they can learn to implement these skills in their daily lives (Crowell, Beauchaine, & Linehan, 2009; Linehan, 2014).

DBT teaches individuals to develop a “radical acceptance” of the fact that two seemingly opposing forces can exist at the same time without conflicting (Linehan, 1993, 2014). For example, individuals can be content with who they are as individuals and simultaneously want to change. DBT works with this “dialectic” by providing individuals with a validating environment that accepts them as intrinsically worthy, while it simultaneously encourages them to adopt and apply more functional ways of thinking and behaving (Linehan, 1993, 2014). Over the course of DBT, the group leaders strive to (1) enhance and maintain clients’ motivation to change; (2) improve and develop clients’ problem-solving and coping strategies in response to

different emotions and stimuli; (3) ensure that the clients' skills are generalized to all relevant environments; (4) support the therapists' motivation to treat clients; (5) to enhance the therapists' capabilities (6) and to create an environment conducive to treatment (Linehan et al., 2006).

DBT initially targets maladaptive behaviour patterns, including life-threatening therapy-interfering behaviours, and quality-of-life interfering behaviours, of which forensic psychiatric patients have many (Dimeff & Koerner, 2007). Life-threatening behaviours include behaviours such as suicide and violence. Therapy-interfering behaviours include behaviours such as skills training groups, showing up to therapy intoxicated, or not completing homework (Linehan, 1993, 2014). Quality-of-life interfering behaviours include substance dependence and depression.

Promisingly, since DBT is designed to target the very behaviours that make therapy challenging, it has become an attractive option for both forensic and correctional populations (Berzins & Trestman, 2004; Evershed et al., 2003). Over the past few decades, DBT has garnered substantial empirical support in several challenging psychiatric populations (Dimeff & Koerner, 2007; Robins & Chapman, 2004) and has been informally referred to as the "treatment for the untreatable" (Dingfelder, 2004; Pickersgill, 2013).

1.8 How Does Dialectical Behaviour Therapy Meet the Demands of the Forensic Psychiatric Setting?

DBT is appropriate for forensic psychiatric settings for five major reasons. First, DBT has shown consistent success in treating individuals with personality disorders. DBT was originally designed to treat women diagnosed with borderline personality

disorder (Linehan, 1993), and is now showing considerable promise in treating individuals diagnosed with antisocial personality disorder (Dimeff & Koerner, 2007). As mentioned previously, borderline personality disorder and antisocial personality disorder are among the most frequently diagnosed disorders within forensic psychiatric settings. Therefore, the success of DBT in treating disorders that are prevalent within forensic psychiatric settings suggests that it may be appropriate for this population (Dingfelder, 2004).

Second, research has shown that highly structured cognitive-behavioural treatment approaches with clear behavioural targets are associated with reduced recidivism in forensic psychiatric populations (Robertson, Barnao, & Ward, 2011), which aligns with DBT's structure and theoretical approach. DBT is also a long-term therapeutic approach, often ranging from several months to over a year (Linehan, 2014). Long-term therapeutic approaches have consistently demonstrated superior success to either short-term or unstructured treatments among individuals with personality disorders (Dimeff & Koerner, 2007).

Third, managing and reducing life-threatening and therapy-interfering behaviour is a critical need within forensic psychiatric populations (Bader et al., 2014; Hart, 2002). DBT specifically targets aggressive behaviour, and, in doing so, addresses factors that impede the effectiveness of treatment. Reduced life-threatening and therapy-interfering behaviour is also extremely important for the wellbeing and safety of staff in forensic settings.

Fourth, DBT includes consultation groups for the DBT leaders so that they can discuss their experiences of leading DBT and be validated and supported throughout

the therapeutic process. This component is essential to DBT, as it can help reduce staff burnout and address feelings of frustration and resentment, which are consistent challenges among staff working with forensic psychiatric populations (Happell, Martin, & Pinikahana, 2003; Vitacco & Van Rybroek, 2006; Wong & Hare, 2001).

Fifth, the four skills modules (mindfulness, interpersonal effectiveness, emotion regulation, and distress tolerance) effectively map on to many of the problematic behaviours that characterize forensic psychiatric patients and contribute to aggressive behaviour. I will delineate the four skills modules below and provide a theoretical basis on which to support their use in a forensic psychiatric population.

1.8.1. Mindfulness. Mindfulness is conceptualized as participating in life while being non-judgmental, aware, and observant (Linehan, 2014). This skill often requires individuals to separate themselves from situations in order to absorb their surrounding experience without manipulating it. Effective communication is another essential component of mindfulness. Being able to describe and communicate sensations and experiences can help individuals express their thoughts and feelings accurately and clearly. This skill may also help individuals to organize experiences and increase self-control (Borders, Earleywine, & Jajodia, 2010; Heppner et al., 2008).

In the forensic psychiatric context, mindfulness skills can effectively assist patients in being more aware of what triggers them to behave inappropriately. For example, individuals who absorb experiences non-judgmentally may be better able to control their immediate, potentially maladaptive, emotions, reactions, and automatic responses to each experience. Understanding what can trigger maladaptive behaviour,

such as aggression, can help individuals to better navigate conflicts and to inhibit behaviours that are inappropriate and incompatible with social and institutional expectations (Linehan, 1993, 2014). Forensic psychiatric settings often provide individuals with consistent boundaries, rules, and schedules. This level of structure may facilitate the practice of mindfulness, as triggers may be more stable and predictable than in the outside world. In this way, increasing mindfulness within forensic psychiatric settings may lead to reduced aggression, increased self-control, reduced impulsivity, and heightened awareness of life-threatening and therapy-interfering behaviours within and outside of forensic institutions (Howells, Tennant, Day, & Elmer, 2010). Further, data suggest an empirically-supported negative association between mindfulness and aggressive behaviour among psychiatric populations (Borders et al., 2010; Heppner et al., 2008; Singh, Lancioni, Singh Joy, et al., 2007; Singh, Lancioni, Winton, et al., 2007).

1.8.2 Interpersonal effectiveness. Interpersonal effectiveness is conceptualized as a series of interpersonal response patterns that allow individuals to effectively ask for what they need, be clear about what they want or need from a situation (e.g., saying “no” to a substance of abuse), and cope with interpersonal conflict (Linehan, 2014). In this context, effectiveness refers to obtaining the changes that a person wants in a relationship, maintaining relationships, and maintaining self-respect. Given that aggressive behaviour is commonly directed toward another individual, enhancing interpersonal effectiveness may directly decrease individuals’ propensity to behave aggressively with other individuals.

In the forensic psychiatric context, patients are often unable to choose with

whom they interact. Rather, they are typically placed in groups with individuals who often have similar needs and similar deficits. Given that forensic psychiatric patients are often characterized by having substantial interpersonal difficulties, living in constant close proximity to other individuals with similar interpersonal challenges inevitably fosters conflict (Heppner et al., 2008). In DBT, patients are encouraged to empathize, support, and collaborate with their fellow group members. Naturally, this is extremely challenging for many of the patients (Heppner et al., 2008). In this way, working on interpersonal deficits in DBT is not only beneficial for the therapeutic process, but it may help these patients function more adaptively within the forensic environment overall.

Research has shown that interpersonal deficits lead to distress for individuals in custody. McMurrin, Theodosi, Sweeney, and Sellen (2008) reported that improving relationships and increasing self-control were the most commonly cited treatment goals among males in a correctional facility. This is an important finding, as individuals in forensic psychiatric and correctional settings may be highly motivated to work on these skills, and may be acutely aware of the benefits that increased interpersonal functioning can afford them (McMurrin et al., 2008).

1.8.3 Emotion regulation. Emotion regulation is conceptualized as a non-judgmental observation and description of an individual's current emotional responses so that the responses can be more effectively controlled and altered (Linehan, 2014). The non-judgmental aspect is critical, as Linehan (1993) theorizes that individuals are most distressed by what she calls "secondary emotions". "Secondary emotions" are the emotions that come as a result of a prior intense

emotions (e.g., guilt, shame, anxiety; Linehan, 2014). For example, individuals may feel shame after becoming angry with someone. Linehan suggests that it is the shame, rather than the anger, that causes individuals with emotional dysregulation to be most distressed. In order to reduce the distressing “secondary emotions”, this skills-training module focuses on being mindful and non-judgmental about one’s natural response to events. While doing this, individuals may be more aware of what triggers their emotions, how they interpret situations, and why they react the way that they do. Impulsive aggression, which is characterized by becoming highly aroused in response to environmental stimuli, often escalates due to emotional dysregulation. It is highly likely that individuals who increase their ability to manage their emotional reactions will engage in less impulsive aggression.

In forensic psychiatric settings, where the consequences of such behaviour can be significant (e.g. losing privileges, seclusion and restraint, longer hospitalizations), the benefits of improved emotional control are clear. Within the forensic psychiatric literature, emotional dysregulation has been highlighted as an important dynamic risk factor for recidivism (Day, 2009). Therefore, this component of DBT has already been identified as a treatment priority within forensic psychiatric settings.

1.8.4 Distress tolerance. Distress tolerance is characterized by learning how to survive during crises without making the situation worse (Linehan, 2014). Four sets of crisis survival strategies are taught in the module: distracting, self-soothing, improving the moment, and thinking of pros and cons. These strategies must be met with complete acceptance of the situation (choosing to accept reality the way it is). The patient must learn that some things cannot be changed and that there are

behavioural skills that can be learned and used to make the situation better or more palatable.

In forensic psychiatric settings, patients have been involuntarily admitted to a psychiatric hospital – an event that is frequently associated with marked distress. Learning to cope with the current situation in an accepting and non-judgmental way is understandably challenging. At the same time, many of the patients within forensic facilities spend long periods of time within these institutions and learning to accept this reality has the potential to be highly liberating. For individuals with a propensity for aggressive behaviour, learning to incorporate some of these strategies (e.g., thinking of the pros and cons associated with being aggressive, or self-soothing as a way to calm down) may naturally reduce aggressive behaviour within forensic settings.

To summarize, the tenets and modules of DBT meet several institutional needs within forensic psychiatric settings. Patients are offered the skills they need to engage in more adaptive, self-enhancing activities that may contribute to more efficient and effective rehabilitation. Therapeutic gains may facilitate patients' progress through the forensic psychiatric system and may assist them in receiving a conditional disposition or an absolute discharge. For the staff, DBT may provide support and motivation to commit to and enjoy working with such a challenging population. In turn, such benefits may reduce staff burnout and turnover, which may increase the continuity and quality of care within the facility. If patients can learn the skills and strategies that they need to live independently and safely within the community, they may become gainfully employed and may develop into contributing

citizens. The following section will outline how DBT has been used in forensic psychiatric populations. While the general foundations of each module has a theoretical basis for being effective in the population, many of the specificities of this therapy have been altered to better account for the unique factors inherent to forensic psychiatric patients.

1.9 Forensic Adaptations of Dialectical Behaviour Therapy

Multiple correctional and forensic facilities have implemented modified versions of dialectical behaviour therapy, and initial reactions to this therapy by both staff and patients have been exceedingly positive (Berzins & Trestman, 2004; Dimeff & Koerner, 2007; Galietta & Rosenfeld, 2012; McCann et al., 2000; van den Bosch et al., 2012). McCann, Ball, and Ivanoff (2000)¹ were the first to systematically modify DBT so that it could be implemented effectively with an inpatient forensic psychiatric population, many of whom present with an antisocial organization of symptoms, and many of whom are male.

First, they altered the pronouns and hypothetical situations outlined in the manual to better reflect the fact that forensic patients are predominantly male (whereas individuals with borderline personality disorder are more often female). For example, the manual discusses participating in calming activities, such as flower arranging, when experiencing stress. McCann and colleagues (2000) incorporated the ideas of their forensic patients in order to alter these suggested activities to appeal

¹ While several institutions have implemented forensic psychiatric adaptations of DBT, there is no published manual for conducting DBT in a forensic psychiatric setting. Monica Tomlinson is currently collaborating with Dr. Nina Desjardins and staff at the Southwest Centre for Forensic Mental Health Care to publish a manualized forensic adaptation of DBT.

more generally to male, forensic psychiatric patients (e.g., watching a football match).

Second, McCann and her colleagues re-wrote the emotion-regulation model to include skill-development in areas such as emotional attachment, empathy, and “random acts of kindness” (an activity designed to help individuals practice caring behaviours). To accompany these practices, this adaptation also discussed problematic beliefs such as “The weak deserve to be exploited”. Other implementations have added work on “Criminal Thinking Errors”, which explain how to adaptively use feelings, like anger and fear, to guide behaviour (Berzins & Trestman, 2004).

Third, McCann and colleagues (2000) altered the individual therapy sessions to focus on building skills rather than discussing life events. The reason for this change is that, in forensic psychiatric settings, DBT leaders are often in close contact with the patients. The DBT leaders are already aware of the patients’ daily schedules and are part of most daily events. Thus, rather than using individual therapy session to discuss life events, McCann and her colleagues altered the manual to focus on skill sets related to DBT. Further, if a DBT leader is aware of a problematic behaviour within the hospital, he or she could conduct behavioural chain analyses immediately rather than waiting to complete it during group or individual therapy sessions (McCann et al., 2000).

Lastly, McCann and colleagues (2000) altered the manual to prohibit any communication with DBT leaders outside of the forensic setting. In standard outpatient DBT, it is common for patients to telephone their DBT therapist should

they be in distress. Given the potential for egregious boundary violations and security concerns within forensic psychiatric populations, this component of outpatient DBT is rarely implemented in forensic psychiatric settings (McCann et al., 2000). Instead, efforts are consistently made to surround the patients with institutional supports should they need guidance. Other adaptations of DBT with forensic psychiatric outpatients have included telephone coaching (without incident) by using a telephone service that forwards calls from a toll-free number to the therapist's phone, to avoid distributing personal contact information (Galietta & Rosenfeld, 2012).

To date, forensic-adapted versions of DBT, which have closely resembled McCann, Ball, and Ivanoff's adapted version, have been implemented in the Netherlands (van den Bosch et al., 2012), New Zealand (Sakdalan & Gupta, 2014; Sakdalan et al., 2010), the United States of America (Galietta & Rosenfeld, 2012; Rosenfeld et al., 2007; Shelton, Kesten, Zhang, & Trestman, 2011; Shelton et al., 2009), the United Kingdom (Evershed et al., 2003), and Canada (McDonagh, Taylor, & Blanchette, 2003).

1.10 The Present Study

The objective of the current research is to empirically support the use of a forensic-modified version of DBT (similar to that of McCann, Ball, and Ivanoff's [2000] adaptation) to reduce aggression in a forensic psychiatric population. Other, related, outcomes were measured (i.e., anger, hostility, mindfulness, and emotion regulation) to assess whether DBT is also targeting the underlying mechanisms that are theoretically associated with aggressive behaviour in this population. Two six-month-long DBT groups were conducted and evaluated to assess the effectiveness of

DBT in reducing aggression, anger, and hostility, and promoting mindfulness and emotional regulation. The two groups were compared to each other using a quasi-experimental randomized wait-list control crossover design. Each group was evaluated at five time points over the course of a year. Thus, each group was evaluated over six months of DBT and six months of standard treatment within the hospital.

Method

2.1 Participants

Eighteen participants (14 male, 4 female) were recruited for the present study. Participants were randomly assigned to begin DBT either in the first group (first six months of the study; *Table 1*) or the second group (second six months of the study; *Table 2*). Of note, similar studies have also been restricted to similar sample sizes, as DBT groups can hold a maximum of 10 participants at a time (Linehan, 1993). Further, attrition is common in this population. Studies have reported attrition rates of up to 64% in this population (Galietta & Rosenfeld, 2012; McCann et al., 2000). Sample sizes of studies evaluating patients in DBT in a forensic psychiatric context range from $N = 6$ (Wolpow, Porter, & Hermanos, 2000) to $N = 35$ (McCann & Ball, 2000).

When the study began, all participants were under custodial dispositions from the Ontario Review Board, and were all patients of a medium-security forensic psychiatric hospital in Ontario. Within the hospital, individuals were given different privilege statuses based on their behaviour and clinical risk. Participants with higher levels of privilege were able to access the community at varying degrees. Some were able to leave the hospital for multiple days at a time on a Leave of Absence (LOA).

Thus, participants may have been either in the hospital, on short-term LOAs, or on longer-term LOAs (e.g., three months) at different points in the study. It is important to note that this study did not interfere with these dispositions (i.e., participants did not have to remain in the hospital until the completion of DBT if their behaviour significantly improved), and participants attended Ontario Review Board evaluations as scheduled. Within the first month of DBT, one participant significantly psychiatrically decompensated and lost the capacity to consent. He was immediately withdrawn from the study.

Therefore, 17 participants (13 male, 4 female) contributed to at least one of the five data collection sessions, and were included in data analysis. Participants' ages ranged from 22 to 61 years old ($M = 41.06$, $SD = 12.27$). Fourteen participants identified as Caucasian/White, one identified as Aboriginal, one as Asian/Pacific Islander, and one as East Indian. Participants had been under the supervision of the forensic mental health care system for an average of 43.37 ($SD = 18.23$) months, or 3.6 years. Fifty percent of participants entered the forensic mental health care system due to a violent index offence causing bodily harm (e.g., stabbing). The other participants' offences did not involve physical aggression (e.g., theft, uttering threats), although the majority were deemed high risk by the HCR-20 (Douglas et al., 2013). Psychiatric assessments of each participant were completed within the last year, and patients' diagnoses ranged widely (see *Table 1 and Table 2*). The diagnostic profile of this group adds further support to the evidence that programs within these settings must be adaptable to a wide range of diagnostic groups, rather than focusing on one group exclusively (e.g., borderline personality disorder).

Over the course of the year, no participants completed any other structured therapy. One participant's charts mentioned that his psychologist was using cognitive behavioural therapy during individual therapy sessions, although no further information was available. There was no evidence to suggest that any participants were in any other structured psychotherapy. Although all participants were inpatients at the beginning of the study, seven participants (43%) lived in the community by the end of the study and were monitored by the outreach team. One participant received an absolute discharge, and was no longer part of the forensic mental health care system. Given that the outreach team would only report significant incidents of aggression that were brought to their attention, aggressive behaviour was much harder to assess in the second half of the study, when the second group was in DBT. As a result, staff-report incidents of aggression are more accurate in the first six months of the study, as participants were more likely to be under constant supervision. At the same time, however, participants must have a consistent record of good behaviour to receive community access, thus, it is likely that aggression was rare, if not non-existent, when individuals were living in the community.

2.1.1 Inclusion and exclusion criteria. All participants were referred to DBT by mental health professionals due to their therapy-interfering behaviours, and, thus, already met the criteria for the population this research sought to assess. Participants were included in the study if; (a) they were deemed capable of providing consent (each participant was evaluated by a psychiatrist); (b) they were able to read and write English; and (c) they were able to type answers on a computer keyboard. All individuals referred to DBT met these criteria. Therefore, all referred patients were eligible to participate.

Participants were withdrawn from the study if they; (1) were no longer capable of providing informed consent; (2) missed three sessions without appropriate notice to the group leaders (as is standard DBT protocol according to the guidelines); (3) became physically aggressive toward other group members, themselves, or the staff during group or individual therapy; (4) put themselves, the staff, and the other group members at risk at any point; (5) could no longer attend DBT due to a change in their security status (e.g. if they were placed in seclusion or restraint, or could no longer leave their unit) for a period of three or more group therapy sessions.

Importantly, there are no data to support gender differences in the prevalence rates of aggression among forensic psychiatric patients (Nicholls et al., 2009). Thus, both female and male patients were included in this study.

Table 1

Demographic Information For Participants in Group One (DBT 1 and TAU 2)

Participant #	Participant's group	HCR-20 V3 Risk level	# of data collection sessions attended (out of five)	Sex	Age	Education	Current Diagnoses (based on patient files)	Status at end of study	Number of years in forensic mental health care system	Index Offense
1	1	Low-Moderate Risk	4	Male	29	10th grade	Substance use disorder, antisocial personality disorder, schizophrenia	Outpatient	2.24	Dangerous driving, breach of probation, possession
2	1	High Risk	5	Male	28	10th grade	Antisocial personality disorder, borderline personality disorder, narcissistic personality disorder	Inpatient	5.72	Assault, uttering threats
3	1	High Risk	5	Male	38	11th grade	Substance-induced psychosis, adjustment disorder with depression, personality disorder with antisocial features	Inpatient	1.93	Robbery, uttering threats, assaulting a police officer

4 (dropped out)	1	High Risk	1	Male	50	High school diploma	Schizophrenia, substance use disorder, depression (chronically suicidal)	Inpatient	1.67	Uttering threats
5	1	Low Risk	5	Female	46	High school diploma	Delusional disorder - erotomanic type	Inpatient	2.41	Uttering threats
6 (dropped out)	1	N/A	0	Male	49	N/A	Schizophrenia	Inpatient	4.19	Assault
7	1	Very High Risk	5	Male	38	9th grade	Substance use disorder	Inpatient	4.41	Attempted murder
8	1	High Risk	5	Female	60	High school diploma	Bipolar disorder, schizoaffective disorder	Outpatient	2.62	Aggravated assault
9	1	Moderate-High Risk	1	Female	63	High school diploma	Schizoaffective disorder, substance abuse disorder, borderline personality disorder	Outpatient	4.72	Uttering threats

Table 2

Demographic Information for Participants in Group Two (TAU 1 and DBT 2)

Participant #	HCR-20 V3	# of data collection sessions attended (out of five)	Sex	Age	Education	Current Diagnoses	Status at end of study	Number of years in forensic mental health care system	Index Offence
1	Low Risk	4	Male	37	High school diploma	Schizophrenia	Inpatient	2.62	Aggravated assault, attempted murder
2	Low Risk	3	Female	45	College degree	Bipolar disorder	Absolute Discharge	6.07	Assault with a weapon, uttering threats, theft
3	High Risk	4	Male	29	High school diploma	Schizophrenia, substance use disorder	Inpatient	3.05	Attempted murder
4 (dropped out)	High Risk	1	Male	22	N/A	Anxiety disorder NOS, autism spectrum disorder, narcissistic personality disorder, bipolar disorder, schizotypal personality disorder	Inpatient	1.87	Uttering threats, arson
5	High Risk	4	Male	49	Two years of university	Antisocial personality disorder, delusional disorder – persecutory type, substance use disorder, bipolar disorder	Inpatient	4.13	Uttering threats, arson
6	Low Risk	3	Male	62	11th grade	Schizoaffective, narcissistic	Outpatient	2.64	Harassment

7	Low Risk	5	Male	30	9th grade	personality disorder Schizoaffective disorder, substance use disorder, antisocial personality disorder	Outpatient	5.07	Theft, uttering threats
8	High Risk	3	Male	37	College degree	Borderline personality disorder with psychosis	Outpatient	2.79	Aggravated assault, damage to property
9	Low Risk	4	Male	50	High school diploma	Narcissistic personality disorder, bipolar disorder, substance use disorder, fetishistic disorder	Outpatient	3.05	Sexual assault, forcible confinement, aggravated assault

2.2 Design

To evaluate the effectiveness of DBT in reducing aggression, anger, and hostility in a forensic psychiatric population, I employed a quasi-experimental crossover design using a waitlist control group. I recruited forensic psychiatric patients ($N = 18$) based on referrals from a forensic psychiatric hospital in Southwestern Ontario, Canada. It was not possible to recruit more than 20 individuals, as a maximum of 10 people could be in each DBT group and resources at the hospital did not allow for multiple concurrent DBT groups to be run. I randomly assigned nine forensic psychiatric patients to begin DBT immediately for six months (group one) and nine to begin DBT six months later (group two), once the first group had completed DBT.

