Aggressive Behavior in Dutch Forensic Psychiatric Inpatients: Determinants of reactive aggression and their consequences for treatment

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Agressief Gedrag van Nederlandse Forensisch Psychiatrische Patiënten: Determinanten van reactieve agressie en consequenties voor de behandeling

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Do you know why people like violence? It is because it feels good. Humans find violence deeply satisfying. But remove the satisfaction, and the act becomes… hollow.

Alan Turing in The Imitation Game

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CHAPTER ONE

Introduction

Background

According to the World Health Organization (WHO, 1996), violence can be considered as a global public health problem as it is one of the leading causes of death worldwide (Krug, Dahlberg, Mercy, Zwi, & Lozano, 2002). The consequences of violence for the victim may include physical harm, emotional trauma and stress, but the costs that are made, due to medical and/or psychological treatment of the victim and the detection, trial and punishment of the offender, also affect society (Shapiro & Hassett, 2012). For example, in the United States, estimates of the costs of interpersonal violence reach to 3.3 percent of the gross domestic product (Waters, Hyder, Rajkotia, Basu, & Butchart, 2005). Therefore, as a part of the public protection policy, intervention programs are needed that target the criminogenic factors of individuals who are prone to display violent behavior.

In the Netherlands, violent offenders can be sentenced to mandatory treatment in which the security level is based on the severity of the committed offense and the assessed risk of recidivism. In case of a severe offense (e.g., murder, manslaughter, aggravated assault, or rape), offenders can be detained under hospital order TBS (Dutch translation: Terbeschikkingstelling). This means that the offender is not fully accountable for the committed offense since the court has established a relation between a psychiatric disorder on the one hand and the committed offense on the other hand (e.g., Van Marle, 2002). These rulings about the psychiatric disorder and the degree of accountability are based on an extensive psychiatric and psychological evaluation in a special forensic assessment organization (Nederlands Instituut voor Forensische Psychiatrie en Psychologie, including the Pieter Baan Centrum as a centre for observation) by order of the court. Treatment under hospital order involves an involuntary admission to a specialized maximum-security forensic psychiatric clinic (FPC), where patients are subjected to treatment programs that focus on the reduction of specific problem behaviors, such as aggression, deviant sexual behavior, psychotic symptoms, and addiction. Recidivism risk is estimated each year by means of a standardized set of risk assessment instruments, such as the Historisch Klinisch Toekomst-Revisie (HKT-R; Spreen, Brand, Ter Horst, Willems, & Bogaerts, 2013), the Historical Clinical Risk management 20 (HCR-20; Webster, Douglas, Eaves, & Hart, 1997), the Structured Assessment of Protective Factors for Violence risk (SAPROF; De Vogel, De Ruiter, Bouman, & De Vries Robbé, 2007; English version, 2009), and – in the case of sexually violent patients – the Sexual Violence Risk-20 (SVR-20; Boer, Wilson, Gauthier, & Hart, 1997). Based on the risk assessment and reports about the progress of treatment during their stay in the FPC, every one or two years the court decides if treatment should be either prolonged or

has to be ended. In 2010, at the start of the present research project, there were 1,977 patients detained under hospital order who were receiving mandatory treatment at one of the FPC's in the Netherlands. From that moment, the number of admissions declined (as a result of an increasing number of offenders who refused psychiatric and psychological evaluation), which resulted in a total of 1,704 patients detained under hospital order in 2013 (Van Gemmert & Van Schijndel, 2014).

Within the TBS population, a differentiation is usually made between patients with a personality disorder and patients with a psychotic disorder (often in combination with a personality disorder) as their primary diagnosis. Most of the patients under hospital order (about 75%) are diagnosed with a personality disorder (De Beurs & Barendregt, 2008), whereas in other countries, such as the United States (Silver, 1995) and Canada (Quinsey, Harris, Rice, & Cormier, 1998), most forensic psychiatric patients are diagnosed with a psychotic disorder. The present thesis focused primarily on treatment effects in patients with a cluster B personality disorder, because aggression in patients with a psychotic disorder may also be related to specific disorder-related features (such as threat-control/override symptoms; e.g., Nederlof, Muris, & Hovens, 2011), which were not a target of investigation in the current research project.

Definitions of aggression and related concepts

Terms like aggression, anger, hostility, and violence are often used interchangeably (e.g., Eckhardt, Barbour, & Stuart, 1997; Suris et al., 2004). Therefore, to avoid any ambiguities, definitions of these terms will first be provided.

For aggression, the definition of Berkowitz (1993) is one of the most widely accepted: "goal-directed motor behavior that has a deliberate intent to harm or to injure another object or person". Therefore, accidental harm cannot be considered as aggressive behavior, because that does not include the intention to harm (Anderson & Bushman, 2002). Within aggression, a distinction can be made between reactive and proactive aggression (e.g., Buss, 1961; Dodge & Coie, 1987). Reactive aggression is often described as a type of aggression in which a person reacts to a possible threat or frustration, whereas proactive aggression is aggressive behavior that is applied to reach a certain goal. Both types of aggression are determined by different factors. For example, reactive aggression is related to high levels of anger (Miller & Lynam, 2006), impairments in executive functioning (Stanford, Greve, & Gerstle, 1997), and a "hostile attribution bias" (Dodge, Price, Bachorowski, & Newman, 1990; Walters, 2007), whereas

proactive aggression is related to low levels of physiological arousal (Stanford, Houston, Villemarette-Pittman, & Greve, 2003) and a lack of moral norms and values (Cima, Tonnaer, & Lobbestael, 2007). Therefore, both types of aggression demand different treatment approaches which focus on improving these specific characteristics.