Within the first month of the study the first group dropped to seven participants, and the second group dropped to eight participants. The second group was the treatment as usual (TAU) control group while the first group participated in DBT. Half way through the study, these groups switched roles. The TAU group became the second DBT group and the first DBT group became the second TAU group. *Figure 1* represents the study design. Groups are labeled based on their status at different points in the study. Labels such as DBT 1 and TAU 2 will be used to help depict which groups were compared during analyses (e.g., DBT 1 was compared to TAU 1).

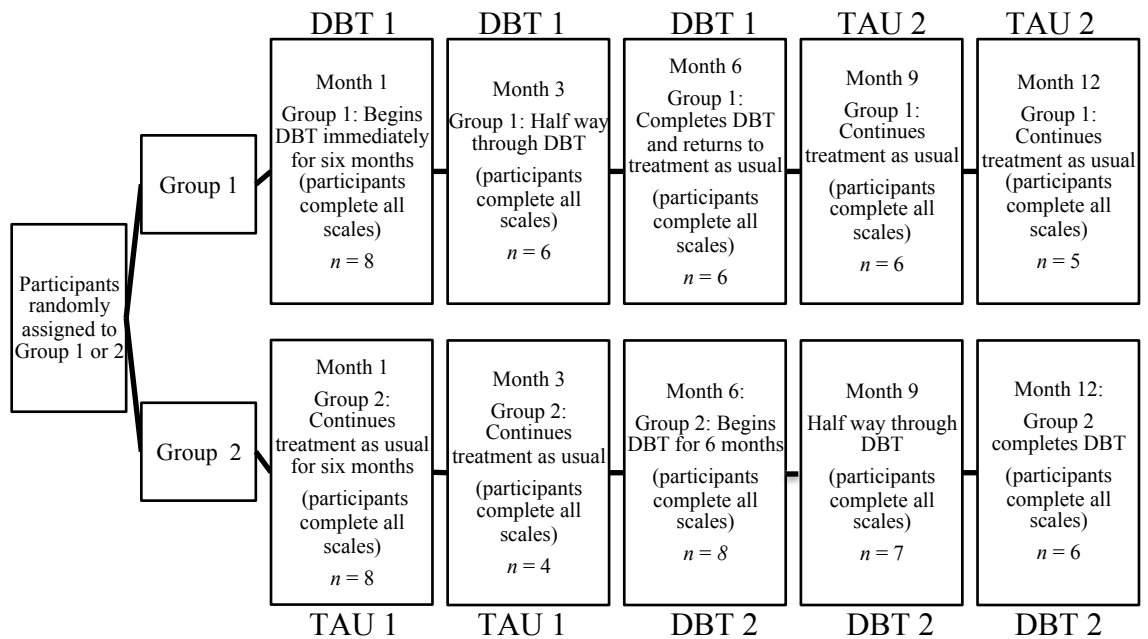


Figure 1. Study design: A representation of the quasi-experimental crossover design with a waitlist control group. The number of individuals who contributed to each data collection session is presented. Note that only five individuals in the first group and three individuals in the second group contributed to all data points. Participants may not have completed all scales at each data point. Thus, missing data was common.

2.2.1 The crossover design. The crossover design was selected instead of a case-control design for multiple reasons. First, given that this design follows up the same individuals over time, each participant was able to serve as his or her own control (Wellek & Blettner, 2012). This aspect is important, as it naturally avoids problems with the comparability of treatment versus control groups with regards to confounding variables (e.g., psychiatric disorder, age, sex). Further, since both groups were followed-up over a year, this design allows inferences to be made about the long-term effects of DBT (for group one), and whether DBT produces significant gains compared to baseline

levels on the outcome measures being evaluated (for group two). To elaborate, given that the first group is in DBT for six months and then returns to their regular treatment at the hospital, inferences can be made about whether DBT is associated with positive patient outcomes (e.g., reduced aggression, increased mindfulness), and whether these gains last up to six months after DBT. Comparatively, given that the second group is in TAU for six months and then begins DBT, this group can be used to determine whether participants were stable on the outcome measures before DBT, and whether changes in performance increased during DBT.

Moreover, crossover designs require lower sample sizes compared to parallel (case-control) designs to meet the same criteria in terms of Type I and Type II error risks (Wellek & Blettner, 2012). This is because the variance due to within-subject variability is typically smaller in this design. To illustrate, six times as many participants would be required to achieve the same power in a case-control study compared to a crossover design study (Wellek & Blettner, 2012). It is important to note, however, that crossover designs require more significant time commitments on the part of participants, as crossover designs require multiple evaluations of the same participants (rather than simply comparing pre-test and post-test results of a case-control study). This was a significant challenge with this study, as several participants were not able to contribute to all time points in the study, or did not complete all measures at each data collection session.

Fortunately, crossover designs also have a case-control component. In the first six months of the study, the first DBT group was compared to the waitlist control group (DBT 1 compared to TAU 1). Further the two DBT groups were compared during the

months that they were in DBT (DBT 1 compared to DBT 2), to determine whether the effects of DBT were similar for different DBT groups. Therefore, this design allowed participants to be compared to themselves, and compared to similar individuals who had been previously identified as eligible for DBT.

I collected data at five time points. There are two major reasons for this decision. First, having five time points allowed for pre-, mid-, and post-DBT analyses for each group, which is common in the literature on DBT studies with forensic populations (e.g., Evershed et al., 2003; Nee & Farman, 2005). To clarify, times one, two, and three corresponded to months one, three, and six of the study (pre-, mid-, and post-DBT for group one). Times three, four, and five corresponded to months six, nine, and twelve of the study (pre-, mid-, and post-DBT for group two). Since the first group finished DBT on month six, and the second group began DBT on month six, the middle time point (time three) served as a post-DBT measure for the first group and a pre-DBT measure for the second group. Thus, group one had a pre-DBT evaluation (month one), a mid-DBT evaluation (month three), a post-DBT evaluation (month six), and two follow up evaluations (months nine and twelve). Group two, on the other hand, had the reverse order of evaluations. Group two had three pre-DBT evaluations (months one, three, and six), one mid-DBT evaluation (month nine), and one post-DBT evaluation (month twelve).

Further, more frequent evaluations may subject participants to higher carry-over effects on each measure (Gardner & Tremblay, 2007). For example, in the first validation study of the Buss-Perry Aggression Questionnaire, participants were re-administered the test nine weeks apart, to avoid such carry-over effects (Buss & Perry, 1992). Other scales

have been re-administered as early as four weeks (e.g., the Novaco Anger Inventory; Mills, Kroner, & Forth, 1998). Thus, having three months in between data collection sessions may have reduced the likelihood of carry-over effects.

2.3 Procedure

2.3.1 Data collection. During data collection sessions, I guided participants into a quiet room with a computer. Self-report measures were all presented on the computer using SurveyMonkey software. Each data collection session was approximately one hour in duration (ranging from 20 minutes to three hours, depending on the participant). If participants were not able to use a computer (due to a restriction in their privileges), I printed a copy of the scales and complete them with the participant in his or her ward. If participants were living in the community, an outreach nurse would complete the scales with them either on the computer, or on a printed copy of the scales. All participants were expected to complete all scales at the same five time points over a one-year period (see *Figure 1*).

2.3.2 Dialectical behaviour therapy. Three certified DBT leaders conducted DBT in groups of 8-10 participants. Linehan (1993) typically suggests having groups with a maximum of 6-8 participants, however I included more participants to account for high attrition rates in this population. One of the leaders was a psychiatrist and the other two were social workers. The same three leaders conducted DBT with both groups. The psychiatrist and one of the social workers taught the skills groups and the second social worker attended all groups, and helped teach the skills modules if one of the other leaders was unavailable. The DBT leaders completed an intensive DBT training course through the Centre for Addiction and Mental Health, as well as a DBT certificate through

Behavioural Tech (<http://behavioraltech.org/index.cfm>) in December 2013. While the DBT group closely followed standardized DBT in many respects (e.g., closely followed each skills module, used DBT worksheets/homework sheets, filled out weekly diary cards [on which each participants tracks his or her skills use during each week]), important changes were made to better account for the forensic psychiatric setting. For example, given the limited resources at this hospital, and given that all patients have access to individualized therapy with psychologists and psychiatrists at the hospital, the standardized individual therapy component was excluded from this adaptation. However, participants were given one-on-one assistance when they asked for it, or when the DBT leaders believed a patient needed it. Over the course of the study, every participant had at least one one-on-one session with a DBT leader. Excluding the individual therapy component of DBT has become increasingly common due to limited resources in inpatient settings. Of those researchers that have evaluated stand-alone skills training, there is now mounting evidence that skills training alone can be highly effective in multiple settings (Linehan, 2014). A recent study that compared stand-alone skills training to standard group therapy found the stand-alone skills training demonstrated greater gains than non-DBT group therapy alone (Soler et al., 2009). Further, previous studies assessing aggression among offenders with borderline personality disorder found that skills training alone reduced aggression (Shelton et al., 2009).

Further, patients were not able to telephone their DBT group leaders. Rather, patients were constantly surrounded by mental health staff and were followed-up with DBT group leaders if they needed additional mental health care outside of the weekly DBT group. Participants also completed several role-play activities to help them practice

their skills during session. When completing the work sheets on emotional dysregulation, there was a clear focus on increasing individuals' sensitivity to other's emotions, rather than decreasing their sensitivity (as is the case in standardized DBT, since individuals with borderline personality disorder tend to be hyper-sensitive, whereas forensic psychiatric patients as a group tend to be hypo-sensitive).

Last, DBT was condensed to six months (allotting about six weeks to each module). This is a significant modification, as standard DBT often has participants complete each module twice over the course of the year (Linehan, 1993). Thus, this adaptation only had participants complete each module once. Having participants go through each module only once is not uncommon in inpatient psychiatric settings (Linehan, 1993), or in the literature evaluating DBT (e.g., Blackford & Love, 2011; Koons et al., 2001; Linehan, McDavid, Brown, Sayrs, & Gallop, 2008; Neacsiu, Eberle, Kramer, Wiesmann, & Linehan, 2014; Wolpow et al., 2000).

The leaders began each weekly session by providing psychoeducation on topics such as emotion regulation, behavioural inhibition, and self-injurious behaviour. The orientation session of each group focused extensively on the rationale behind DBT. While standardized DBT does not typically include extensive group discussions on the rationale behind DBT, it was emphasized in this adaptation to help foster commitment among the group members, many of who were highly ambivalent about the process of therapy. As an example, many participants reported that they had registered for DBT because they hoped it would help them with their ORB dispositions, rather than because they felt they needed to learn the skills that DBT taught. Thus, group leaders mentioned feeling an increased responsibility to help participants move from treatment ambivalence to

treatment commitment. To help accomplish this goal, group leaders would review how each skill set was relevant to participants, and what the theory behind each module of DBT was. During each session, the group would also have discussions surrounding how to make DBT more applicable to the forensic psychiatric context. For example, discussions on interpersonal effectiveness would include skill sets related to institutional effectiveness and how to productively interact with the staff and patients at the institution.

At the end of each session, clients were given diary cards. Diary cards are designed to assist clients in monitoring their behaviours throughout the week, to document how they are implementing their skills, and to assess their strengths and weaknesses throughout therapy. Participants' diary cards were simplified so that participants with intellectual disabilities, reading difficulties, or issues with concentration could understand them (see *Appendix 1*).

Initially, weekly homework groups were held separately from the group therapy sessions, as Linehan recommends (Linehan, 1993). These homework sessions would involve going over weekly homework assignments and reviewing the weekly diary cards. Over the course of the first group, however, several patients were transferred into outreach services. As a result, it became challenging to have patients attend two separate sessions. Thus, after the first module, homework groups and skills training sessions were combined. The DBT leaders also found that discussing homework and then having a DBT therapy session immediately afterward (rather than having the therapy sessions and the homework group on different days) provided a better flow within the group. Therefore, homework groups and therapy groups were permanently combined half way

through the first DBT group. To mirror the same change in the second group, the DBT leaders began the second group with separate homework and skills training sessions, and then combined them half way through.

Finally, standard DBT involves a supervision/consultation group in which the DBT leaders can discuss clients and receive support. Initially, DBT leaders set aside one hour each week to devote to this supervision/consultation group, however nearing the end of each group, DBT leaders' schedules became too busy and the group failed to meet on a weekly basis. The DBT leaders did meet at least twice a month throughout the study, and communicated with the other treatment teams of each participant.

2.3.3 Treatment as usual. Treatment as usual (TAU) at the hospital involved direct contact with several mental health professionals. Each patient had weekly sessions with a psychiatrist and 24-hour nursing supervision. Nursing supervision included daily monitoring of patients' psychological symptoms, administration of medications, and psychoeducation about the patients' disorders and their treatments. Each unit within the facility was also equipped with social workers, occupational therapists, and recreational therapists. Patients' contact with these professionals varied and depended on clinical need. Blood work was done as needed, and sometimes included metabolic monitoring every 12 months (fasting serum lipid profiles, fasting serum glucose) and monitoring of therapeutic drug levels every one to three months. Individuals in both the DBT and TAU groups received this care throughout the duration of the study. The only difference between the two groups was that only one group was in DBT at a time.

2.4 Materials

2.4.1 Self-report measures.

2.4.1.1 *Novaco Anger Inventory-Short Form* (NAI-25; Novaco, 1975; Novaco, 2003). This 25-item scale measured anticipated levels of anger in specific situations (such as being teased or inconvenienced) on a four-point likert scale from 0 = *you would feel very little or no annoyance* to 4 = *you would feel very angry*. The scale is based on the theoretical model, developed by Novaco and Taylor (2004) which posits that anger is an emotional state characterized by increased physiological arousal and cognitions of antagonism, which are predictive of aggressive behaviour.

There is evidence that the NAI-25 has good psychometric properties when used with forensic psychiatric patients (Hornsveld, Muris, & Kraaimaat, 2011) and adult criminal samples (Mills et al., 1998). Specifically, a factor analysis of the NAI-25 found four factors with an eigenvalue above 1.00, however one factor with an eigenvalue of 12.62 accounted for over half of the variance. Thus, data suggest that this scale reliably only consists of one factor, anger. The NAI-25 has also been found to be highly reliable, with an estimated Cronbach's alpha of 0.96. This scale has an average inter-item correlation of 0.49, and an item-total correlation between 0.50 and 0.77.

2.4.1.2. *Impulsive/Premeditated Aggression Scale* (IPAS; Stanford et al., 2003). This instrument evaluates overall aggression, as well as impulsive (reactive) aggression or premeditated (instrumental), specifically, in the last six months. Evaluations of the IPAS with forensic samples have found that this scale has adequate psychometric properties. A principal-components analysis of the IPAS' 30 items revealed two distinct factors (impulsive and premeditated aggression), which accounted for 33% of the

variance (Kockler, Stanford, Nelson, Meloy, & Sanford, 2006). 15 items loaded on to each construct. The IPAS also demonstrates adequate reliability, with an estimated Cronbach's alphas of 0.77 and 0.82 for the Impulsive and Premeditated subscales, respectively.

While completing this measure, participants were instructed to think about their past aggressive behaviours. The IPAS was designed to better explicate the motivations behind aggressive behaviour (Kockler, Stanford, Meloy, Nelson, & Sanford, 2006). Although the distinction between impulsive and premeditated aggression has been widely accepted in the literature (Barratt et al., 1999), it is important to note that controversy has recently arisen regarding whether this impulsive/premeditated distinction is clinically useful and externally valid (Bushman & Anderson, 2001). The controversy has motivated further examination into whether these constructs are orthogonal, and evidence continues to support this distinction, especially within the forensic domain (Fontaine, 2007; Tapscott et al., 2012).

2.4.1.3 Hypothetical Vignettes (Serin, 1991). This instrument presents six short vignettes previously used in forensic settings by Serin (1991) and Vitale, Newman, Serin, and Bolt (2005) to evaluate participants' perceived hostility in ambiguous contexts. Each vignette describes a hypothetical scenario involving a negative outcome for the main character resulting from the actions of another individual, whose intentions are ambiguous. Participants were asked to imagine a time when something similar occurred to them or to imagine themselves in the presented situation. Participants were then asked four questions about the intent of the provocateur. Participants were asked if they think the provocateur's actions were (a) deliberate, (b) done out of disrespect, (c) done to "piss

him off,” and (d) done to get back at him for something. A response of *no* to these questions was coded as a 1, a response of *yes* was coded as a 3, and a response indicating uncertainty (e.g., *maybe, it depends*) was coded as a 2. Therefore, higher overall scores reflected greater hostile attribution biases.

A meta-analytic review of hypothetical vignettes previously demonstrated a robust relationship between hostile attribution (the tendency to perceive ambiguous situations as hostile) and overall aggression in children and adults (Bailey & Ostrov, 2008; Dodge, 2006; Orobio de Castro, Veerman, Koops, Bosch, & Monshouwer, 2002). Moreover, there is evidence that having a hostile attribution bias is specifically related to children’s and adolescents’ use of impulsive, rather than premeditated, aggression (Crick & Dodge, 1996; Helfritz-Sinville & Stanford, 2014; Orobio de Castro et al., 2002). Despite the popular use of hypothetical vignettes in the literature, no studies to the author’s knowledge have assessed the psychometric properties of this measure.

2.4.1.4 Short-Form Buss-Perry Aggression Questionnaire (BPAQ-SF: Bryant & Smith, 2001; Buss & Perry, 1992). The 12-item short form of the Buss-Perry Aggression Questionnaire assesses individual reactions to provocative situations on a 5-point scale from 1 = *very unlike me* to 5 = *very like me*. Factor analyses of the 12 items in this measure have revealed a four-factor measurement model with acceptable goodness-of-fit indices (GFI = 0.94) in both American and Canadian community samples (Bryant & Smith, 2001). Thus, data suggest that this scale has four factors, anger, hostility, verbal aggression, and physical aggression. Importantly, the short form of the BPAQ has better fit indices than the long version of this scale (Bryant & Smith, 2001). The BPAQ has also been found to have adequate internal consistency, with Cronbach’s alphas of 0.85 for

physical aggression, 0.72 for verbal aggression, 0.83 for anger, and 0.77 for hostility. The total internal consistency of this scale is estimated at 0.89 (Buss & Perry, 1992).

The BPAQ has also been used with offenders suffering from mental disorders (Diamond & Magaletta, 2006), as well as federal offenders without mental disorders (Diamond, Wang, & Buffington-Vollum, 2005). Confirmatory factor analyses with BPAQ data from both of these forensic populations found the same factor structure to exist in these populations, and found similar psychometric properties compared to previous studies (Diamond & Magaletta, 2006; Diamond et al., 2005).

2.4.1.5. Inventory of Statements about Self-Injury (ISAS: Klonsky & Glenn, 2009). This instrument assesses history of non-suicidal self-injury as well as the reasons for the self-injury on a 3-point scale from 1 = *not relevant* to 3 = *very relevant*. This scale has 13 individual functional scales, which identify the functions that self-harming behaviours serve (e.g., to release tensions, to show others the extent of the individual's emotional pain) and 13 individual behavioural scales, which identify how the person self-harms (e.g., burning). Factor analyses of the 13 functional scales have found them to be well represented by a 2-factor structure (interpersonal and intrapersonal), which accounts for 61% of the variance (Klonsky & Glenn, 2009). Intrapersonal functions refer to behaviours that are focused on the self, such as regulating emotions. Interpersonal functions refer to behaviours that are focused on others, such as peer bonding. Estimates of Cronbach's alpha also suggest that both the intrapersonal ($\alpha = 0.80$) and interpersonal ($\alpha = 0.88$) scales are adequately internally consistent. Test re-test reliability of this scale is also high ($r = 0.85$). Regarding individual functions, test-retest correlations ranged from 0.35 (affect regulation) to 0.89 (peer bonding), with a median of 0.59. For the functional

scales, test-retest correlations were also adequate, ranging from 0.60 for the intrapersonal functions scale and 0.82 for the interpersonal functions scale. For the behavioural scales, test-retest correlations were adequate and ranged from 0.52 (biting) to 0.83 (burning), with a median of 0.68 (Glenn & Klonsky, 2011). The ISAS' behavioral and functional scales have exhibited good construct validity as indicated by their theoretically consistent relationships to other scales measuring non-suicidal self injury (Klonsky & Glenn, 2009).

2.4.1.6. *Emotion Regulation Questionnaire* (ERQ: Gross & John, 2003). This 10-item instrument measures individuals' strategies for emotion-regulation. Specifically, it is a general assessment of individual differences in the tendencies to use either Cognitive Reappraisal or Expressive Suppression (two emotion regulation strategies) when faced with emotionally arousing events on a 7-point scale from 1 = *strongly disagree* to 7 = *strongly agree*. This scale was designed to determine whether participants were using the skills for emotion regulation that they learned in DBT, and whether they increased on the two subscales.

Studies have suggested that the ERQ has sound psychometric properties. Initial factor analyses support the ERQ's two-factor structure (cognitive reappraisal and expressive suppression; Gross & John, 2003) and more recent studies have found adequate internal consistency in both American and British samples, with Cronbach's alpha estimated between 0.79 – 0.82 for cognitive reappraisal, and between 0.74 and 0.78 for expressive suppression (Spaapen, Waters, Brummer, Stopa, & Bucks, 2014).

2.4.1.7 *Kentucky Inventory of Mindfulness Skills* (KIMS: Baer, Smith, & Allen, 2004). This 39-item self-report inventory was used to assess mindfulness skills, and includes four subscales, Observing (12 items), Describing (8 items), Acting With

Awareness (10 items), and Accepting Without Judgement (9 items). These are skills are specifically targeted in DBT and have been shown to reduce aggression by increasing behavioural regulation (Borders et al., 2010). This scale helped determine whether increased use of DBT's mindfulness skills were related to reduced aggression (Baer, Smith, & Allen, 2004). This measure has sound psychometric properties when used in clinical populations, and, more specifically, individuals with borderline personality disorder (Baum et al., 2010). Studies have found the KIMS to have acceptable internal consistency for the four scales, with estimates ranging between $r = 0.83$ and $r = 0.91$ (Baer et al., 2004). A recent confirmatory factor analysis provided good support for the underlying four-part structure of this model, and adequate sensitivity to clinical changes in mindfulness (Baum et al., 2010). Further, test-retest reliability was adequate, ranging from $r = 0.61$ to $r = 0.84$ (Baer et al., 2004).

2.4.2 Staff-Report Measures

2.4.2.1 Patient files. Patient files were reviewed to determine (1) patients' index offences; (2) patients current psychiatric diagnoses; (3) aggressive incidents during the study; (4) patients' demographic information (e.g., age, ethnicity, level of education); (5) the number of months each person had been in the forensic mental health care system; (7) and violence risk assessment scores. Historical Clinical Risk – 20 (HCR-20 V3; Douglas et al., 2013) were available for all participants, and were recorded. While some participants had also been administered the Violence Risk Appraisal Guide (VRAG; Quinsey et al., 2006), most participants did not have VRAG scores.

In general, aggressive incidents are rare in the hospital, and only one patient exhibited severe enough aggression to warrant a formal report over the course of the

study. Thus, rather than relying on formal reports of aggressive behaviour, each patient's progress notes were reviewed daily to determine whether he or she had behaved aggressively or inappropriately. Progress notes serve as a continuous report of patients' activities while they are in the hospital. These notes are updated several times a day by ward staff and provide a detailed account of each individual's behaviour throughout the day. These notes are an appropriate source of staff-observed aggressive behaviour for two reasons. First, staff are required to take detailed notes of all behaviours, especially those that could increase the individual's risk within the hospital. Thus, aggressive behaviours would have been particularly well-recorded as long as staff members were abiding by standard protocol at the hospital.

Second, while staff members may have been aware of which patients were in DBT, they would not have been aware of the objectives in the study. Thus, there is no reason to believe that their knowledge of patients' participation in DBT would have biased staff members' recording of aggressive incidents in the hospital. For the purposes of this study, all incidents of verbal aggression (e.g., heated arguments, swearing at others, sexually harassing others, intimidating others, and threatening others), and physical aggression (e.g., attempting to physically harm another individual, or successfully physically harming another individual) were recorded. These behaviours are in line with the definition of aggression laid out earlier.

2.5 Hypotheses

This study sought to evaluate three major sets of hypothesis:

1. The first DBT group will show significantly reduced aggression, anger, and hostility as well as increased emotion regulation and mindfulness, and these gains

will be maintained in the following six months (DBT 1 compared to TAU 2). The first DBT group will also show significantly reduced aggression, anger, and hostility as well as increased emotion regulation and mindfulness compared to the waitlist control group in the first six months of the study (DBT 1 compared to TAU 1).

2. The second DBT group will show significantly reduced aggression, anger, and hostility as well as increased emotion regulation and mindfulness compared to the six months before participating in DBT (TAU 1 compared to DBT 2). This group will serve as its own control group, as it can no longer be compared to the first DBT group (since the first group will have already participated in DBT).
3. When the first DBT group and the second DBT group are compared to each other (during the time points that they were participating in DBT), they will both demonstrate significantly reduced physical aggression, verbal aggression, anger, and hostility as well as increased emotion regulation and mindfulness (DBT 1 compared to DBT 2).

Results

3.1 Rationale

The present study investigated whether participating in DBT was associated with reductions in anger, hostility, and aggression, and increases in emotion regulation and mindfulness in a forensic psychiatric population. To assess change across time points and groups, I employed split-plot ANOVAs. To assess change across time points, I employed single repeated measures ANOVAs. These method accounts for the correlation between data points for each individual, and participants can serve as their own control group in

these analyses (Field, 2009). Having participants serve as their own control group is important, as sample sizes in this study were small and participants could not be matched on demographic variables, such as age and education, before the study began.

3.2 Statistical Analyses

When groups were compared to each other across time (i.e., when DBT 1 was compared to TAU 1 and DBT 1 was compared to DBT 2), I employed split-plot ANOVAs with group as the between-subjects factor and time as the within-subjects factor. For analyses that compared the same individuals across time points (e.g., DBT 1 compared to TAU 2), I employed single repeated measures ANOVAs with time points as the within-subjects factor. Repeated measures ANOVAs assume that the level of dependence is generally equal across time points, or, in other words, that the pooled covariance matrix satisfies the assumption of sphericity (Gardner & Tremblay, 2007). To ensure that variance across time points was roughly equivalent, I conducted Mauchly's Test of Sphericity on each analysis. Conducting this test is important, as violating sphericity results in a loss of test power (or an increased probability of Type II error), and the calculation of an incorrect, inflated, F-ratio (Field, 2009; O'Brien & Kaiser, 1985).

During analyses where the assumption of sphericity was met, I reported univariate statistics, as there is evidence that, for smaller sample sizes, univariate tests have higher power (Field, 2009). When the assumption was violated, I used a multivariate approach to testing the repeated measures effect (Field, 2009). Although several statisticians suggest reporting univariate statistics with epsilon multipliers when sphericity is violated, this approach may be more appropriate for larger sample sizes (Field, 2009). O'Brien & Kaiser (1985) recommend reporting multivariate statistics when sphericity is violated, as

multivariate tests do not require the assumption of sphericity to be met and have higher power when sample sizes are small. Pillai's Trace (V) was chosen as the test statistic for all multivariate tests as it is robust to violations of multivariate normality and has high test power (Field, 2009; O'Brien & Kaiser, 1985).

I reported effect sizes on all significant results to better understand the degree to which DBT had an effect on each outcome variable in this population (Sullivan & Feinn, 2012) using the partial eta squared statistic (η_p^2). In ANOVA studies, partial eta squared is defined as the ratio of variance accounted for by an experimental effect (in this case, DBT) and that effect plus its associated error variance. It provides a measure of the extent to which an effect is present in the sample being studied (Cohen, 1988; Field, 2009; Levine & Hullett, 2002). Some argue that partial eta squared may over-represent the extent to which an effect is present, compared to eta squared (η^2 ; Bakeman, 2005). However, given the small sample size in this study, which may decrease the chances of detecting an effect, I selected partial eta squared (Bakeman, 2005; Levine & Hullett, 2002). Although the majority of studies on DBT in forensic psychiatric samples do not report effect sizes (e.g., Sakdalan et al., 2010; Shelton et al., 2011; Shelton et al., 2009), I included them here, as they may present a more accurate picture of whether an effect is present in the population, compared to p values (Sullivan & Feinn, 2012).

It is important to note that I recognize the many consequences of having a small sample size. First, small sample sizes reduce the power associated with each test, and may increase the probability of Type II error (failing to detect a significant effect of the treatment; Levine & Hullett, 2002). To account for this notable limitation, I provided figures and descriptive statistics on all results with a p -value below 0.1, as they may

indicate promising areas of future research, or may indicate effects that would be significant with an increased sample size.

I conducted pairwise and within-subjects contrasts comparisons on all significant and marginally significant results (operationalized here as $p < 0.10$) to determine which time points differed from each other, and whether there are trends in the data. Further, to better understand whether groups are showing improvements on the targeted outcome measures at different points in the study (e.g., whether aggression is decreasing from pre-DBT to post-DBT, specifically), I presented pairwise comparisons and within-subjects effects, even if omnibus tests are non-significant. Of note, retaining analyses that reveal marginally significant pairwise comparisons or trends (with $p < 0.10$) is common in this field of research. Some studies have even considered $p < 0.10$ to be significant and $p < 0.15$ to be marginally significant (e.g., Evershed et al., 2003). I used Tukey HSD tests during pairwise comparisons to correct for each family-wise error rate, or the probability of making at least one Type I error in a family of comparisons (Seaman, Levin, & Serlin, 1991). The Tukey HSD is based on a variation of the t distribution that takes into account the number of means being compared.

Second, given the large number of analyses being conducted, Type I error (finding a significant effect where none exists; Field, 2009) is also a notable concern. This concern is particularly pertinent to the decision to describe pairwise comparisons and within-subjects effects when omnibus tests are non-significant. However, given the limited sample size, these comparisons may provide a more detailed understanding of the potential effects of DBT. One way to account for the increased probability of Type I error is to amalgamate several of the outcome measures into one. However, given that each

outcome measure is assessing different constructs (e.g., impulsive versus premeditated aggression), amalgamating outcome measures impedes a nuanced understanding of the data. In the following sections, I discuss how missing values were handled and how results were organized for presentation.

3.3 Missing Data.

Missing time points are common in DBT studies. For example, in a study evaluating DBT with female offenders, five out of 16 participants provided data for all time points (Nee & Farman, 2005). Given that only five participants in the first DBT group and three participants in the second DBT group contributed data to all five time points, analyses were conducted on more specific data points (e.g., time points one, three, and five), to increase the likelihood that each analyses was as representative of groups as possible. For a break down of how many participants completed each data collection session, see *Figure 1*. Importantly, the fact that some individuals may have only contributed to certain time points (and may not have completed each measure at each time point), the degrees of freedom in the analyses differ widely. Further, while participants may have contributed to multiple data points, they may not have completed all measures at each data point. Some participants failed to complete the entire package of questionnaires, and some would refuse to complete all scales at each time point. At times, I would see participants over multiple days to help them complete each scale to the best of their ability. Nonetheless, missing data was common. This reality is an unfortunate consequence of conducting longitudinal data with a population that is frequently moving from inpatient to outpatient status, or who may be highly sensitive to perceived stress.

3.4 The Presentation of Results.

To evaluate the effectiveness of DBT across outcome measures, I conducted the same analyses for each of the following outcome measures: (1) aggression; (2) anger; (3) hostility; (4) emotion regulation and; (5) mindfulness. The analytic process mirrored the main hypotheses. I conducted analyses in three steps for each outcome measure, as detailed below. I present figures to better depict changes on outcome measures over time and present results with a $p < 0.1$ as marginally significant, and results with $p < 0.05$ as significant.

1. *DBT 1 compared to TAU 2.* To determine whether the first group made significant gains over the course of DBT, and whether these gains lasted over the following six months, I conducted a single repeated measures ANOVA with time as the within-subjects factor with each outcome measure over the five time points, and then across time points one, three, and five to increase the sample size. I also conducted these analyses with the first three time points to analyze the six months of DBT, specifically.
2. *DBT 1 compared to TAU 1.* Next, I conducted a split-plot ANOVA on each outcome measure to compare the first DBT group to the first TAU group over the first three time points. I employed this analysis to determine whether the first DBT group changed significantly on each outcome measure, compared to a demographically similar control group.
3. *TAU 1 compared to DBT 2.* For the second DBT group, I conducted a single repeated measures ANOVA to determine whether participants were stable on each outcome measure before participating in DBT, and whether DBT subsequently

changed participants' performance on each outcome measure. I conducted analyses across all five time points, and then across time points one, three, and five to increase the sample size. I also conducted a single repeated measures ANOVA on time points three, four, and five, to increase the sample size, and better understand whether changes occurred while this group was in DBT, specifically.

4. *DBT 1 compared to DBT 2.* Finally, I conducted a split-plot ANOVA on each outcome measure to compare each group during their DBT phase.

3.5 Findings

3.5.1 Aggression. In the following section, I will outline changes on self-reported aggression on the BPAQ (Bryant & Smith, 2001; Buss & Perry, 1992). I will then present changes on self-reported aggression on the IPAS (Stanford et al., 2003). Last, I will present how many aggressive incidents were reported over the course of the year, and will offer the results from paired-samples t-tests to determine whether staff-reported physical and verbal aggression was significantly different depending on whether an individual was in DBT or TAU across groups. This section includes incidents of self-harm on the ISAS (Klonsky & Glenn, 2009).

BPAQ. Analyses of data from the first group over the five time points revealed no significant changes on the BPAQ. Therefore, I analyzed time points one, three, and five to increase the sample size. While I found no main effects or trends, pairwise comparisons revealed a significant decrease in aggression scores from time three ($M = 2.05$, $SD = 0.474$, $CI\ 95\% [1.46, 2.64]$) to time five ($M = 1.58$, $SD = 0.606$, $p = 0.041$, $CI\ 95\% [0.830, 2.34]$) thus, there is some evidence that aggression decreased following DBT

for group one (Figure 2). When I analyzed the first three time points for group one separately, I found no change in self-reported overall aggression.

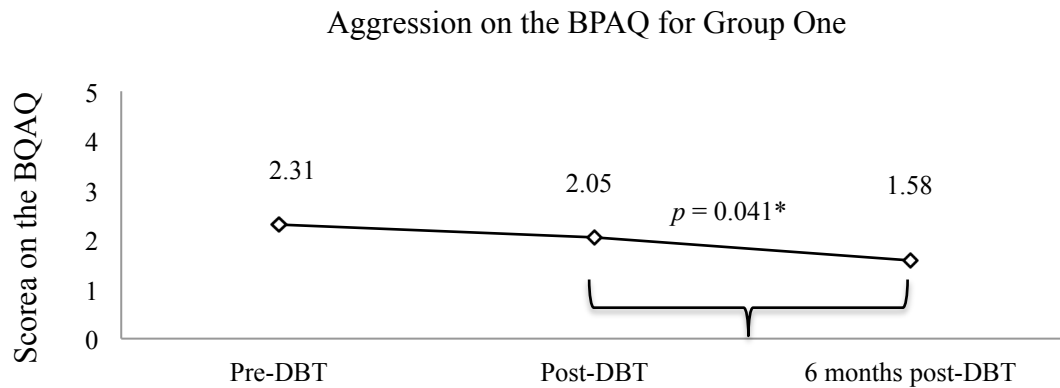


Figure 2. Aggression (BPAQ) over a year for group one.

Next, I compared the first group to the second group across the first three time points (DBT 1 compared to TAU 1). A marginally significant main effect of group was detected, such that group one ($M = 2.13$, $SD = 0.748$, 95% CI [1.63, 2.63]) was more aggressive than group two ($M = 1.40$, $SD = 0.895$, $p = 0.086$, 95% CI [0.706, 2.11]). I did not find a decrease in aggression while group one participated in DBT.

When I analyzed the second group separately from the first DBT group, I found no main effects or trends across all five time points. To increase the sample size, I analyzed time points one, three, and five separately. I did not find any significant or marginally significant results. Therefore, I analyzed the second DBT group across the third, fourth, and fifth time points separately (DBT 2). I found no significant main effects however within-subjects contrasts revealed a marginally significant downward linear trend in aggression, $F(1, 4) = 4.59$, $p = 0.099$, such that aggression decreased over the last three time points. Pairwise comparisons also found a decrease in aggression from time point three ($M = 2.58$, $SD = 0.39$, 95% CI [2.09, 3.07]) to time point five $M = 1.95$, $SD = 0.915$,

$p = 0.099$, 95% CI [0.823, 3.09]). Next, I compared the DBT groups to each other (DBT 1 compared to DBT 2). I did not find any significant or marginally significant results.

I did not find any significant results on either the verbal or physical aggression subscales of this questionnaire for either group one or two, nor when I compared the two DBT groups to each other. Overall, there is some evidence that self-reported aggression decreased in the first group after DBT. There is little evidence to suggest a decrease in self-reported aggression for the second group on the BPAQ, although there is some indication that aggression may have decreased during DBT for the second group.

IPAS. I will present all findings on overall scores on the IPAS, followed by findings from scores on the Impulsive and Premeditated aggression subscales separately. I analyzed the first group on overall aggression to determine whether participants experienced changes in aggression across the five time points. I did not find any differences between the five time points, thus I compared time points one, three, and five to increase the sample size. I detected a marginally significant main effect of time, $F(2, 8) = 4.20$, $p = 0.056$. Pairwise comparisons found aggression scores to decrease from time point one ($M = 2.70$, $SD = 0.425$, 95% CI [2.17, 3.22]) to time point five ($M = 1.68$, $SD = 0.755$, $p = 0.097$, 95% CI [0.738, 2.61], *Figure 3*). Tests of within-subjects effects also found a marginally significant downward linear trend in overall aggression across time, $F(1, 4) = 4.643$ $p = 0.097$. Thus, aggression decreased marginally significantly while the first group was in DBT, and gains were maintained for the following six months, according to scores on the IPAS.

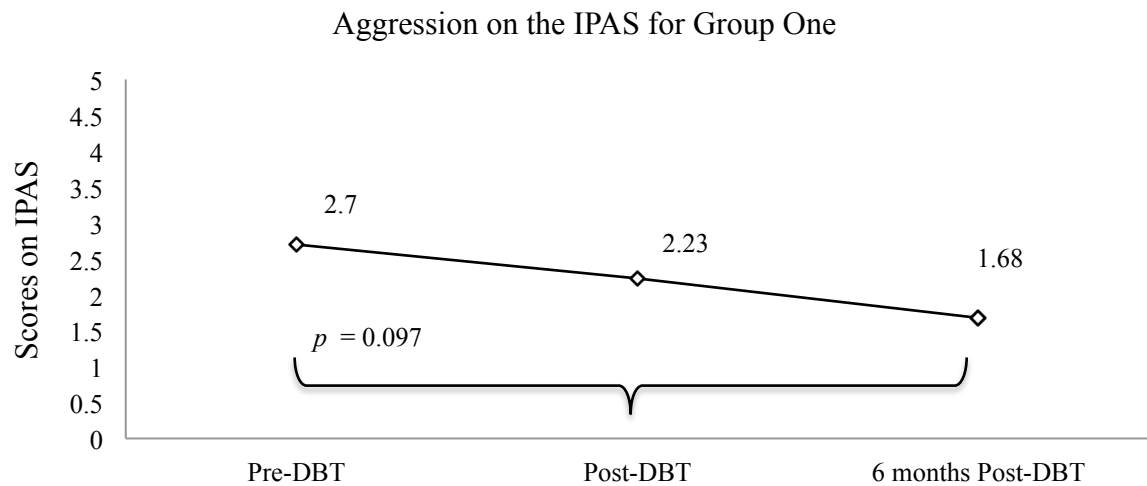


Figure 3. Aggression (IPAS) over a year for group one.

Next, I compared the first group to the second group on overall aggression across the first three time points (DBT 1 compared to TAU 1). I found a marginally significant main effect of time $F(1, 8) = 3.08, p = 0.078$. Pairwise comparisons revealed that participants decreased on overall aggression from time one ($M = 2.65, SD = 0.423, 95\% CI [2.29, 3.00]$) to time two ($M = 2.02, SD = 1.04, p = 0.079, 95\% CI [1.19, 2.85]$) across groups (Figure 4). However, the plotted estimated marginal means suggested that aggression then increased in both groups between times two and three. When I plotted the groups separately, group one appears to have remained relatively stable on aggression, whereas group two appears to have decreased slightly and then increased again during the six months of TAU. Thus, there is no evidence to suggest that group one decreased in aggression while in DBT, compared to group two in TAU (Figure 5). Given that both groups were at different periods in the study (group one was in DBT and group two was in TAU, graphs for these data have been labeled by time point (i.e., Time 1, Time 2, Time 3; see Figures 4 and 5).

differences between groups. Therefore, I analyzed the Premeditated and Impulsive subscales.

Premeditated aggression. Analyses from the first DBT group on premeditated aggression scores revealed no overall main effects or trends across the five time points. Thus, I analyzed time points one, three, and five separately. Again, I detected no significant results. I then focused analyses for time points one, two, and three. While I found no main effects, within-subjects contrasts detected a marginally significant linear downward trend in premeditated aggression, $F(1, 5) = 4.33, p = 0.092$. Pairwise comparisons found a marginally significant decrease in premeditated aggression from time one ($M = 2.50, SD = 0.353, 95\% CI [2.13, 2.87]$) to time three ($M = 2.10, SD = 0.346, p = 0.092, 95\% CI [1.73, 2.46]$) in the first DBT group (*Figure 6*).

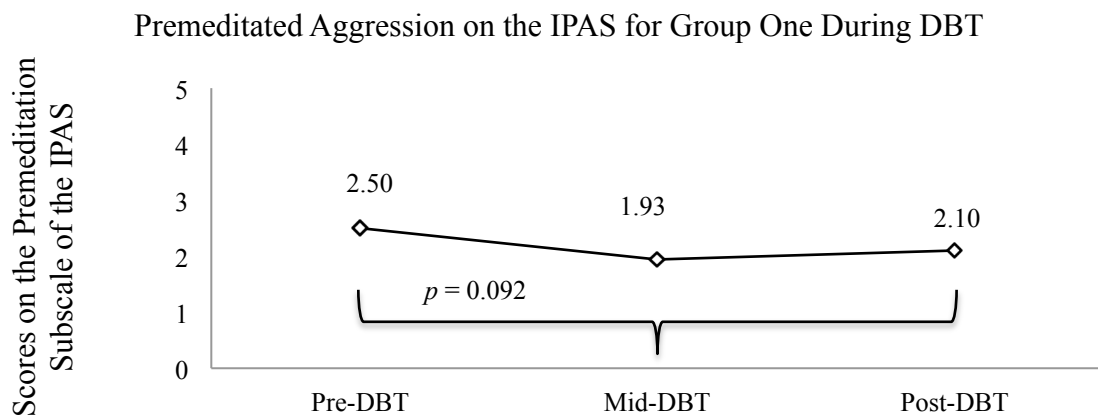


Figure 6. Premeditated aggression (IPAS) during DBT for group one.

When I compared the first DBT group to the TAU group on the Premeditated subscale, tests of within-subjects contrasts revealed a marginally significant downward linear trend across the first three time points, $F(1, 8) = 4.94, p = 0.072$. That is, when compared to the first TAU group, both groups decreased in their levels of self-reported premeditated aggression. Pairwise comparisons also revealed a decrease in premeditated

aggression from time one ($M = 2.54$, $SD = 0.327$, 95% CI [2.30, 2.81]) to time three ($M = 2.16$, $SD = 0.439$, $p = 0.072$, 95% CI [1.84, 2.52]), and an increase in premeditated aggression from time two ($M = 1.81$, $SD = 1.17$, 95% CI [0.867, 2.70]) to time three ($M = 2.16$, $SD = 0.439$, $p = 0.086$, 95% CI [1.84, 2.52]). Thus, while results suggest a possible downward linear trend in premeditated aggression scores in the first DBT group, when compared to the first TAU group, it appears that these scores dropped in the first three months of DBT, and then rose again slightly in the second three months of DBT (Figure 7).

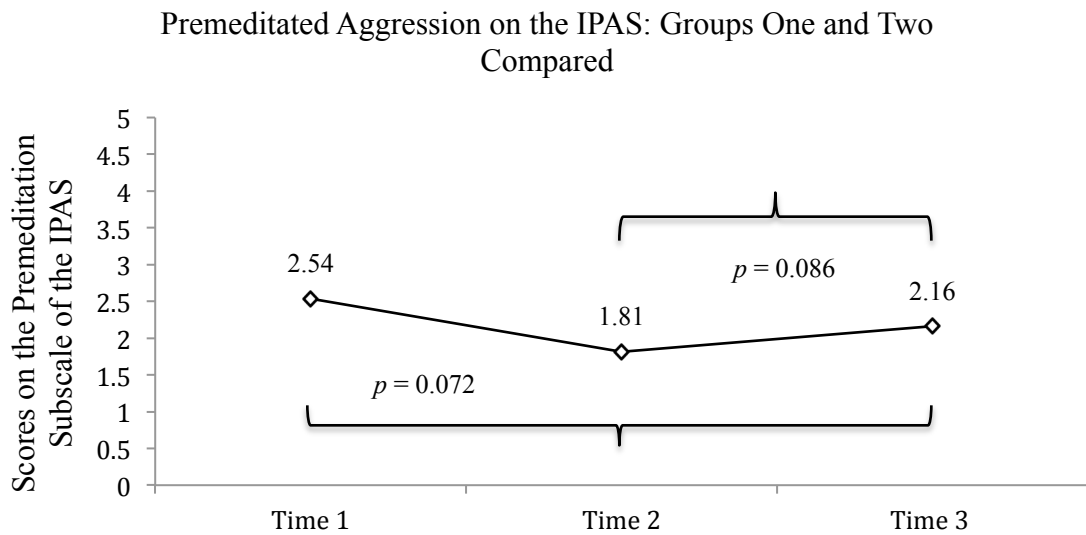


Figure 7. Premeditated aggression (IPAS) in the first six months, groups one and two compared. Marginal means shown.

When I analyzed the second group was separately, I did not find any changes in premeditated aggression across all time points, time points one, three, and five, or time points three, four, and five. I also found no changes when two DBT groups were compared to each other.

Impulsive aggression. I then analyzed the impulsive aggression subscale of the IPAS. Findings from the first group over the five time points revealed no main effects. However, pairwise comparisons found a marginally significant decrease from time point one ($M = 2.88$, $SD = 0.583$, 95% CI [2.15, 3.61]) to time point five ($M = 1.71$, $SD = 0.911$, $p = 0.074$, 95% CI [0.575, 2.83]).

When I analyzed time points one, three and five, I found a significant main effect of time, $F(2, 8) = 4.67$, $p = 0.045$, $\eta_p^2 = 0.539$, and a marginal downward linear trend across time, $F(1, 4) = 5.78$, $p = 0.074$. Pairwise comparisons found a marginally significant decrease from time point one ($M = 2.88$, $SD = 0.593$, 95% CI [2.15, 3.60]) to time point five ($M = 1.71$, $SD = 0.911$, $p = 0.074$, 95% CI [0.575, 2.83], *Figure 8*). Results suggest that impulsive aggression decreased during DBT for group one, and gains were maintained in the months following DBT.

When I analyzed group one on the first three time points, no changes were revealed. Next, I compared group one to group two over the first three time points. Pairwise comparisons found that both groups marginally decreased from time one ($M = 2.76$, $SD = 0.651$, 95% CI [2.25, 3.27]) to time three ($M = 2.53$, $SD = 0.477$, $p = 0.066$, 95% CI [2.17, 2.90]).

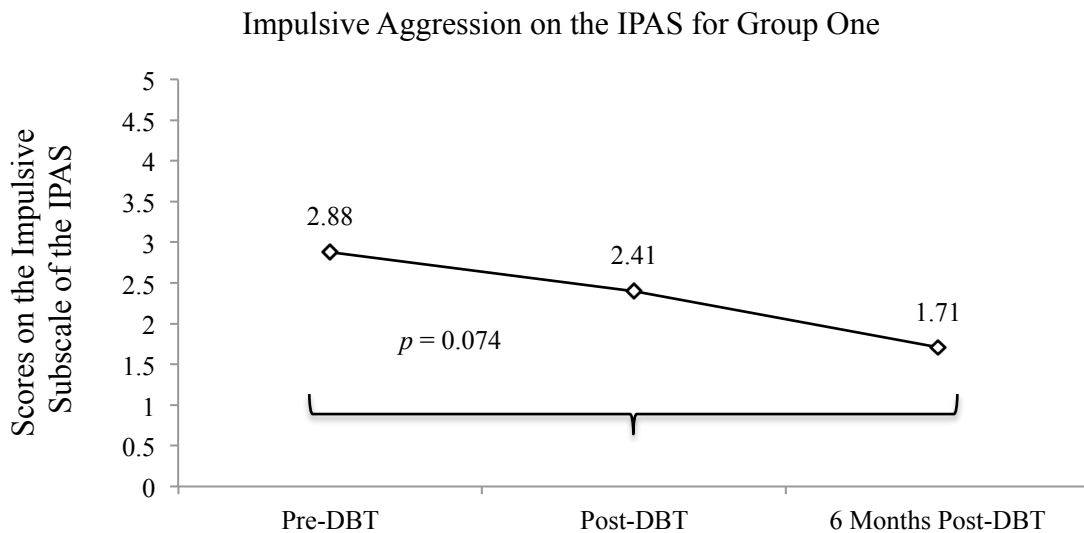


Figure 8. Impulsive aggression (IPAS) over a year for group one.

I then analyzed the second group's scores on the Impulsive subscale. I did not find any changes on any analyses. I also found no changes when I compared both DBT groups to each other either.

Staff-reported aggression. Over the course of 12 months, staff members reported 88 incidents of aggression (nine physical and 79 verbal). It is important to note that one participant accounted for 100% of physically aggressive incidents, and that same participant accounted for 75% of the verbally aggressive incidents. Three other participants accounted for the other 25% aggressive incidents, one of whom committed 80% of that 25% (i.e., he committed 16 of the 20 remaining incidents). Thus, one person committed all physically aggressive acts, and two participants committed 95% of the verbally aggressive acts. As a result, comparing groups on aggressive incidents is unlikely to yield meaningful results. Nonetheless, I conducted a single repeated measures ANOVA on each group to determine whether aggressive incidents differed between DBT and TAU. There were no significant findings.

Next, I combined the data for aggressive incidents while individuals were in DBT or in TAU, (i.e., DBT groups were combined and TAU groups were combined). I conducted a paired-samples t-test to determine whether individuals differed on aggressive behaviour depending on whether they were in DBT or TAU. I did not find any significant or marginally significant results. To better understand whether DBT was effective for the two participants that accounted for 95% of aggressive incidents, I plotted the trajectory of each individual's verbally aggressive incidents over time (*Figure 9*). Participant one had 29 incidents of verbal aggression while in DBT, and 30 incidents during TAU. Participant two had five incidents of verbal aggression during DBT and 11 incidents during treatment as usual. Thus, while DBT appears to have had little effect for Participant one, it may have had an effect for participant two (*Figure 9*).

I also reviewed physically aggressive incidents over time. The one participant who elicited physical aggression committed two physically aggressive acts while in DBT, and seven while in TAU. Thus, DBT may have had an effect on physical aggression, however it did not last once the participant had completed DBT. Review of this participant's charts show a change in medication around the time of his aggressive behaviour, possibly accounting for some of the variability in his frequency of physically aggressive behaviour. Further, discussions with participant one revealed that he intends to remain in this hospital. He is aware of the challenges associated with leaving the hospital, and thus, may have purposely engaged in aggressive behaviour to sabotage his Ontario Review Board meetings so that he would not receive increased community privileges.

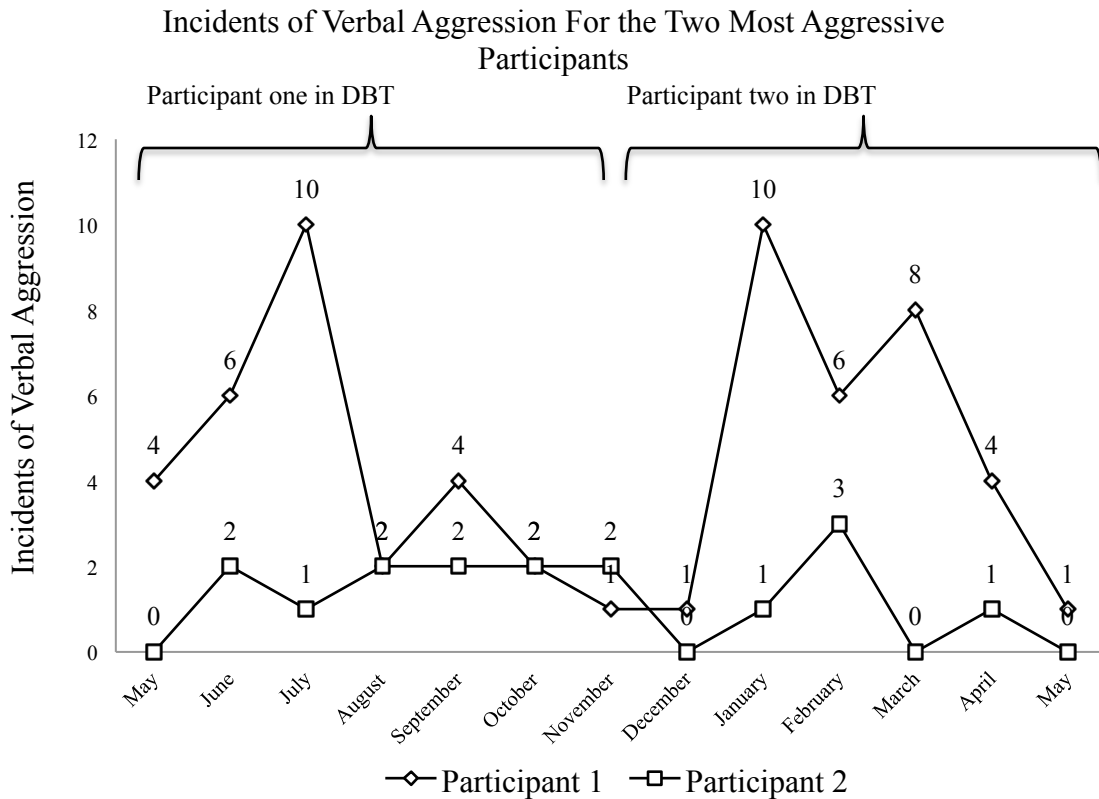


Figure 9. Incidents of verbal aggression over one year for the two participants that elicited the most aggression.

ISAS. While some participants did have a history of self-injury, no participants injured themselves over the course of the year. Thus, there was no data to analyze for this measure. One individual attempted suicide during the study, however this participant subsequently lost capacity to consent and was removed from the analyses.

To summarize findings on aggression, there is evidence to suggest decreases on measures of overall aggression, as well as measures of impulsive and premeditated aggression, specifically, for group one. I found no changes in measures of verbal or physical aggression. There is some evidence to suggest that group two remained stable in aggression until DBT, at which point a marginal decrease was found. Finally, I found no changes on staff-reported aggression. Interestingly, however, results suggest that group

one was more aggressive than group two, perhaps indicating that group two may have had low aggression scores in general.

3.5.2 Anger. I will first present results from the NAI-25 (Novaco, 1975), followed by findings from the Anger subscale of the BPAQ (Buss & Perry, 1992).

NAI-25. Data from the first group's NAI-25 scores over five time points revealed no changes in anger across the year. I did not find any changes on either time points one, three, and five, or time points one, two and three. When I compared the first and second group over the first three time points, I did not find any significant or marginally significant changes in anger. Thus, results do not suggest any changes in no changes in anger for group one on the NAI-25.

I then analyzed group two's anger scores across the five time points. While I did not find any main effects, a marginally significant downward linear trend in anger surfaced, $F(1, 2) = 13.20, p = 0.068$. Pairwise comparisons suggest that anger significantly decreased from time one ($M = 2.10, SD = 0.092, 95\% CI [1.87, 2.33]$) to time five ($M = 1.35, SD = 0.340, p = 0.037, 95\% CI [0.50, 2.19]$, *Figure 10*). Profile plots suggest that this decrease was particularly pronounced when group two was in DBT, however no significant or marginally significant changes were found when time points three, four, and five were analyzed separately. When the two DBT groups were compared against each other, no significant or marginally significant results were discovered.

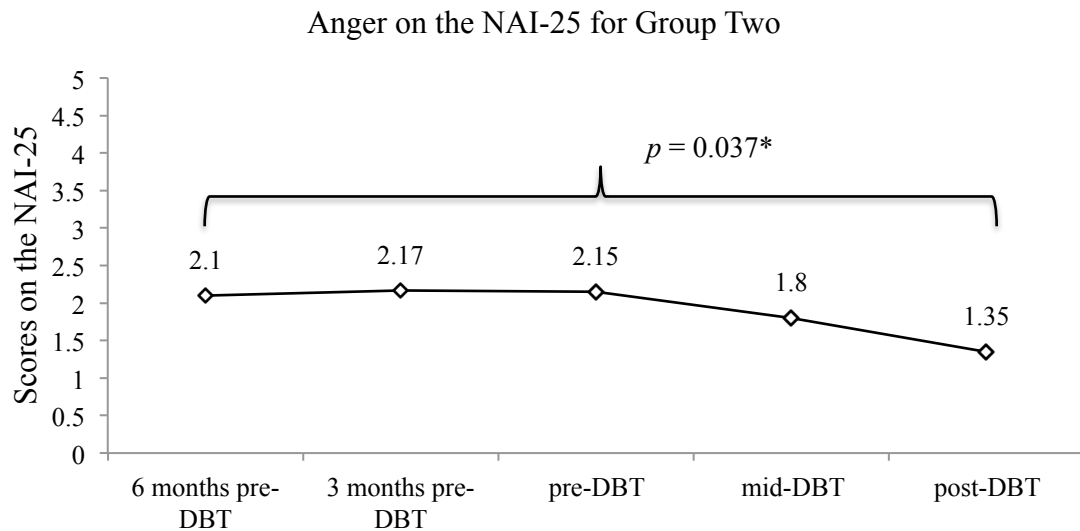


Figure 10. Anger (NAI-25) over a year for group two.

BPAQ. I found a significant main effect of time for the first group over the five time points on the Anger subscale of the BPAQ (Buss & Perry, 1992), $V = 1.00$, $F(4) = 529.75$, $p = 0.033$, $\eta_p^2 = 1.00$. Mauchly's Test of Sphericity indicated that the assumption of sphericity had been violated, $\chi^2(9) = 22.65$, $p = 0.019$, thus, I have reported multivariate tests. Post hoc pairwise comparisons revealed decreases in anger from time three ($M = 1.80$, $SD = 0.557$, 95% CI [1.10, 2.49]) to time five ($M = 1.33$, $SD = 0.745$, $p = 0.052$, 95% CI [0.401, 2.26]), and decreases from time four ($M = 2.1$, $SD = 0.767$, 95% CI [1.18, 3.08]) to time five ($M = 1.33$, $SD = 0.745$, $p = 0.099$, 95% CI [0.408, 2.259]), however, it is important to note that anger peaked at time four before decreasing again (Figure 11). Next, I compared the first DBT group to the first TAU group over the first three time points. I did not find any main effects or interactions. Therefore, the first group demonstrated decreases in aggression in the months following DBT.

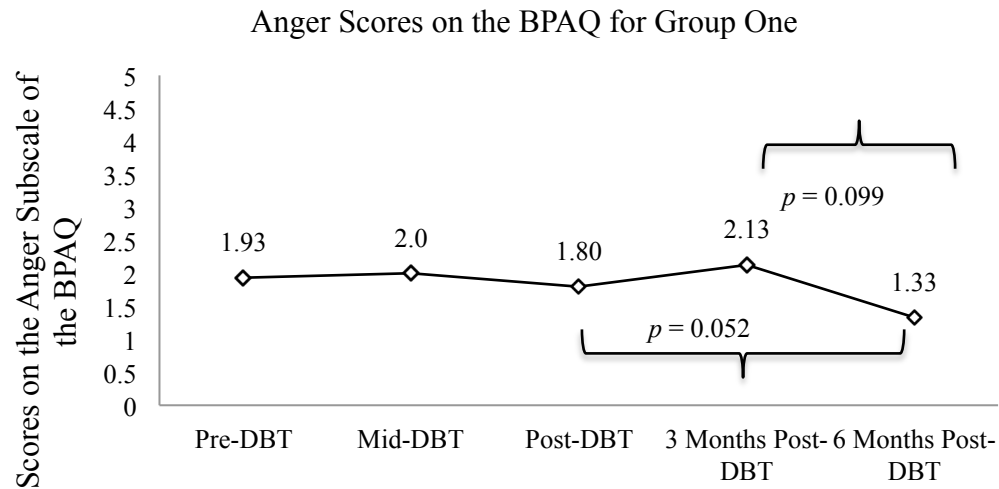


Figure 11. Anger (BPAQ) over a year for group one.

Next, I analyzed the second DBT group separately from the first on anger. I did not find any differences on all five time points for group two, thus I analyzed time points one, three, and five. Again, I found no differences. I also did not find any differences when time points three, four, and five were analyzed. Last, I compared the two DBT groups to each other on anger. I found no changes.

In summary, there is some evidence that self-reported anger decreased over the five time points for group one, however, I only found evidence of decline after the first group had completed DBT. Findings also suggest a decrease in self-reported anger for group two over the five time points. It is important to note, however, that I found decreases in anger for group one from the BPAQ and decreases for group two on scores from the NAI-25, perhaps suggesting that these two scales tap into slightly different experiences of anger.

3.5.3 Hostility. I measured hostility using the Hypothetical Vignettes (Serin, 1991) measure and the Hostility subscale of the BPAQ (Buss & Perry, 1992). I did not find any

significant or marginally significant results on any analyses for the Hypothetical Vignettes measure. As a result, I only present results from the Hostility subscale of the BPAQ.

I analyzed the Hostility subscale on the BPAQ to determine changes in hostility over the five time points for group one. While I did not find any significant main effects, I did find a marginally significant downward linear trend across the five time points, $F(1, 4) = 5.72, p = 0.075$. Review of the pairwise comparisons for the first group showed a marginally significant decrease in hostility between time one ($M = 2.66, SD = 1.02, 95\% CI [1.39, 3.94]$) and times two ($M = 1.80, SD = 1.12, p = 0.090, 95\% CI [0.761, 2.83]$), four ($M = 1.80, SD = 0.836, p = 0.090, 95\% CI [0.761, 2.83]$), and five ($M = 1.60, SD = 0.683, p = 0.067, 95\% CI [0.752, 2.45]$). I also found a decrease in hostility between times three ($M = 2.20, SD = 0.429, 95\% CI [1.00, 3.39]$) and five ($M = 1.60, SD = 0.683, p = 0.088, 95\% CI [0.752, 2.44]$, *Figure 12*).

When I analyzed hostility over time points one, three, and five, I discovered similar changes. First, I found a marginally significant main effect of time, $F(2, 8) = 3.40, p = 0.085$ and a marginally significant downward linear trend across time, $F(1, 4) = 6.24, p = 0.067$. Pairwise comparisons suggested marginal decreases from time one ($M = 2.66, SD = 1.03, 95\% CI [1.39, 3.94]$) to time five ($M = 1.60, SD = 0.683, p = 0.067, 95\% CI [0.752, 2.45]$), as well as time three ($M = 2.20, SD = 0.960, 95\% CI [1.00, 3.39]$) to time five ($M = 1.60, SD = 0.683, p = 0.088, 95\% CI [0.752, 2.45]$). Thus, hostility marginally decreased over the first three months of DBT, and then steadily marginally decreased in the six months following DBT for the first group.

When I focused analyses on the six months of DBT for the first group, there was a significant decrease in hostility between time one ($M = 2.61$, $SD = 0.929$, 95% CI [1.64, 3.59]) and time two ($M = 1.72$, $SD = 0.416$, $p = 0.038$, 95% CI [0.652, 2.79]). Thus, hostility significantly decreased in the first three months of DBT, but appears to then have increased slightly in the second three months of DBT for the first group.

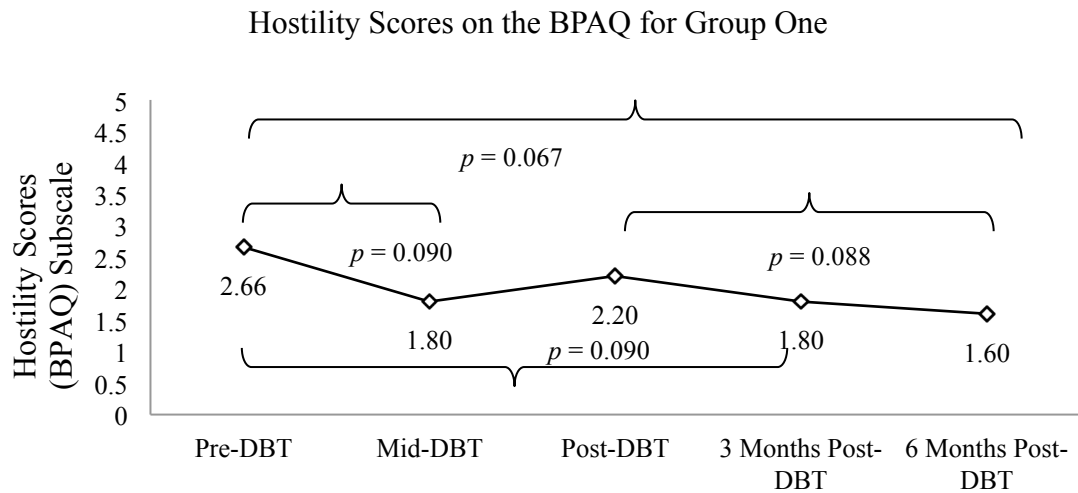


Figure 12. Hostility (BPAQ) over a year for group one.

When I analyzed the second group's scores over the five time points, I did not find any main effects or trends. I did not find any changes across time points one, three, and five either. I did not find any significant main effects over time points three, four, and five, however, pairwise comparisons on hostility scores revealed a significant decrease in hostility between time three ($M = 2.50$, $SD = 1.03$, 95% CI [1.42, 3.58]) and time four ($M = 2.00$, $SD = 1.22$, $p = 0.045$, 95% CI [0.710, 3.29]). Analyses of the profile plots indicated that scores slightly increased during the second three months, although findings were not significant. Thus, for the second group, hostility scores also significantly decreased over the first three months of DBT (Figure 13). While the profile plots suggest

an increase in hostility scores over the second three months of DBT, this increase is not significant ($p = 0.618$). When I compared the two DBT groups to each other, I did not find any significant or marginally significant changes on the hostility subscale of the BPAQ.

In sum, findings suggest a downward trend in hostility for group one over the course of the year, and a significant decrease in hostility during the first three months of DBT for both groups.

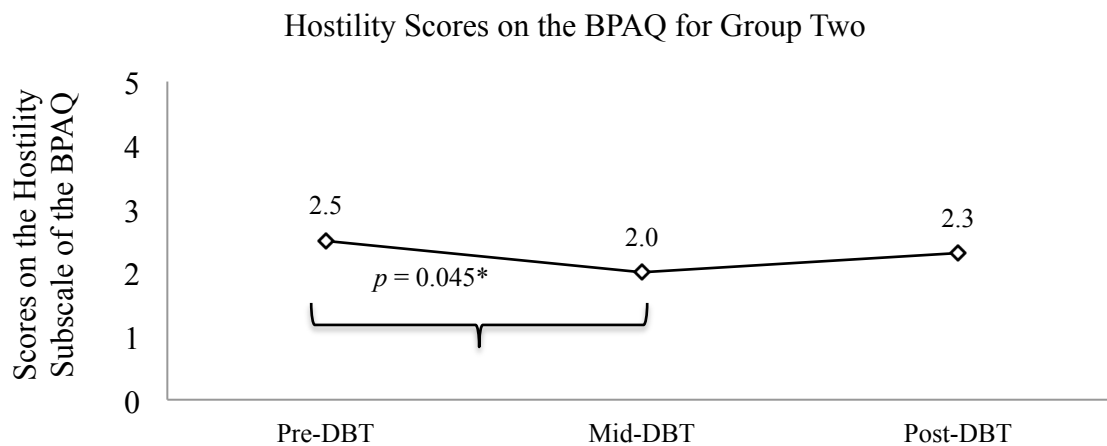


Figure 13. Hostility (BPAQ) during DBT for group two.

3.5.4 Emotion regulation. I will present results from the overall emotion regulation scores on the ERQ (Gross & John, 2003), followed by findings from the Expressive Suppression and Cognitive Reappraisal subscales.

On overall ERQ scores for group one, I found a marginally significant main effect of time, $F(4, 16) = 2.76$, $p = 0.064$. Pairwise comparisons of the five time points revealed a marginally significant decrease in emotion regulation from time one ($M = 4.38$, $SD = 0.465$, 95% CI [3.8, 4.95]) to time three ($M = 2.74$, $SD = 1.29$, $p = 0.097$, 95% CI [1.13, 4.35]), and a significant decrease in emotion regulation from time one ($M = 4.38$, $SD =$

0.465, 95% CI [3.8, 4.95]) to time four ($M = 3.54$, $SD = 0.451$, $p = 0.004$, 95% CI [2.98, 4.10]). Further, pairwise comparisons revealed a marginally significant decrease in emotion regulation from time two ($M = 4.64$, $SD = 0.522$, 95% CI [3.19, 6.09]), to time three ($M = 2.74$, $SD = 0.581$, $p = 0.080$, 95% CI [1.13, 4.35]), and a significant decrease from time two ($M = 4.64$, $SD = 0.522$, 95% CI [3.19, 6.09]) to time four ($M = 3.54$, $SD = 0.201$, $p = 0.049$, 95% CI [2.98, 4.09]). Within-subjects contrasts also detected a marginally significant linear downward trend in emotion regulation over the 12 months, $F(1, 4) = 4.65$, $p = 0.097$. These results suggest that emotion regulation skills worsened over the course of the study (Figure 14).

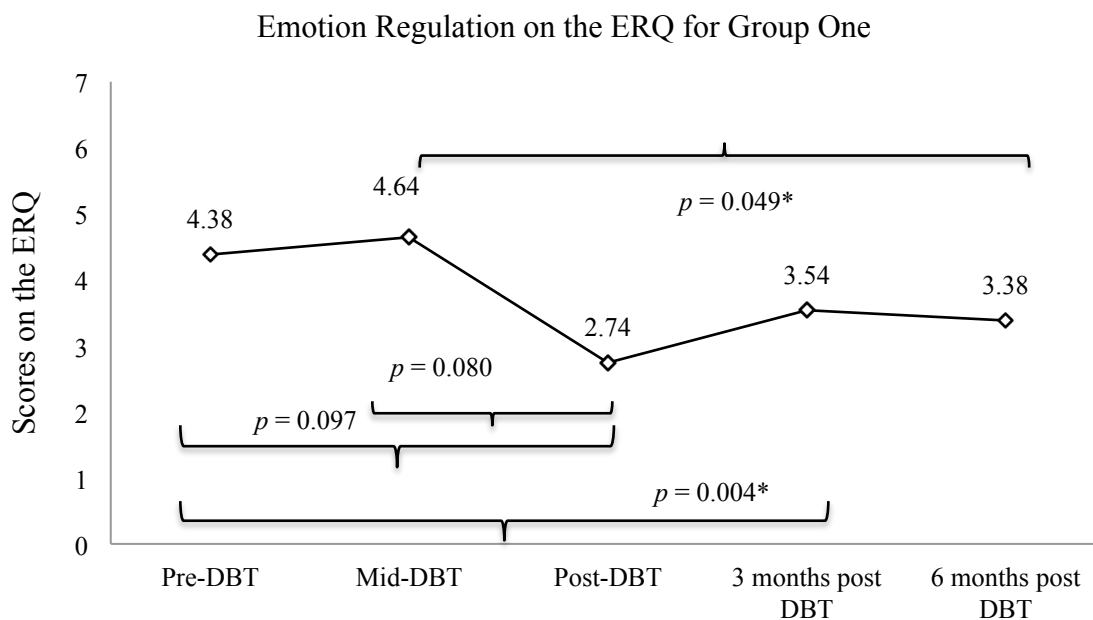


Figure 14. Emotion regulation over a year for group one.

When I analyzed the first three time points separately, I found a significant main effect of time $F(2, 10) = 4.13$, $p = 0.049$, $\eta_p^2 = 0.452$. Pairwise comparisons detected that emotion regulation scores marginally decreased from time one ($M = 4.31$, $SD = 0.444$, 95% CI [3.85, 4.78]) to time three ($M = 2.91$, $SD = 1.24$, $p = 0.089$, 95% CI [1.65, 4.22])

and from time two ($M = 4.5$, $SD = 1.06$, 95% CI [3.4, 5.67]) to time three ($M = 2.91$, $SD = 1.24$, $p = 0.071$, 95% CI [1.61, 4.21]). Tests of within-subjects contrasts also suggested a marginally significant downward linear trend in emotion regulation across time $F(1, 5) = 4.428$, $p = 0.089$. Thus, contrary to hypotheses, the first DBT group significantly decreased on their self-reported emotion regulation while in DBT, and following DBT. Next, when I compared the first group to the second group over the first three time points, I did not find any significant or marginally significant differences.

Last, I analyzed the second DBT group separately. I found the second group's self-reported emotion regulation to marginally significantly linearly increase over the five time points, $F(1, 2) = 13.07$, $p = 0.069$, as evidenced by tests of within-subjects contrasts. Pairwise comparisons across the five time points revealed that emotion regulation scores at time five ($M = 5.13$, $SD = 0.404$, 95% CI [4.13, 6.14]) were marginally significantly higher than at time one ($M = 3.46$, $SD = 1.10$, $p = 0.090$, 95% CI [0.730, 6.20], *Figure 15*). I did not find any changes on emotion regulation across time points one, three, and five.

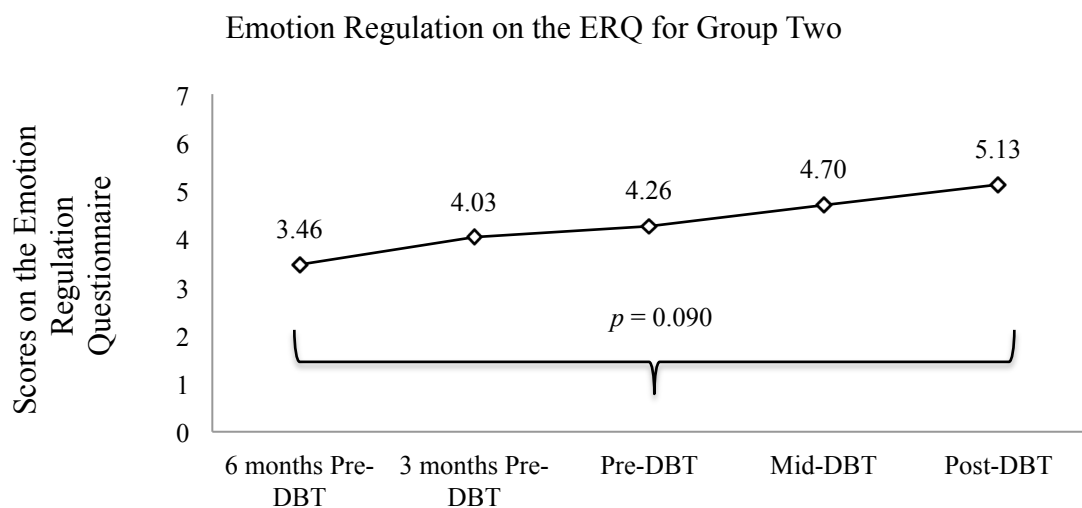


Figure 15. Emotion regulation over a year for group two.

Once in DBT, analyses on the second three time points revealed a marginally significant main effect of time, $V = 0.761$, $F(2, 4) = 6.37$, $p = 0.057$. Given that Mauchly's Test of Sphericity was significant, $\chi^2(2) = 7.428$, $p = 0.024$, I have reported multivariate tests. Pairwise comparisons found emotion regulation to increase from time three ($M = 4.23$, $SD = 0.434$, 95% CI [3.11, 5.35]) to time five ($M = 5.01$, $SD = 0.135$, $p = 0.097$, 95% CI [4.66, 5.36]). Tests of within-subjects contrasts also revealed a marginally significant upward linear trend of emotion regulation across the six months that group two participated in DBT, $F(1, 5) = 4.15$, $p = 0.097$, *Figure 16*. I did not find any changes when the two groups were compared across the first three time points.

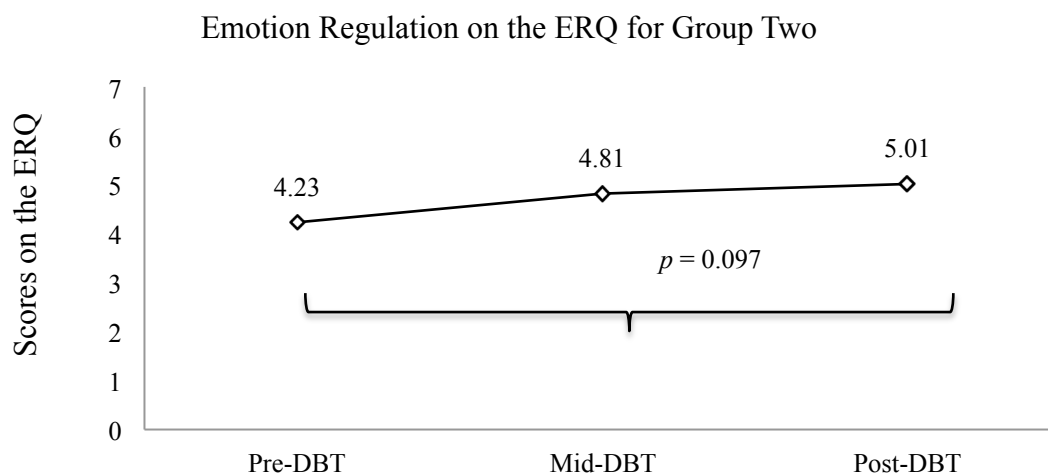


Figure 16. Emotion regulation during DBT for group two.

When I compared the two DBT groups to each other, I detected a significant interaction, $F(2, 20) = 4.54$, $p = 0.024$, $\eta_p^2 = 0.312$. Tests of within-subjects contrasts also found a significant interaction, $F(1, 10) = 8.07$, $p = 0.017$, $\eta_p^2 = 0.447$, such that the trends between groups differed. Analyses of the profile plots suggest that group one demonstrated a downward linear trend and group two demonstrated an upward linear trend (*Figure 17*). Pairwise comparisons found a significant difference between the

groups; such that group two ($M = 4.68$, $SD = 0.893$, 95% CI [4.01, 5.28]) had higher emotion regulation scores than group one ($M = 4.27$, $SD = 0.778$, $p = 0.010$; 95% CI [3.75, 5.79]) across time points. Pairwise comparisons between time points, across groups, found that emotion regulation decreased for both groups from mid-DBT ($M = 4.68$, $SD = 0.267$, 95% CI [4.01, 5.28]) to post-DBT ($M = 3.96$, $SD = 0.262$, 95% CI [3.38, 4.55]). Although, review of the profile plots suggest that group one's decrease in emotion regulation is largely accounting for this decrease, rather than an actual decrease in both groups.

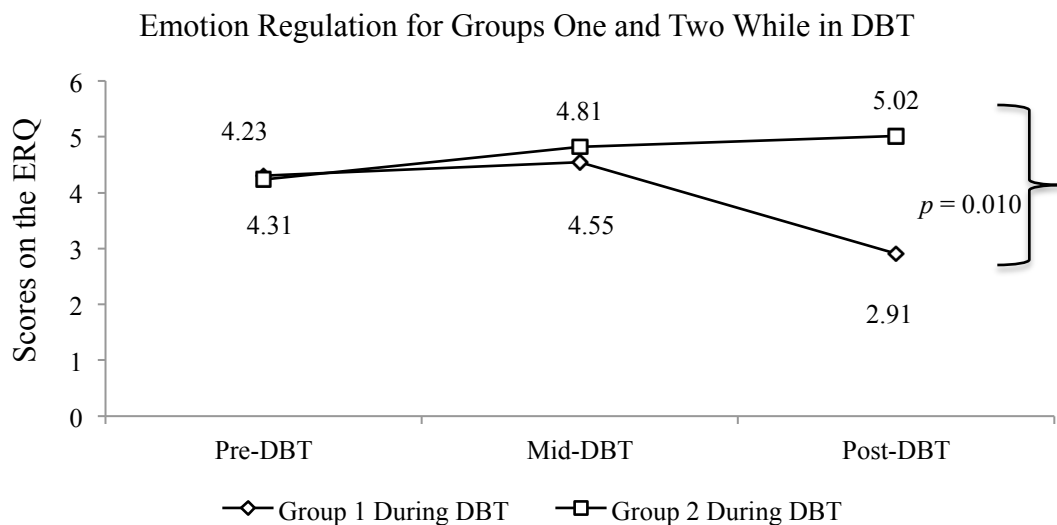


Figure 17. Emotion regulation during DBT for both groups.

Expressive suppression. I did not find any significant or marginally significant findings on any of the analyses over time or between groups for the Expressive Suppression subscale of the ERQ.

Cognitive reappraisal. I analyzed group one's scores on Cognitive Reappraisal scores across all five time points. I found a significant main effect of time, $F(4, 24) = 4.22$, $p = 0.010$, $\eta_p^2 = 0.413$, and within-subjects contrasts revealed a significant

downward linear trend across time, $F(1, 6) = 11.25, p = 0.015, \eta_p^2 = 0.652$. Pairwise comparisons found scores to decrease from time one ($M = 4.28, SD = 1.05, 95\% CI [3.31, 5.26]$) to times three ($M = 2.452, SD = 1.52, p = 0.016, 95\% CI [1.05, 3.86]$), four ($M = 3.07, SD = 1.44, p = 0.000, 95\% CI [1.74, 4.41]$), and five ($M = 2.57, SD = 1.91, p = 0.020, 95\% CI [0.805, 4.34]$). Scores also decreased from time two ($M = 4.07, SD = 2.10, 95\% CI [2.12, 6.02]$) to time three ($M = 2.45, SD = 1.52, p = 0.063, 95\% CI [1.05, 2.86]$) and four ($M = 3.07, SD = 1.44, p = 0.065, 95\% CI [1.74, 4.41]$; *Figure 18*). Therefore, Cognitive Reappraisal decreased across the year for the first DBT group. I did not find any changes when I compared the first group to the second group over the first three time points.

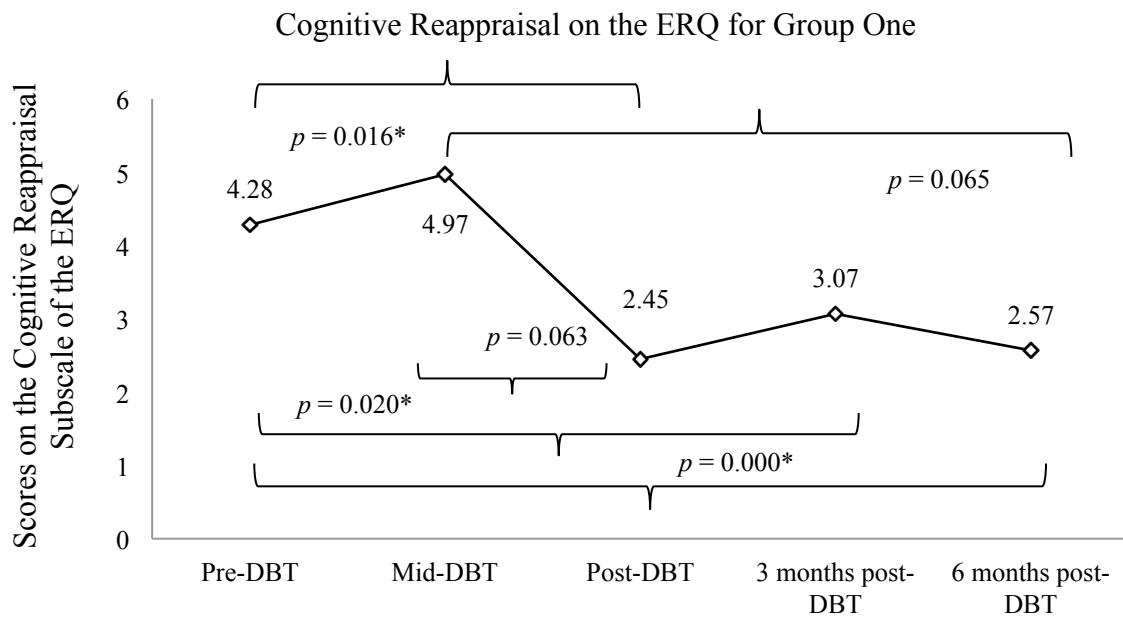


Figure 18. Cognitive Reappraisal over a year for group one.

When I analyzed group two separately across all time points, I did not find any main effects or trends. Pairwise comparisons suggested that Cognitive Reappraisal significantly increased from time two ($M = 2.31, SD = 2.40, 95\% CI [0.468, 4.16]$) to

time three ($M = 4.01$, $SD = 1.87$, $p = 0.049$, 95% CI [2.58, 5.45]). Therefore, there is some indication that Cognitive Reappraisal skills increased before participants began DBT.

When I compared both groups during their six months in DBT, I found a marginally significant main effect of time, $F(2, 28) = 2.76$, $p = 0.080$. Tests of within-subjects contrasts revealed a marginally significant downward linear trend in Cognitive Reappraisal, $F(1, 14) = 3.77$, $p = 0.072$. Pairwise comparisons suggest that scores on the Cognitive Reappraisal subscale marginally significantly declined from time one ($M = 4.15$, $SD = 1.52$, 95% CI [3.30, 5.00]) to time three ($M = 3.08$, $SD = 2.36$, $p = 0.072$, 95% CI [1.81, 4.35]), and significantly declined from time two ($M = 4.082$, $SD = 4.08$, 95% CI [2.83, 5.32]) to time three ($M = 3.08$, $SD = 3.36$, $p = 0.045$, 95% CI [1.81, 4.35], *Figure 19*).

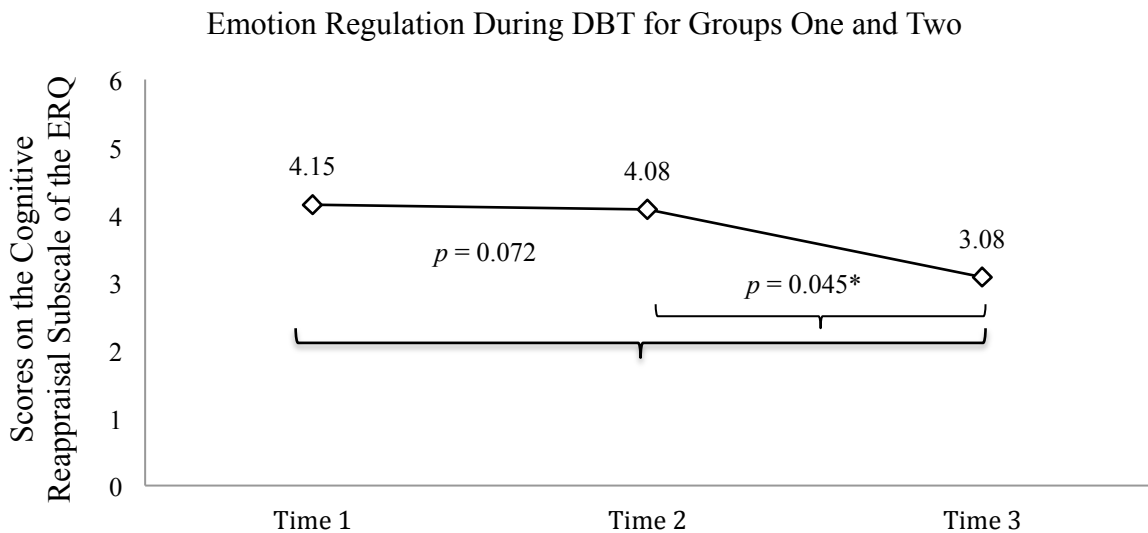


Figure 19. Cognitive Reappraisal during DBT for both groups. Marginal means shown.

Importantly, however these results should be interpreted with caution, as review of the profile plots of both groups separately reveal that group one is likely carrying this effect (*Figure 20*)

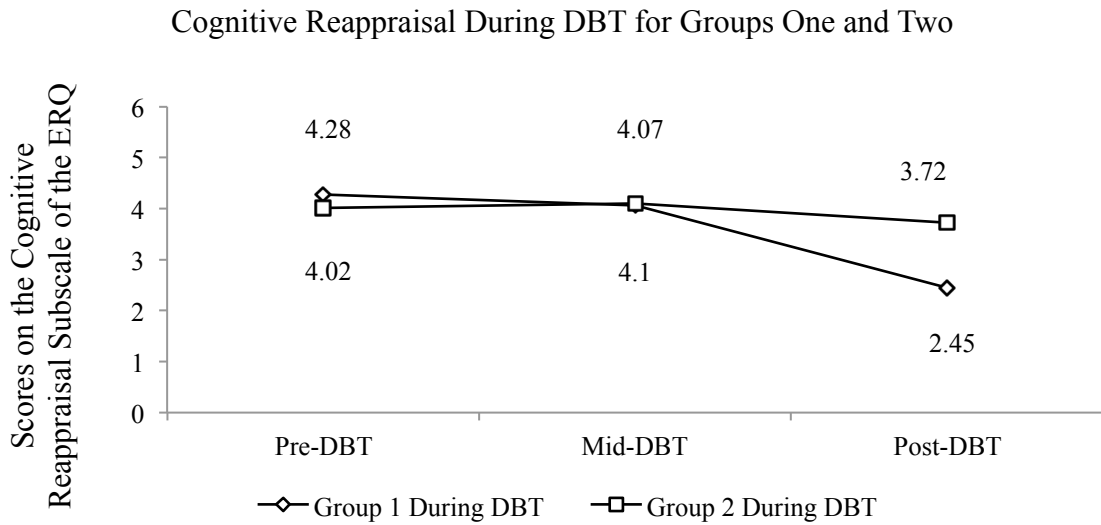


Figure 20. Cognitive Reappraisal during DBT, groups plotted separately.

In summary, scores on the ERQ suggest that group one declined in their emotion regulation skills, whereas there is some evidence that group two increased in their ability to emotionally regulate over the course of DBT. Further, group two significantly increased on the Cognitive Reappraisal subscale of emotion regulation right before participating in DBT.

3.5.5 Mindfulness. I evaluated mindfulness using the KIMS (Baer, Smith, and Allen, 2004). I will report changes in overall mindfulness, and then changes on each of the four subscales (Observe, Describe, Act With Awareness, and Accept Without Judgement). To begin, I analyzed the first DBT group separately across all five time points on overall mindfulness. I did not find any main effects across the 12 months. Tests of within-subjects contrasts revealed a significant downward linear trend across time, $F(1, 3) = 13.31, p = 0.036, \eta_p^2 = 0.816$. Pairwise comparisons revealed that mindfulness decreased from time one ($M = 3.45, SD = 0.321, 95\% CI [2.94, 3.96]$) to time three ($M = 2.97, SD = 0.065, p = 0.050, 95\% CI [2.87, 3.08]$) and time five ($M = 2.86, SD = 0.258, p$

= 0.050, 95% CI [2.45, 3.27]). Further analyses revealed a similar downward trend across time when the first three time points were analyzed separately. Thus, the first DBT group significantly decreased in their levels of overall mindfulness across time, contrary to hypotheses (*Figure 21*). When I compared the first DBT group to TAU across the first six months of the study, I did not find any changes.

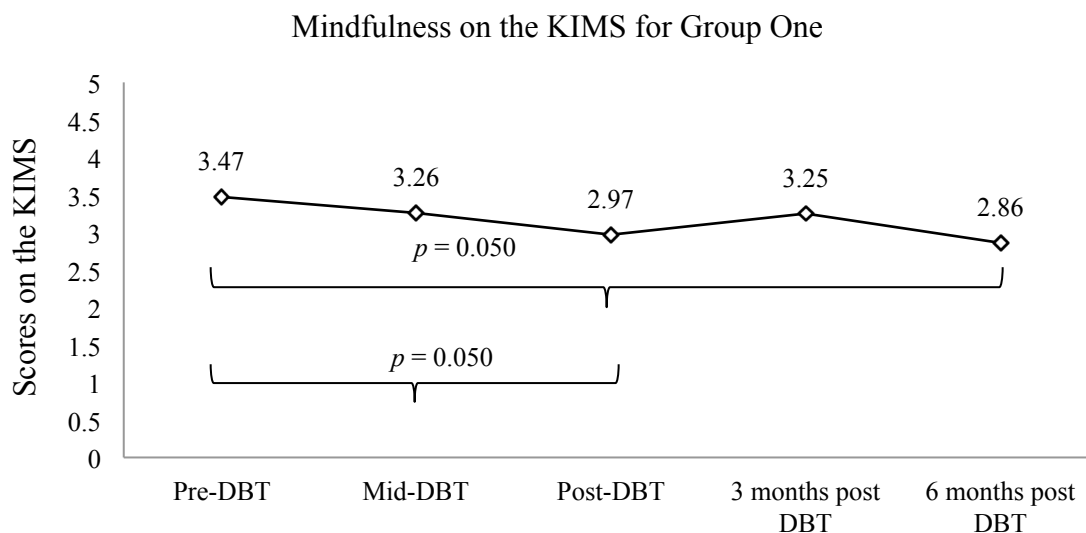


Figure 21. Mindfulness over a year for group one.

I then analyzed the second DBT group separately across all five time points. However, given that only one individual contributed to all five time points of mindfulness in the second group, results could not be computed in SPSS. Thus, I compared the second group on time points one, three, and five. I did not find any significant or marginally significant results. Therefore, I focused analyses on the last three time points. I did not find any significant main effects. Within-subjects contrasts also revealed no change in mindfulness across time.

Next, I compared the two DBT groups to each other. I did not find any changes on either group in mindfulness. For overall mindfulness, the data suggest that group one

declined in their mindfulness skills across time, and the second DBT experienced no change in mindfulness over time.

Next, I analyzed all four subscales. I analyzed the first DBT group's scores on each subscale across all five time points. I did not find any changes on the Describe or Observe subscales of the KIMS. When I analyzed the Act With Awareness subscale, no main effects were found on all five time points. I then analyzed time points one, three, and five to increase the sample size. Again, I did not find any main effects. Within-subjects contrasts detected a marginally significant quadratic trend of time, $F(1, 3) = 0.157, p = 0.061$. Pairwise comparisons revealed a marginally significant increase in acting with awareness from time point three ($M = 2.60, SD = 0.082, 95\% \text{ CI } [2.47, 2.73]$) to time point five ($M = 3.32, SD = 0.543, p = 0.080, 95\% \text{ CI } [2.46, 4.19]$). Review of the profile plots suggests that acting with awareness decreased (although non-significantly) over the first six months of the study and then marginally significantly increased in the second six months, after the first group finished DBT (*Figure 22*).

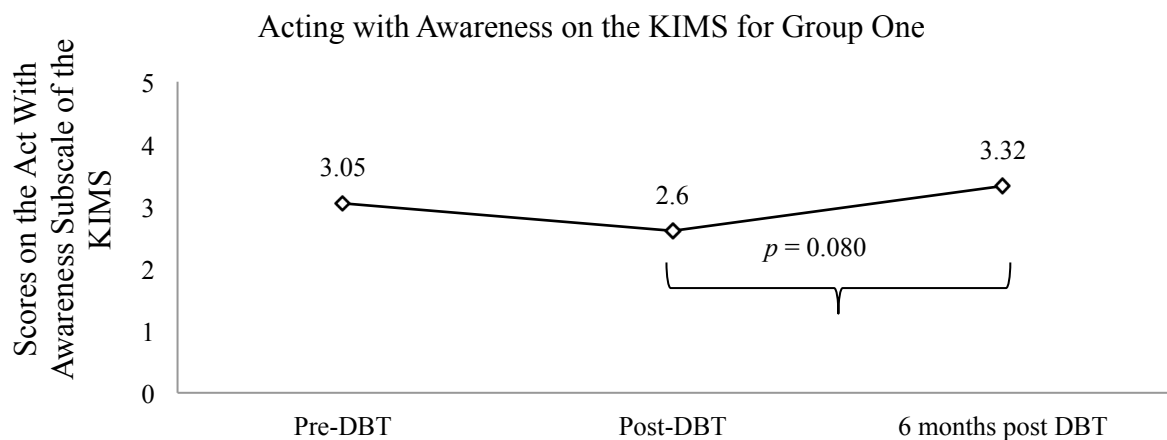


Figure 22. Acting With Awareness over a year for group one.

Interestingly, when I analyzed data over the first three time points, I found a significant main effect of time, $F(2, 10) = 5.18, p = 0.028, \eta_p^2 = 0.509$. Tests of within-subjects contrasts detected a significant quadratic trend, $F(1, 5) = 2.83, p = 0.008, \eta_p^2 = 0.278$, such that acting with awareness marginally significantly increased from time one ($M = 3.11, SD = 0.309, 95\% CI [2.32, 3.91]$), to time two ($M = 3.35, SD = 0.246, p = 0.091, 95\% CI [2.71, 3.98]$), and significantly decreased from time two ($M = 3.35, SD = 0.246, 95\% CI [2.71, 3.98]$) to time three ($M = 2.58, SD = 0.031, p = 0.030, 95\% CI [2.50, 2.66]$; *Figure 23*). Therefore, acting with awareness appears to have increased in the first three months of DBT, decreased in the second three months of DBT, and then increased in the months following DBT.

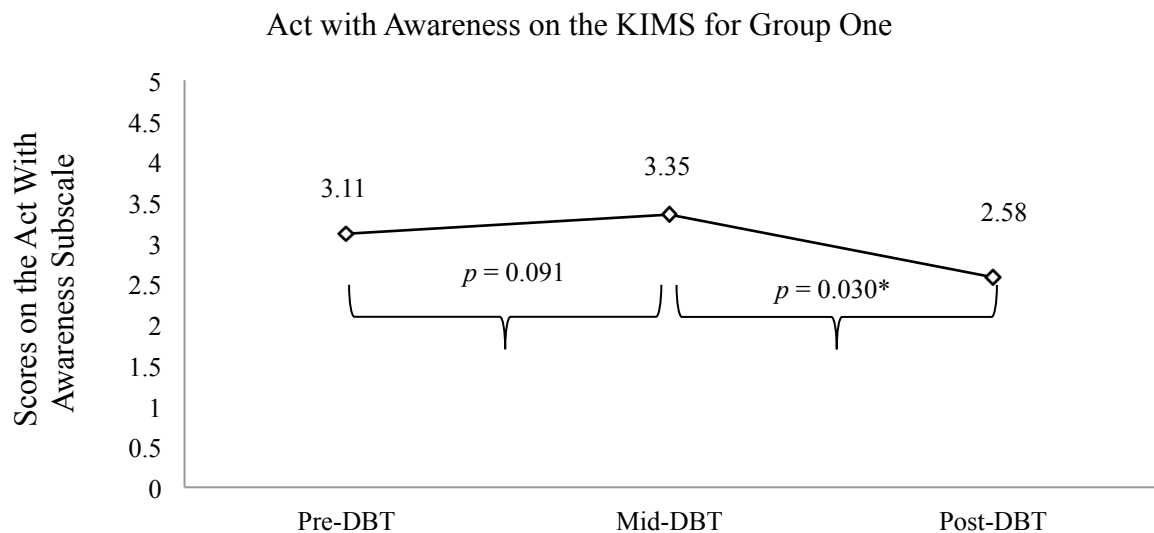


Figure 23. Acting with Awareness during DBT for group one.

Next, I compared group one to group two during the first three time points on all four subscales of the KIMS. I did not find any changes on the Observe or Describe subscales. Results from the Act With Awareness subscale revealed no main effects or interactions, however within-subjects contrasts show a marginally significant downward

linear trend across time, $F(1, 8) = 3.93, p = 0.083$. Pairwise comparisons revealed that scores at time one ($M = 3.25, SD = 0.745, 95\% CI [2.68, 3.84]$) were marginally significantly higher than at time three ($M = 2.65, SD = 0.1.09, p = 0.083, 95\% CI [1.78, 3.52]$). Thus, both groups decreased in their scores on the Acting With Awareness subscale across the three time points (*Figure 24*).

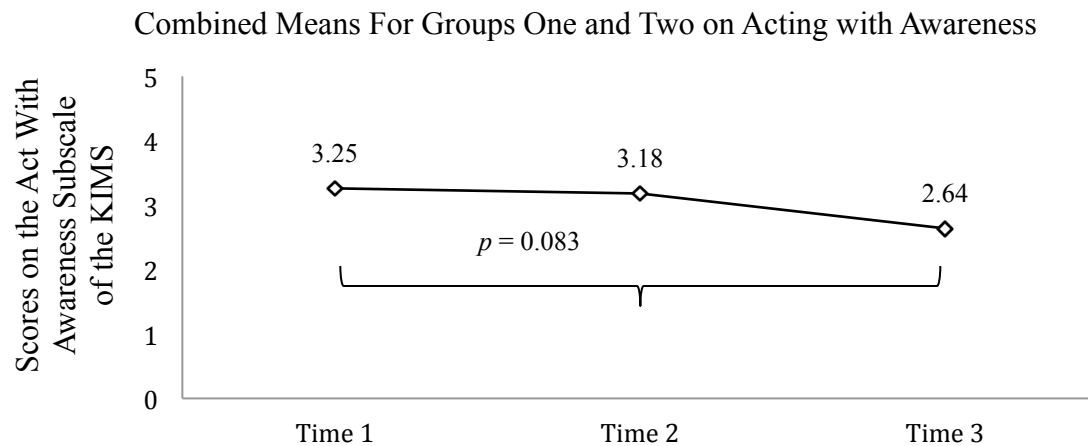


Figure 24. Acting With Awareness over the first six month, both groups compared.

Marginal means shown

Next, I analyzed the Accept Without Judgement subscale. When I analyzed group one separately, I did not find any changes on the Accept Without Judgement subscale. When I compared group one to group two across the first three time points, I found a significant main effect of time, $V = 0.629, F(2, 7) = 5.93, p = 0.031, \eta_p^2 = 0.629$, and a marginally significant interaction between group and time, $V = 0.490, p = 0.095$. Given that Mauchly's Test of Sphericity was significant, $\chi^2(2) = 8.02, p = 0.018$, I have reported multivariate tests. When I review the profile plots, there is some indication that group one increased in scores between time one and time two, whereas group two decreased in scores during that time period. Within-subjects contrasts found a significant downward linear trend, $F(1, 8) = 7.78, p = 0.024, \eta_p^2 = 0.493$, and pairwise comparisons suggest a

decrease from time one ($M = 3.54$, $SD = 0.772$, 95% CI [2.95, 4.13]) to time three ($M = 2.54$, $SD = 1.16$, $p = 0.023$, 95% CI [1.62, 3.46]; *Figure 25*).

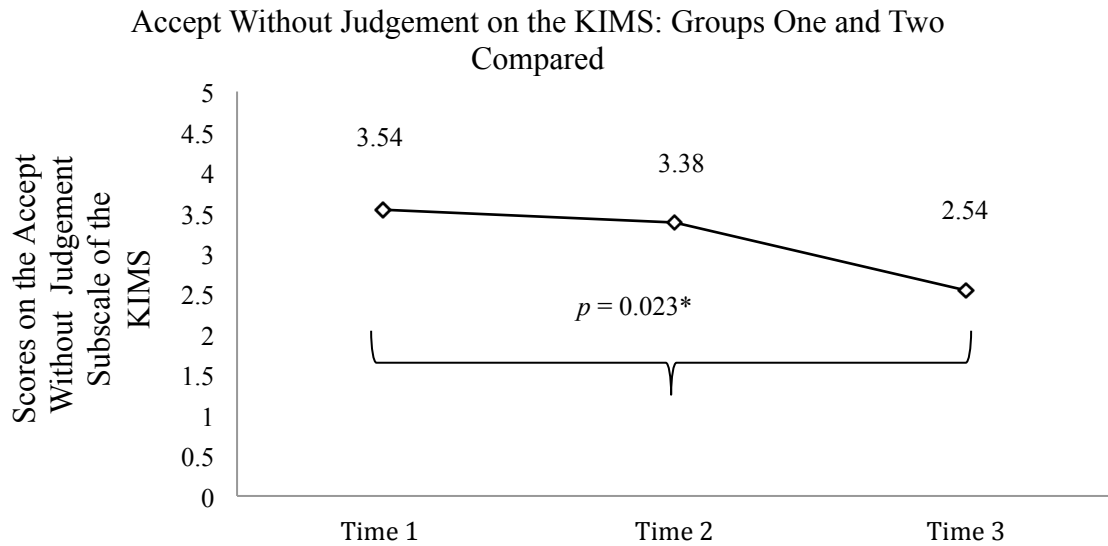


Figure 25. Accept Without Judgement across the first six months, both groups compared.

Next, I compared the second group on all four KIMS subscales. I did not find any changes on any of the subscales, either over the five time points or while the second group was in DBT. I did not find any changes when both DBT groups were compared to each other either. To summarize the findings on mindfulness, there is evidence that group one decreased in mindfulness skills and then increased slightly in the months following DBT on the Acting With Awareness subscale. There is little evidence for any changes in mindfulness across TAU or DBT for group two.

I conducted Chi-squared analyses to determine whether groups differed on age, number of months in the forensic system, years of education, risk level (on the HCR-20), and diagnosis. I did not find any differences.

3.6 Summary of Findings.

Overall, the data suggest that DBT shows some promise in reducing maladaptive outcomes, such as aggression, hostility, and anger. For the first group, there is some evidence for a decrease in self-reported aggression, anger, and hostility over the year, which provides preliminary support for the hypotheses. Contrary to hypotheses, the first group was found to significantly decrease in both emotion regulation and mindfulness across time. However, there is some evidence that acting with awareness increased in the first group after completing DBT. Interestingly, however, comparisons between groups one and two revealed that group one had higher overall scores in aggression, and lower overall scores in emotion regulation, compared to the second group. Therefore, the first group may have begun the study with more deficits than the second group.

Results from the second group revealed little support for decreases in self-reported aggression over time, however they did show evidence for decreases in anger and hostility. Interestingly, the second group increased in emotion regulation, which is in line with hypotheses, but showed no changes in mindfulness, contrary to hypotheses. Again, the second group also demonstrated lower overall aggression and higher overall emotion regulation, compared to group one. Therefore, there may have been less room for the second group to improve on measures of aggression, compared to the first group.

Discussion

While the research evaluating DBT is expansive (O'Connell & Dowling, 2014; Robins & Chapman, 2004; Valentine, Bankoff, Poulin, Reidler, & Pantalone, 2015), studies have typically excluded individuals with comorbid diagnoses, and the vast majority of studies have focused on specific diagnostic groups (most commonly

individuals with borderline personality disorder). Naturally, strict experimental conditions are necessary in preliminary studies to determine whether effects can be replicated and mechanisms of change can be identified. Although such studies are integral to understanding whether DBT is efficacious, the findings cannot be generalized to broader, more representative clinical populations (Koerner & Dimeff, 2000).

In forensic psychiatric populations, comorbidity is prevalent (Regier et al., 1990; Ritschel, 2006) and treatment approaches must account for this reality. Thus, evaluations of potential therapeutic approaches must demonstrate effectiveness in a representative forensic psychiatric population. While DBT has already been widely employed in this setting with patients suffering from a range of mental disorders (including mood disorders, personality disorders, substance use disorders, and psychotic disorders; Linehan, 2014), this study is the first to evaluate whether DBT decreases aggression and related constructs in a representative sample of forensic psychiatric patients.

Overall, this study provides preliminary evidence that DBT may be effective in reducing aggression, hostility, and anger in a representative sample of forensic psychiatric patients. For the first group, decreases in overall aggression, as well as premeditated and impulsive aggression, specifically, were found both during DBT and in the six months following DBT. The first group was also found to decrease in self-reported anger and hostility, both during DBT and in the six months following DBT.

Group two remained relatively constant on aggression scores before participating in DBT, and then decreased in aggression during the months in DBT. While these findings were only marginally significant, it is possible that the second group had lower levels of aggression to begin with. Findings suggested that group two had lower overall

aggression than group one and average scores on the BPAQ were 1.4 out of 5. Therefore, the second group may have had little opportunity to decrease further while in DBT. This possibility is further supported by the low number of aggressive incidents reported over the year for the second group. Encouragingly, significant decreases in hostility and anger were found, which may have further protected this group from engaging in aggressive behaviour over the course of the study.

To help better understand the mechanisms by which DBT may have reduced aggression, hostility, and anger, emotion regulation and mindfulness were also included in this study. Interestingly, there is little evidence to suggest that either of these skills increased over the course of the study. Thus, there is no reason to theorize that these skill sets were associated with the observed decreases in aggression, hostility, or anger². Data suggest that the first group's mindfulness and emotion regulation skills worsened over the course of the study (although there was evidence for an increase in acting with awareness). While there was some evidence of increases in emotion regulation for group two, there were no changes in mindfulness. Therefore, there is little evidence to suggest that any gains made in DBT were accounted for by the specific skills sets taught during the four skills modules. There are several possible explanations for these findings.

It is conceivable that any detected decreases seen in aggression, anger, and hostility were a result of increases in the other two skill sets, interpersonal effectiveness and distress tolerance (neither of which were specifically evaluated in this study due to a lack of appropriate self-report measures in these domains). Future research may develop

² The present study did not specifically analyze associations between variables. Future studies are encouraged to assess whether the skill sets learned in DBT mediate or moderate the outcome variables among forensic psychiatric patients.

and incorporate measures of these two skill sets to determine whether they have a greater impact on maladaptive behaviours than mindfulness and emotion regulation. It is also possible that patients were aware of the objective of the study and completed self-report measures in a way that would be consistent with hypotheses. At the same time, however, patients may have wanted to present themselves in socially desirable ways, and may have underreported their aggressive behaviour. To help deter either of these possibilities, I repeatedly reminded participants that all self-report data was completely anonymous. I emphasised that data would not be available to the DBT leaders, the Ontario Review Board, or any other individuals that may have a role in determining patient privileges. Nonetheless, these confounds may have influenced the data.

Further, it is possible that DBT is not successful in teaching the skills sets that it intends to teach. A review of the literature would argue that this is unlikely, given the wealth of evidence suggesting that DBT is consistently associated with increases in both mindfulness (Heppner et al., 2008) and emotion regulation (Neacsiu, Eberle, et al., 2014). There are also numerous studies delineating the theoretical promise for DBT in diverse populations due to its presumed ability to increase these skills (e.g., Federici & Wisniewski, 2013; Fleming, McMahon, Moran, Peterson, & Dreesen, 2015).

Intriguingly, however, a deeper look into this literature reveals that very few studies empirically measure mindfulness and emotion regulation (or interpersonal effectiveness and distress tolerance, for that matter). Rather, they often assume that these skills are increasing, and that they mediate any outcome variables being evaluated (Bohus et al., 2004; Lynch, Chapman, Rosenthal, Kuo, & Linehan, 2006; Lynch et al., 2007; Rathus, Cavuoto, & Passarelli, 2006). Of the studies that do explicitly evaluate whether

mindfulness and emotion regulation increase, findings are equivocal. For example, while there is some evidence that mindfulness (Fleming et al., 2015) and emotion regulation (Neacsiu, Eberle, et al., 2014) increase over the course of DBT (based on self-report measures of these skill sets), some studies have not only found mindfulness to be unaffected, but have even argued that mindfulness may not be a necessary component of DBT (Ritschel, 2006). Moreover, other studies claim to evaluate the skills associated with DBT, but do not use measures of mindfulness or emotion regulation in their evaluations (e.g., Miller, Wyman, Huppert, Glassman, & Rathus, 2000).

Upon further examination of the studies that do support a correlation between DBT and increases in mindfulness and emotion regulation (e.g., Fleming et al., 2015; Neacsiu, Eberle, et al., 2014), it appears that these skills may be increasing in higher functioning populations, such as university students suffering from attention deficit hyperactivity disorder. This is an important consideration, as patients suffering from more persistently debilitating mental disorders (e.g., schizophrenia) are not often highly educated, may have more difficulty grasping the concepts learned in skills training, or may have trouble reading handouts and expressing their thoughts during skills training (Didonna, 2009).

To help better understand how the participants in the present study were experiencing the DBT modules, I conducted an hour-long focus group at the end of each DBT group. During these sessions, participants mentioned that mindfulness was a challenging construct to grasp and that the homework sheets were confusing. Further, they mentioned that it was difficult to incorporate mindfulness strategies in specific situations. For example, during times where patients experienced either psychotic

symptoms or side effects from their medication, they felt it more challenging to use their mindfulness skills. Additionally, many participants suffered from comorbid anxiety disorders and admitted that they feared negative evaluation from other group members. As a result, participants reported being hesitant to ask questions when they found the skills training sessions confusing.

Overall, more research needs to be conducted on whether mindfulness and emotion regulation (and interpersonal effectiveness and distress tolerance) are directly targeted over the course of DBT, and whether these modules are explaining the gains experienced by patients. Further, future research should evaluate whether more simplified, forensically-adapted modules, may help increase the four DBT skills in these settings.

Indeed, the field has acknowledged this limitation and there has already been a push to identify and evaluate the mechanisms by which DBT is effective. For example, Lynch et al. (2006) published an article in which they laid out the theoretical mechanisms of change in DBT. They emphasized that mindfulness and emotion regulation were foundational components of DBT, and were likely primarily responsible for the behavioural and emotional changes seen after participating in DBT (Lynch et al., 2006). The authors suggested that mindfulness might mediate various outcomes (e.g., decreasing aggression) by reducing the patient's attempts to control private emotions, cognitions, or bodily sensations, thus helping them to become aware of these phenomena and accept them (Lynch et al., 2006). Contrarily, emotion regulation techniques were theorized to be effective by encouraging participants to re-evaluate emotionally-charged associations to stimuli and re-wire automatic emotional responses to stimuli (Lynch et al., 2006). The authors posited that both skills sets are likely necessary to reduce maladaptive

behaviours, such as self-injury and aggression. Therefore, according to the theoretical underpinnings of DBT, this therapy teaches individuals to be less judgemental and controlling of their emotions so that they might help reduce them.

While this theory may be appropriate for populations characterized by high levels of emotionality and reactivity, it is possible that these theories may not translate to more antisocial diagnostic groups. To elaborate, this theory is likely most applicable to women with borderline personality disorder (the population for which DBT was first developed), who tend to be characterized by high levels of emotional expression and reactivity. For forensic psychiatric patients, however, mindfulness and emotion regulation modules may need to serve a different purpose. For example, participants in the present study have high levels of antisocial traits. Many of these individuals are under-reactive, callous, insensitive, and many present with the negative symptomology of concomitant psychotic disorders (such as lethargy or detachment). In this sense, emotion regulation modules in this population may need to adopt a different theory to explain the effectiveness of DBT and may need to set different therapeutic goals. Rather than trying to decrease emotional expression and reactivity, DBT with forensic psychiatric patients may need to focus on effective emotional expression and increased sensitivity to external stimuli.

Consequently, current measures of emotion regulation are likely inappropriate for this population, as they are consistent with a theoretical framework that may be inappropriate for forensic psychiatric patients. For example, on the ERQ (Gross & John, 2003), there are questions such as, “I keep my emotions to myself”, and “I control my emotions by not expressing them”. Theoretically, patients should endorse these items, as they suggest increased emotional control. In the case of forensic psychiatric populations,

however, patients may be overly-suppressive of their emotions, which may cause their emotions to build and be released in maladaptive ways (e.g., in the forms of verbal or physical aggression). As a result, lower endorsement of these items may actually signify that patients are more emotionally expressive, which may indicate increased emotional regulation in this context. Although data in the current study did not support this (i.e., no changes were found on the Expressive Suppression subscale of the ERQ), future studies should determine what the goals are in specific modules, and how to evaluate whether those goals are being met. Overall, more research is needed to better understand the mechanisms by which DBT is effective, and how these mechanisms might manifest differently in different clinical populations.

Furthermore, it is possible that the measures used in this study to evaluate mindfulness and emotion regulation were inappropriate for the forensic psychiatric context. In addition to the potential challenges associated with the content of the scales, the questionnaires may have been difficult for the participants to understand, given that reading comprehension is typically poor in this population. Over the course of the study, it became clear that many participants struggled with reading and understanding the content of the surveys, homework sheets, and handouts. To remedy this issue, future studies might have researchers read questions out loud to participants, and ensure that participants understand the meaning of different words. Accordingly, future efforts should be made to develop simpler questionnaires for participants.

It is also possible that participants struggled to relate items of questionnaires to their own lives, or to put them into concrete examples. To illustrate, one participant inquired about the question, “When I am feeling POSITIVE emotions, I am careful not to

express them” (an item on the KIMS; Baer et al., 2004). She was confused as to how this might be applied to a real life situation. She could not understand why one would want to suppress positive emotions and could not imagine a scenario in which this would apply to her. Therefore, she mentioned that she often selected the “neutral” response for items that she did not understand. Other participants also voiced that questions were vague and hard to relate to their current situations, or were hard to think about in relation to everyday feelings or thoughts. Therefore, it may have been challenging for participants to translate their understanding of skills to these items, and may have caused their responses to be unrepresentative of their actual skills development. Questionnaires that use simple phrasing and concrete examples may provide more accurate evaluations of skills use in this population.

It is also possible that responses to these questionnaires may have been highly confounded by changes in participants’ insight into their disorders. For example, when discussing answers to questions such as, “I believe some of my thoughts are abnormal or bad and I shouldn’t think that way,” or “I tend to evaluate whether my perceptions are right or wrong” (items selected from the KIMS; Baer et al., 2004), patients mentioned that their insight into their symptomatology greatly influenced their answers. To explain, at the beginning of the study, many participants were anosognosic, or unaware that they suffered from a disorder. This was particularly relevant to participants who suffered from delusions. When DBT began, a few participants mentioned that they were confused as to why they had been referred to therapy, or why they were in a psychiatric hospital. Over the course of DBT, many individuals became more aware of their psychotic symptoms and were more able to identify and evaluate them. Thus, while mindfulness teaches

participants to be non-judgmental and accepting, the institutional staff may have offered positive reinforcement for increases in awareness and evaluation of psychotic symptoms. In this way, while mindfulness strategies teach participants not to evaluate whether perceptions/emotions are right or wrong, for example, these skills may be highly adaptive in the context of psychotic disorders, and may have significantly confounded the results on the KIMS measure, which may help explain why scores on this subscale were either maintained (in group two), or tended to decline (in group one).

The findings of this study may have also been influenced by several important limitations. First, as previously stated, the small sample sizes of this study impeded statistical power and reduced the likelihood of detecting a true effect of DBT on the outcome variables measured. During statistical analyses, power estimates were reviewed and most analyses estimated power around 0.50, which is lower than the standard power estimates of 0.80 sought in behavioural sciences research (Cohen, 1992). Thus, the probability of Type II error was substantial.

As a result, the decision was made to analyze pairwise comparisons (and report all analyses with a p-value below 0.10), even in cases where omnibus tests were non-significant. Unfortunately, while this decision was made to provide a more nuanced picture of promising findings, it also significantly increased the chances of Type I error. For example, review of significant pairwise comparisons show that 95% confidence intervals often overlapped. Thus, significant findings may simply have been due to chance. The number of analyses conducted with each outcome variable further increases this possibility. Therefore, all results should be interpreted with caution, and future studies are needed to replicate these findings with larger sample sizes and more

conservative analyses. In preparation for future research, G*Power analyses were conducted, and a sample size of 22 was suggested to reach an effect size of $f = 0.35$ (roughly equivalent to a $\eta_p^2 = 0.11$, which is far more conservative than the average effect sizes of 0.50 found in this study) and a power estimate of 0.80. Thus, plans have been established to continue evaluating DBT groups until that sample size has been reached and analyses can be conducted with adequate statistical power.

Furthermore, this study was hindered by not having a standardized DBT manual for forensic psychiatric patients. Given that DBT has been previously modified and implemented with this population, the current adaptation was based on previous versions of DBT in forensic psychiatric settings (e.g., McCann et al., 2000). To build on these efforts, the author is currently on a team of psychiatrists, social workers, and psychologists that are formally writing up a forensic psychiatric adaptation of DBT. To help accomplish this goal, the author conducted focus groups at the end of each DBT group, and patient feedback on the program was solicited throughout the year.

Once the forensically-adapted manual is complete, it will be implemented and evaluated within the Southwest Centre for Forensic Mental Health Care and will be distributed to other forensic psychiatric hospitals in Ontario to be evaluated and further altered as necessary. Until a standardized manual is available for this population, it will remain challenging to interpret the results of extant DBT evaluations in this population, as they were all modified to meet their respective institutional needs (e.g., Berzins & Trestman, 2004; McCann et al., 2000).

Of note, Linehan recently published an updated version of her skills training manual (Linehan, 2014). Upon review of the new manual, it is clear that Linehan has

endeavoured to make the skills more adaptable to multiple populations and has significantly decreased her focus on treating borderline personality disorder, specifically. While the 2014 manual has addressed many of the previous challenges, the handouts and homework sheets continue to use sophisticated language, jargon, and remain too complicated for the forensic psychiatric population. Thus, significant changes will be necessary to adapt this new manual to forensic psychiatric populations.

Further, in the 2014 manual, Linehan has reviewed the extant literature and supported the implementation of stand-alone skills training, as well as six-month DBT groups (Linehan, 2014). However, future studies should be conducted to better understand the “dose” of DBT required obtain desired outcomes. For example, studies that have found DBT to be effective in producing a range of positive outcomes have implemented programs between four months (e.g., Neacsiu, Eberle, et al., 2014; Shelton et al., 2011; Shelton et al., 2009; Wolpow et al., 2000) and 18 months (e.g., Evershed et al., 2003). Naturally, some groups of individuals will benefit from longer, more intensive programs than others. Thus, implementations of DBT in inpatient settings may consider running consecutive, open, DBT groups. That way, patients would be able to participate in as many “rounds” of DBT as may be beneficial to them. In her 1993 manual, Linehan mentioned that several individuals with borderline personality disorder participate in multiple DBT groups. She reports that some of her patients have been in DBT for many years. Therefore, it is likely that different “doses” will be required for different individuals under different circumstances.

Additionally, given the low base rate of aggressive behaviour in this study, results are based exclusively on self-report measures. Interestingly, of the other DBT studies

with forensic psychiatric populations that report incidents of aggression (Evershed et al., 2003; Shelton et al., 2011; Shelton et al., 2009), many did not find significant differences in incidents of aggression after participating in DBT (e.g., Evershed et al., 2003), or were not able to reliably record incidents of aggression (e.g., Sakdalan et al., 2010). Therefore, the majority of studies in this area have relied on self-report measures of aggression. Although there is evidence that self-report measures are valid methods by which to collect information (Chan, 2009), they are subject to validity threats, such as social desirability and poor memory recall. Therefore, more objective measures of aggression should accompany future studies in this area.

The low incident rates of aggression may also have implications for future research. First, it is conceivable that aggression is not the paramount concern in medium security inpatient settings. Rather, future studies could focus on whether DBT decreases other unwanted behaviours, such as institutional defiance (e.g., returning late from day passes). Second, it is also possible that staff did not refer highly aggressive patients to DBT. This study evaluated the first implementation of DBT at the Southwest Centre for Forensic Mental Health Care. Thus, due to safety concerns, patients who were highly unstable may not have been referred to the group. Instead, patients who were nearing their Ontario Review Board hearing tended to be recruited to assist them in gaining increased privileges (e.g., day passes or leaves of absence). Since the findings of this study may provide initial evidence to support the continuation of DBT within this hospital, the inclusion of more behaviourally unstable patients is possible in future evaluations. The inclusion of more aggressive patients may provide more incidents of aggression to be examined over the course of DBT. Of note, it is possible that aggressive incidents are

underreported in this study (since many participants were living in the community and, thus, were not being as closely monitored). This is unlikely, however, as none of the outreach patients had any incidents of aggression in the months before they transferred into outreach.

Overall, the challenges and limitations of this study were significant. They have also provided important insight into the necessary future directions of research with forensic psychiatric populations. In addition to developing a standardized manual for forensic psychiatric patients, designing more appropriate self-report measures, incorporating more behaviourally challenging participants, and replicating the findings with larger sample sizes, future studies should incorporate behavioural measures. Behavioural measures of the components that may underlie aggressive behaviour (e.g., response inhibition, focusing on rewards rather than consequences, decreased ability to learn from punishment) can be tracked using computer measures such as the Iowa Gambling Task (Bechara, Damasio, Damasio, & Anderson, 1994) and the Balloon Analog Risk Task (Lejuez et al., 2002). These instruments are widely used measures of risky decision-making and antisocial behaviour (Bass & Nussbaum, 2010; Bishara et al., 2009; Wetzels, Vandekerckhove, Tuerlinckx, & Wagenmakers, 2010). Performance on these tasks has also been associated with different forms of aggressive and criminal behaviour. Studies have been able to postdict forms of aggression (i.e., impulsive or premeditated) based on individuals' performance on such tasks (Lejuez et al., 2002). Therefore, the inclusion of behavioural tasks may serve as more accurate, applicable, objective measures of changes in aggression, risky-decision making, and overall

antisociality during DBT in this population. These approaches may be useful in evaluating the effectiveness of rehabilitative strategies with this population in general.

In summary, the paramount goal in forensic psychiatric hospitals is rehabilitation and successful, sustainable, reintegration back into society (*Criminal Code*, R.S., 1985, c. C-46, s. 718) . This goal cannot be met with pharmacotherapy alone. Individuals in these settings need concrete skills with which to cope with the inevitable challenges of reintegrating into society (Mezey, Kavuma, Turton, Demetriou, & Wright, 2010). Not only do these individuals suffer from debilitating disorders, there is widespread stigma associated with this population that further impedes successful societal reintegration (Armiya'u, Audu, Obembe, Adole, & Umar, 2013; Livingston & Boyd, 2010). These individuals need the skills with which to live productive lives, and the systems put in place to rehabilitate them need practicable, empirically-supported, strategies. Given that DBT shows some potential in meeting this need, this therapeutic approach should continue to be evaluated as more forensically-adapted DBT manuals become available.

Further, successful rehabilitation has clear institutional and financial benefits. In Canada, retaining one forensic psychiatric patient in a medium security forensic hospital for one day costs an average of \$747, which corresponds to \$272,655 a year (Higgins et al., 2012). As such, effective rehabilitation strategies that reduce the lengths of hospitalization would save a substantial amount of government funding. This funding could be partly re-distributed to support research efforts with these populations, which could allow for more effective treatments and further reduce the costs associated with retaining patients in this system. Ultimately, there needs to be an increased pressure to identify and implement empirically-supported, standardized treatments for forensic

psychiatric patients to help shorten hospitalizations, decrease the costs associated with treating this population, help patients reintegrate into society, and increase public safety.

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Appendices

Appendix 1: DBT Diary Card

Diary Card	Name:	Date
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Thoughts of Substance Use

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

Feeling Frustrated 1=Low 5= Extremely Frustrated

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

Feeling Depressed 1=Low 5=Extremely

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

OTHER _____ 1=Low 5=Extremely

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

Barriers:

What happened that was positive?:

Appendix 2: Table of Means for Pairwise Comparisons

Table of means for all pairwise comparisons with p-values below $p < 0.1$ ($p < 0.05$ is considered significant*).

Outcome	Comparison	Time 1 (Month one)	Time 2 (Month three)	Time 3 (Month six)	Time 4 (Month nine)	Time 5 (Month twelve)	Time Points That Differed	Omnibus Tests
Aggression (BPAQ)	DBT 1 and TAU 2 (group one over twelve months)	2.31	2.05	2.05	1.58	1.58	3 and 5 ($p = 0.041^*$)	
Aggression (BPAQ)	DBT 2 (group two during DBT)		2.58	2.58	2.38	1.95	3 and 5 ($p = 0.099$)	
Aggression (IPAS)	DBT 1 and TAU 2 (group one over twelve months)	2.70	2.23	2.23	1.68	1.68	1 and 5 ($p = 0.097$)	Marginally significant main effect of time $F(2, 8) = 4.2, p = 0.056$ And downward linear trend ($p = 0.097$)
Aggression (IPAS)	DBT 1 and TAU 1 (first and second group compared over the first six months,	2.65	2.02	2.43			1 and 2 ($p = 0.079$)	Marginally significant main effect of time $F(1, 8) = 3.08, p = 0.078$

	marginal means)						
Premeditated Aggression (IPAS)	DBT 1 (group one during DBT)	2.50	1.93	2.10	1 and 3 ($p = 0.092$)	Marginally significant downward linear trend, $F(1, 5) = 4.33, p = 0.097$	
Premeditated Aggression (IPAS)	DBT 1 and TAU 1 (first and second group compared over the first six months, marginal means)	2.54	1.81	2.16	1 and 3 ($p = 0.072$) 2 and 3 ($p = 0.086$)	Marginally significant downward linear trend $F(1, 8) = 4.94, p = 0.072$	
Impulsive Aggression (IPAS)	DBT 1 and TAU 2 (group one over twelve months)	2.88		2.4	1 and 5 ($p = 0.074$)	Significant main effect of time $F(2, 8) = 4.67, p = 0.045^*$, $\eta_p^2 = 0.539$, and a marginally significant downward linear trend, $F(1, 4) = 5.78, p = 0.074$.	
Impulsive Aggression	DBT 1 and TAU 1	2.76	1.89	2.53	1 and 3 ($p = 0.066$)		

(IPAS)	(first and second group compared over the first six months, marginal means)									
Anger (NAI-25)	TAU 1 and DBT 2 (group two over twelve months)	2.10	2.17	2.15	1.8	1.35	1 and 5 ($p = 0.037^*$)			
Anger (BPAQ)	DBT 1 and TAU 2 (group one over twelve months)	1.93	2.0	1.80	2.13	1.33	3 and 5 ($p = 0.052$) 4 and 5 ($p = 0.099$)	Significant main effect of time, $F = 1.00$, $F(4) = 529.75$, $p = 0.033^*$.		
Hostility (BPAQ)	DBT 1 and TAU 2 (group one over twelve months)	2.66	1.80	2.20	1.80	1.60	1 and 5 ($p = 0.067$) 1 and 2 ($p = 0.090$) 1 and 4 ($p = 0.090$) 3 and 5 ($p = 0.088$)	Marginally significant downward linear trend, $F(1, 4) = 5.72$, $p = 0.075$.		
Hostility (BPAQ)	DBT 1 (group one during DBT)	2.61	1.72	2.33			1 and 2 ($p = 0.038^*$)			
Hostility (BPAQ)	DBT 2 (group two during DBT)			2.5	2.0	2.3	3 and 4 ($p = 0.045^*$)			

Emotion Regulation (ERQ)	DBT 1 and TAU 2 (group one over twelve months)	4.38	4.64	2.74	3.54	3.38	1 and 3 ($p = 0.097$)	Marginally significant main effect of time, $F(4, 16) = 2.76$, $p = 0.064$, and a marginally significant downward linear trend, $F(1, 4) = 4.65$, $p = 0.097$.
							1 and 4 ($p = 0.004^*$)	
							2 and 3 ($p = 0.080$)	
							2 and 5 ($p = 0.049^*$)	
Emotion Regulation (ERQ)	DBT 1 (group one in DBT)	4.31	4.5	2.91			1 and 3 ($p = 0.089$)	Significant main effect of time, $F(2, 10) = 4.13$, $p = 0.049$, $\eta_p^2 = 0.452$.
							2 and 3 ($p = 0.071$)	
Emotion Regulation (ERQ)	TAU 1 and DBT 2 (group two across one year)	3.46	4.03	4.26	4.70	5.13	1 and 5 ($p = 0.090$)	Marginally significant upward linear trend, $F(1, 2) = 13.07$, $p = 0.069$.
Emotion Regulation (ERQ)	DBT 2 (group two in DBT)			4.23	4.81	5.01	3 and 5 ($p = 0.097$)	Marginally significant main effect of time, $V = 0.761$, $F(2, 4) = 6.37$, $p = 0.057$.
Cognitive Reappraisal (ERQ)	DBT 1 and TAU 2 (group one over	4.28	4.97	2.45	3.07	2.57	1 and 3 ($p = 0.016^*$)	
							1 and 4 ($p = 0.020^*$)	
							1 and 5 ($p = 0.000^*$)	

	twelve months)								2 and 3 ($p = 0.063$) 2 and 5 ($p = 0.065$)
Cognitive Reappraisal (ERQ)	TAU 1 and DBT 2 (group two over twelve months)	4.29	2.31	4.01	4.09	3.72			2 and 3 ($p = 0.049^*$)
Mindfulness (KIMS)	DBT 1 and TAU 2 (group one over twelve months)	3.47	3.26	2.97	3.25	2.86			1 and 3 ($p = 0.050$) 1 and 5 ($p = 0.050$)
Act With Awareness (KIMS)	DBT 1 and TAU 2 (group one over twelve months)	3.05		2.6		3.32			1 and 3 ($p = 0.080$)
Act With Awareness (KIMS)	DBT 1 (group one in DBT)	3.11	3.35	2.58					1 and 2 ($p = 0.091$) 2 and 3 ($p = 0.030^*$)
Act With Awareness (KIMS)	DBT 1 and TAU 1 (first and second group compared over the first six months,	3.25	3.18	2.65					1 and 3 ($p = 0.083$)

Significant downward linear trend, $F(1, 3) = 13.31, p = 0.036, \eta_p^2 = 0.0861$.

Significant main effect of time, $F(2, 10) = 5.18, p = 0.028, \eta_p^2 = 0.509$.

Accept Without Judgement (KIMS)	DBT 1 and TAU 1 (first and second group compared over the first six months, marginal means)	3.54	3.38	2.54	1 and 3 ($p = 0.023^*$)	Significant main effect of time, $F = 0.629, F(2, 7) = 5.93, p = 0.031$, and a significant downward linear trend, $F(1, 8) = 7.78, p = 0.024, \eta_p^2 = 0.493$.
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Note. Group one is in DBT during time points one, two and three. Group two is in DBT during time points three, four, and five. Standard deviations and confidence intervals are presented in the results section.



Letter of Information for the Dialectical Behaviour Therapy Study

Project Title: An investigation of Dialectical Behaviour Therapy's effectiveness in reducing aggressive behaviour in a forensic population.

Invitation to Participate in Research: You are being invited to participate in a research study conducted by researchers from Western University. The purpose of this letter is to provide you with the information you require to make an informed decision on participating in this research. We are asking you to take part because we are interested in learning more about how individuals' behaviours change as a result of participating in Dialectical Behaviour Therapy.

Purpose of Research: Individuals can be aggressive in many different ways. Aggression can happen for different reasons and be directed to different sources. That is, aggression can either be planned for a purpose other than hurting someone (for example, to gain money or power), or can be in reaction to something (for example, being called a mean name). Additionally, while some individuals may be aggressive toward other individuals or property, others may hurt themselves. Dialectical Behaviour Therapy is a type of therapy designed to increase behavioural and emotional regulation and reduce multiple forms of aggressive behaviours. The purpose of this study is to better understand what forms of aggression are reduced in individuals participating in Dialectical Behaviour Therapy, to what extent these forms of aggression are reduced over a period of six months, and how they may be maintained. We will look at these outcomes in comparison to individuals who are not participating in Dialectical Behaviour Therapy.

Participant Inclusion Criteria: You may be eligible to participate in this study if you are a patient at the Southwest Centre for Forensic Mental Health Care AND if you (a) have been referred to Dialectical Behaviour Therapy (b) have normal or corrected-to-normal vision (that is, you may participate if you wear glasses or contact lenses), (c) are fluent in English, (d) can use the keyboard and mouse of a computer to click and type in answers to questions, and (f) can respond (verbally or in writing) to verbal and/or written questions (g) are capable of providing consent.

Participant Exclusion Criteria: The exclusion criteria for this study are the same exclusion criteria as standard Dialectical Behaviour Therapy. If you meet any of these criteria

throughout the study, you will not be able to participate in either the study or Dialectical Behaviour Therapy.

1. If you are no longer able to provide informed consent (as decided upon by your psychiatrist);
2. If you miss three or more therapy sessions without appropriate notice to the group leaders;
3. If you become physically aggressive to yourself, the staff, and the other group members at any point and the staff determines that you would be better served outside of Dialectical Behaviour Therapy;
4. If you put yourself, the staff, and the other group members at risk at any point and the staff determines what you would be better served outside of Dialectical Behaviour Therapy;
5. If your security status changes and you are no longer able to attend therapy sessions (e.g. if you are placed in solitary confinement or can no longer leave your unit) for a period of three or more group therapy sessions.

Description of Research: In order for us to better understand how Dialectical Behaviour Therapy helps reduce aggressive behaviour in a forensic population, we are going to compare individuals who are participating in Dialectical Behaviour Therapy to individuals who are receiving the care that they normally receive in the hospital. Given that groups are only 8-10 individuals in size and we have received many referrals for Dialectical Behaviour Therapy, we are going to randomly assign half of the participants to begin Dialectical Behaviour Therapy now and half of our participants to begin Dialectical Behaviour Therapy in the next group (six months from now). This means that if you agree to participate in this study, you may either receive Dialectical Behaviour Therapy now, or you may have to wait for the second group of participants to begin in six months.

If you are randomly assigned to begin therapy in six months, you will continue to receive the care that you usually receive. For example, this may include psychoeducation about your mental disorder, medication, regular sessions with a psychiatrist, and session with other members of your health care team (e.g. social workers, occupational therapists, registered nurses) to ensure that you are receiving the best possible care until you begin Dialectical Behaviour Therapy. While you will not be in the Dialectical Behaviour Therapy group, you will be asked to complete a series of scales as soon as you begin the study and then three months later. Then, once you start DBT-CM six months from now, you will also complete a series of scales three times during Dialectical Behaviour Therapy (before you start, half-way through therapy, and at the end of therapy). These scales will be presented to you on SurveyMonkey, in an online questionnaire format.

If you are in the first Dialectical Behaviour Therapy group, you will be asked to complete scales before, half way through, and at the end of Dialectical Behaviour Therapy. You will also be asked to complete two additional scales, one three months after Dialectical Behaviour Therapy is over, and one 6 months after Dialectical Behaviour Therapy is over. Again, these scales will be presented to you on SurveyMonkey, in an online questionnaire format.

Participation in this study will take approximately 1 hour of your time at five time points, three months apart from each other (5 hours in total over a period of 12 months). At each session, you can ask for breaks as needed. You will be asked to complete a series of questionnaires that assess your feelings and behaviour (including aggressive behaviour). All questionnaires will be on a computer and all will be presented on SurveyMonkey software. Even though this is a password-protected server, no identifying information will ever be stored on that server. For example, you will never write in your name or any other information that may identify you. Instead, you will have a participant number. This way, no one who views the data will ever be able to track it back to our participants.

It is important for you to know that your answers to some of the questions will help us determine whether you are responding honestly. This is necessary because it is very important that we collect truthful data so that we can most accurately assess the effectiveness of Dialectical Behaviour Therapy. We would also like to review your patient file information held by the Southwest Centre for Forensic Mental Health Care. Your patient files will be reviewed to determine the characteristics of any prior aggressive behaviour and any aggressive incidences that have happened in this facility. We will also look at your age and ethnic background.

Potential Harms: There are no known risks to participating in this study, but you may become tired while completing the tasks. You may also be asked to discuss some sensitive topics that may make you feel uncomfortable. If this occurs please inform the researcher and we will provide you with available resources.

Possible Benefits: There are no direct benefits to you for participating in this study, but knowledge may be gained to support the implementation of Dialectical Behaviour Therapy in correctional and rehabilitation-focused facilities to help individual's rehabilitate successfully.

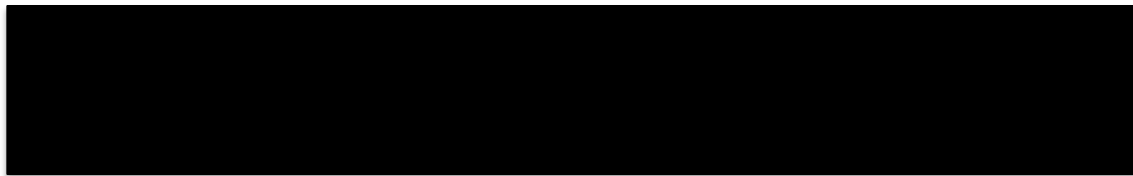
Voluntary Participation: Participation in this study is voluntary. You should only agree to participate if you feel you have been given enough information about the study. You may refuse to participate, refuse to answer any questions, or withdraw from the study at any time. Participation in this study, refusing to answer questions, or withdrawal at any time will not have any effect your length of stay in the facility or decisions of release. This means that your patient files will continue to be reviewed by the Ontario Review Board, as reviews are scheduled, and decisions will be made as the Ontario Review Board would normally make them. If, while participating in the study, you are given a different disposition, you are welcome to remain in Dialectical Behaviour Therapy and in the study.

Further, **no** data from this study (no information that you provide on the **online questionnaire**) will be available for review in your patient files, or by anyone other than the researchers. All information that you provide on the **online questionnaire** will be completely confidential and will never be added to your patient files. No one, except for

the researchers, will have ANY access to the information that you provide on the **online questionnaire**. However, both the Dialectical Behaviour Therapy leaders as well as the researchers may review information contained in your Diary Cards. This will help us better understand how Dialectical Behaviour Therapy is helping those who are participating in it.

Participation in Other Studies: If you are already participating in another study at this time, you should tell the interviewer right away to decide if it is appropriate for you to participate in this study.

Confidentiality: Any information that you provide us with or that is obtained from your file is valuable, and we will respect your privacy by keeping this information confidential. To protect confidentiality, at no point will any personally identifying information be collected; rather, a participant code will be assigned. All data will be placed in a locked cabinet, in a securely locked room, in the Psychology Department at Western University, where only the Principal Investigator and other approved personnel can view it. If the results of the study are published, names will not be used and no information that discloses your identity will be released or published. Five years after the study has been completed, and the findings published, we will destroy the data you have provided us. Please note that if you would like to receive a copy of the overall results of the study please bring this to the attention of the interviewer, and this will be provided to you when it becomes available (please be aware this may take several months). Also, please be aware that the Research Ethics Board at Western University may contact you directly to ask about your participation in the study.



Compensation: No monetary compensation will be provided for participation in this study.

Consent Form

Project Title: An Investigation of Dialectical Behaviour Therapy's effectiveness in reducing aggressive tendencies in a forensic population

By signing below, you are agreeing that:

1. You have read the Letter of Information (or it has been read to you)
2. The nature of the study has been explained to you
3. All questions regarding the study have been answered to your satisfaction
4. You agree to participate.

Please note that you do not waive any legal rights by signing this document. You will be provided with a copy of this letter once it has been signed.

Participant's Full Name: _____

Participant's Signature: _____

Date: _____

Full Name of Person Obtaining Informed Consent: _____

Signature of Person Obtaining Informed Consent: _____

Date: _____

Appendix 4: Original Research Ethics Board Approval



Research Ethics

Use of Human Participants - Initial Ethics Approval Notice

Principal Investigator: [Redacted]
 File Number: 104691
 Review Level: Full Board
 Protocol Title: Assessing Aggressive Behaviour in a Forensic Psychiatric Patient Population Undergoing Dialectical Behaviour Therapy - Corrections Modified
 Department & Institution: Social Science Psychology, Western University
 Sponsor:
 Ethics Approval Date: April 30, 2014
 Ethics Expiry Date: January 31, 2015

Documents Reviewed & Approved & Documents Received for Information:

Document Name	Comments	Version Date
Instruments	Novaco Anger Inventory (Initial Submission)	2013/11/11
Instruments	Impulsive/Premeditated Aggression Scale (IPAS)(Initial Submission)	2013/11/11
Instruments	Staff Observation Aggression Scale - Revised (SOAS-R)(Initial Submission)	2013/11/11
Instruments	Hypothetical Vignettes (Initial Submission)	2013/11/11
Instruments	Diary Card for DBT-CM (Initial Submission)	2013/11/11
Instruments	Emotion Regulation Questionnaire (Initial Submission)	2013/11/11
Instruments	Inventory of Statements about Self-Injury (ISASI)(Initial Submission)	2013/11/11
Instruments	Received Jan 6 2014. Short-Form Buss-Perry Aggression Questionnaire (BPAQ-SF)(Initial Submission)	
Instruments	Received Jan 6 2014. Kentucky Inventory of Mindfulness Skills (KIMS)(Initial Submission)	2008/10/04
Western University Protocol	All elements approved with exception to submitted revision (inclusion of women, inclusion of outpatients)	2014/04/28
Letter of Information & Consent	All elements approved with exception to submitted revision (inclusion of women, inclusion of outpatients)	2014/04/25
Other	For information only. Letter from the Chair - Clarification of Initial approved content.	2014/04/29

This is to notify you that the University of Western Ontario Health Sciences Research Ethics Board (HSREB) which is organized and operates according to the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans and the Health Canada/ICH Good Clinical Practice Practices: Consolidated Guidelines; and the applicable laws and regulations of Ontario has reviewed and granted approval to the above referenced study on the approval date noted above. The membership of this HSREB also complies with the membership requirements for REB's as defined in Division 5 of the Food and Drug Regulations.

The ethics approval for this study shall remain valid until the expiry date noted above assuming timely and acceptable responses to the HSREB's periodic requests for surveillance and monitoring information. If you require an updated approval notice prior to that time you must request it using the University of Western Ontario Updated Approval Request form.

Member of the HSREB that are named as investigators in research studies, or declare a conflict of interest, do not participate in discussions related to, nor vote on, such studies when they are presented to the HSREB.

[Redacted Signature]

ered with the U.S. Department of Health &

Signature

[Redacted Signature]



April 29, 2014

HSREB FB 25Feb2014 ^{12/16/11 d. King 2014} [redacted] - Initial Approval & Amendment Approval

Dear [redacted]

Re: Assessing Aggressive Behaviour in a Male Psychiatric Forensic Population Undergoing Dialectical Behaviour Therapy - Corrections Modified

Thank you for your patience regarding the review of this submission. The HSREB has granted initial approval for the above mentioned study, with exception to any elements regarding the amendment (request for inclusion of women and outpatients) submitted following the original submission.

The Full Board meeting that took place, wherein which this submission was reviewed, did not include the review of the amendment submitted. Therefore, the initial full board approval of this study cannot be granted for amended items contained in the revised protocol.

Please note that you will be receiving an additional approval letter for the revised protocol and Letter of information, containing all elements of the amendment included.

Thank you & best of luck!

[redacted signature]

Date

04-30-2014

Appendix 5: Amended Research Ethics Board Approval



Research Ethics

Use of Human Participants - Revision Ethics Approval Notice

Principal Investigator: [REDACTED]
File Number: 104691
Review Level: Delegated
Protocol Title: Assessing Aggressive Behaviour in a Forensic Psychiatric Patient Population Undergoing Dialectical Behaviour Therapy - Corrections Modified
Department & Institution: Social Science/ Psychology, Western University
Sponsor:
Ethics Approval Date: April 30, 2014 Expiry Date: January 31, 2015
Documents Reviewed & Approved & Documents Received for Information:

Document Name	Comments	Version Date
Revised Western University Protocol	All elements approved (inclusion of women, inclusion of outpatients)	2014/04/28
Revised Letter of Information & Consent	All elements approved (inclusion of women, inclusion of outpatients)	2014/04/25
Other	For information only: Letter from the Chair - Clarification of amendment approved content.	2014/04/29

This is to notify you that The University of Western Ontario Research Ethics Board for Health Sciences Research Involving Human Subjects (HSREB) which is organized and operates according to the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans and the Health Canada/ICH Good Clinical Practice Practices: Consolidated Guidelines; and the applicable laws and regulations of Ontario has reviewed and granted approval to the above referenced revision(s) or amendment(s) on the approval date noted above. The membership of this REB also complies with the membership requirements for REB's as defined in Division 5 of the Food and Drug Regulations.

The ethics approval for this study shall remain valid until the expiry date noted above assuming timely and acceptable responses to the HSREB's periodic requests for surveillance and monitoring information. If you require an updated approval notice prior to that time you must request it using the University of Western Ontario Updated Approval Request Form.

Members of the HSREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussion related to, nor vote on, such studies when they are presented to the HSREB.

[REDACTED] SREB is registered with the U.S. Department of Health & Human Services

Ethics Office to Contact for Further Information

[REDACTED]



Western
Research

Research Ethics

April 29, 2014

HSREB FB 25Feb2014 + [REDACTED] Approval & Amendment Approval

Re: Assessing Aggressive Behaviour in a Male Psychiatric Forensic Population Undergoing Dialectical Behaviour Therapy - Corrections Modified

Please accept this letter as formal notification that the amendment submitted to the HSREB regarding the above mentioned study has been reviewed and approved.

The revised documents (Western Protocol and Letter of Information) requesting the inclusion of women as well as outpatients have been included in the Approval Notice attached to this letter.

Please retain a copy of this letter for your records.

Thank you,



Monica Tomlinson

Curriculum Vitae September 2015

Education

- Doctor of Philosophy, Clinical Psychology
Western University, London, ON
Supervisor: Dr. Peter N. S. Hoaken
Sept 2015-Present
- Master of Science, Clinical Psychology
Western University, London, ON
Supervisor: Dr. Peter N. S. Hoaken
Sept. 2013-Present
- Bachelor of Arts, Psychology and English
McGill University,
Montreal, QC
Supervisor: Dr. John Lydon
Sept. 2007-May 2011

Publications

Peer-Reviewed Publications

- Tomlinson, M., Brown, M., Hoaken, P. (Under Review) Recreational drug use and human aggressive behavior: A comprehensive review since 2003. *Aggression and Violent Behavior*.
- Tomlinson, M., Desjardins, N. (In Preparation). Adapting dialectical behaviour therapy to a medium security forensic psychiatric population in Canada.

Book Chapters

- Chalupa, A. A. & Tomlinson, M. (2015). Migration and survival: An analysis of memory, identity, solidarity, and coping among the gulag survivors of WWII. In W. Owczarski and M. V. F. Cremasco (Eds.), *Memory, Identity, and Solidarity* (225-239). Gdansk: Cambridge University Press.

Government Reports

- Chachamovich, E., & Tomlinson, M. (2013). *Learning from lives that have been lived*. Montreal, QC: Douglas Mental Health University Institute. <http://inuusiq.com/wp-content/uploads/2013/06/Report-NFBS-Final-English.pdf>

Presentations

Papers Presented at Conferences

Tomlinson, M., Chachamovich, E., Wexler, L., Hammond, M., Collins, R., (June, 2015). Promising strategies for the prevention of suicide in the circumpolar north: Findings from an international literature review. Paper presented at the 28th World Congress of the International Association for Suicide Prevention, Montreal, QC.

Tomlinson, M., Hoaken, P., Desjardins, N., Balsom, R. (June, 2015). *Evaluating the effectiveness of dialectical behaviour therapy in a forensic psychiatric population*. Paper presented at the Annual Convention of the Canadian Psychological Association, Criminal Justice Psychology Section, Ottawa, ON.

Tomlinson, M., Hoaken, P., Desjardins, N., Balsom, R. (March, 2015). *An evaluation of dialectical behaviour therapy for forensic psychiatric patients*. Paper presented at the American Psychology-Law Society Annual Conference, San Diego, CA.

Chalupa, A. A. & Tomlinson, M., Wladysiuk, S. (2012, September). *Group memory and identity following trauma: An examination of long-term and short-term effects of solidarity among gulag survivors*. Paper presented at the Annual Solidarity, Memory, and Identity Conference, Gdansk, Poland.

Posters Presented at Conferences

Tomlinson, M. (2014, July). *The effectiveness of dialectical behaviour therapy-corrections modified in reducing aggression in a forensic psychiatric population*. Poster presented at the Annual Conference of the International Society for Research on Aggression, Atlanta, GA.

Tomlinson, M. (2014, February). *Assessing the effectiveness of dialectical behaviour therapy-corrections modified in reducing aggression in an inpatient forensic psychiatric population*. Poster presented at the Ontario Psychological Association's Annual Conference, Toronto, ON.

Tomlinson, M. (2013, June). *Brand priming: Sell to person or personality?* Poster presented at the Annual Convention of the Canadian Psychological Association, Quebec City, QC.

Tomlinson, M. (2013, June). *Memory self-efficacy and its manipulative role in test performance*. Poster presented at the Annual Convention of the Canadian Psychological Association, Quebec City, QC.

Tomlinson, M., Chachamovich, E., Haggarty, J., Cargo, M., & Kirmayer, L. J. (2013, June). *A psychological autopsy study of suicide in Nunavut: Methodological*

and ethical considerations, feasibility and acceptability. Poster presented at the Annual Convention of the Canadian Psychological Association, Quebec City, QC.

Abu Shakra, M., Chalupa, A. A., Tomlinson, M., Pihl, R. O. (2010, June). *Differential effects of alcohol and stress on the psychophysiological responses of sensation seeking males and females?* Poster Presented at Connecting Minds: A North American Undergraduate Research Conference in Psychology, Vancouver, BC.

Invited Lectures

Criminal minds: The intersection between mental health and the criminal justice system, University of Waterloo, 2015.

Volunteer Work

Graduate Student and Early Career Professional Recruitment Chair for the International Council of Psychologists July 2015-Present

Member of the Psychology Colloquium Committee May 2015 - Present

Graduate Representative for the Ethics and Research Participant Pool Committee September 2014-Present

Editor for the Western Undergraduate Psychology Journal September 2014-Present

Awards and Scholarships

Student Achievement Award July 2015
Osler, Hoskin, and Harcourt, LLP
\$2,000

Graduate Research Award April 2015
\$750

Student Achievement Award June 2014
Osler, Hoskin, and Harcourt, LLP
\$2,000

Student Achievement Award June 2013
Osler, Hoskin, and Harcourt, LLP
\$2,000