According to Kassinove and Sukhodolsky (1995), anger can be defined as a "negative, phenomenological (or internal) feeling state associated with specific cognitive and perceptual distortions and deficiencies, subjective labeling, physiological changes, and action tendencies to engage in socially structured and reinforced organized behavioral scripts" (p. 7). Although it has been questioned whether anger automatically causes aggressive behavior (e.g., Berkowitz, 1993; Novaco, 1994), several authors have confirmed its relation (e.g., Anderson & Bushman, 2002; Miller & Lynam, 1996).

Hostility can be defined as "a negative attitude toward one or more people that is reflected in a decidedly unfavorable judgment of the target" (Berkowitz, 1993; p. 6), and may also include cynicism, mistrust, and denigration to others (Miller, Smith, Turner, Guijarro, & Hallet, 1996). In line with this, a hostile attribution style, which has also been labeled as the "hostile attribution bias" (HAB; Nasby, Hayden, & DePaulo, 1979), is a tendency to attribute hostile intentions to someone whose intentions are ambiguous. A number of studies have indicated that a hostile attribution bias is related to aggressive behavior (e.g., Bailey & Ostrov, 2007; Dodge & Coie, 1987) and that the modification of this bias may therefore be well indicated in treatment programs on aggressive behavior (e.g., Leff et al., 2007).

Finally, violence is almost equivalent to aggression as it also refers to the use of physical force or power (World Health Organization, 1996). However, this kind of aggression also includes more extreme forms of aggressive behavior, such as manslaughter and murder.

Attitudes and their relation to violent and aggressive behavior

Several definitions of attitudes have been proposed (e.g., Eagly & Chaiken, 2007; Olson & Fazio, 2009). Although differences can be noted, all of them seem to focus on the extent to which an object or behavior is evaluated as being positive or negative. According to a number of authors, attitudes can play an important role in the onset of behavior (e.g., Allport, 1954; Ajzen & Fishbein, 2005), including violent and aggressive behavior (e.g., Anderson & Huesmann, 2007). Positive attitudes toward a particular type of behavior increase the likelihood that such behavior

is performed, whereas negative attitudes may result in the inhibition of that behavior (e.g., Anderson & Bushman, 2002; Dodge, 1993).

The relation between different types of attitudes toward violence and actual violent and aggressive behavior are described by dual process models. According to these models, two distinct processing mechanisms are related to behavior, namely automatic processes and controlled processes (e.g., Kahneman, 2003; Strack & Deutsch, 2004; Olson & Fazio, 2009). Automatic processes are unconscious and inflexible, and are based on learned associations, resulting in fast and effortless behavior. In contrast, controlled processes are conscious, flexible, and require an increased activation of the working memory. Therefore, this process is slow and effortful. In several situations, controlled processes will be able to exert control over the automatic system, resulting in self-regulating behavior. However, when cognitive resources to restructure intentions, motivation to act according to the explicit attitude, or the time to process information are not available, the automatic process may not be controlled, resulting in impulsive behavior (e.g., Friese, Hofmann, & Schmitt, 2009).

Within attitudes, a differentiation can be made between explicit and implicit attitudes. Explicit attitudes are conscious evaluative associations that can be assessed with self-report measures, such as the Velicer Attitudes Towards Violence Scale (Velicer, Huckel, & Hansen, 1989) and the Attitudes toward Women Inventory (Hornsveld, Timonen, Kraaimaat, Zwets, & Kanters, 2014), whereas implicit attitudes are automatically and unintentionally activated evaluative associations (Gawronski & Bodenhausen, 2006) that can be measured with reaction-time tasks, such as the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998). A number of studies have demonstrated that explicit attitudes (i.e., self-reported attitudes) are related to controlled behavior, whereas implicit attitudes are related to impulsive behavior (e.g., Friese et al., 2009; Olson & Fazio, 2009; Strack & Deutsch, 2004). Therefore, relatively positive implicit attitudes toward violence may result in aggressive behavior in situations when cognitive resources, motivation to act according to the explicit motivation, and time to process information are not available.

Model of impulsive violence

Figure 1 shows a newly developed model of impulsive violence that describes how a high-risk situation can result in either impulsive or controlled behavior. According to this model, a high-risk situation can lead to anger, which includes both an impulsive action tendency and high levels

of arousal. This impulsive action tendency is a result of the implicit evaluation in which the situation is judged according to the implicit attitudes toward violence. More positive attitudes toward violence are related to a higher probability of the impulsive, aggressive action tendency to occur. Then, the explicit evaluation takes place in which the executive functions have an important role in the regulation of the automatic (aggressive) action tendency. The availability of cognitive recourses to restructure intentions, motivation to act according to explicit attitudes, and time to process information will have a positive effect on the executive functioning, whereas high levels of arousal (i.e., high levels of anger), use of narcotics (e.g., Giancola, 2000) and frontal lobe dysfunctioning (e.g., Stuss & Alexander, 2000) have a negative effect on executive functioning. When the action tendency can be regulated, this will result in controlled behavior, which is in line with the explicit attitudes toward violence, whereas impulsive behavior that is in line with the implicit attitudes will be shown when the action tendency cannot be regulated.

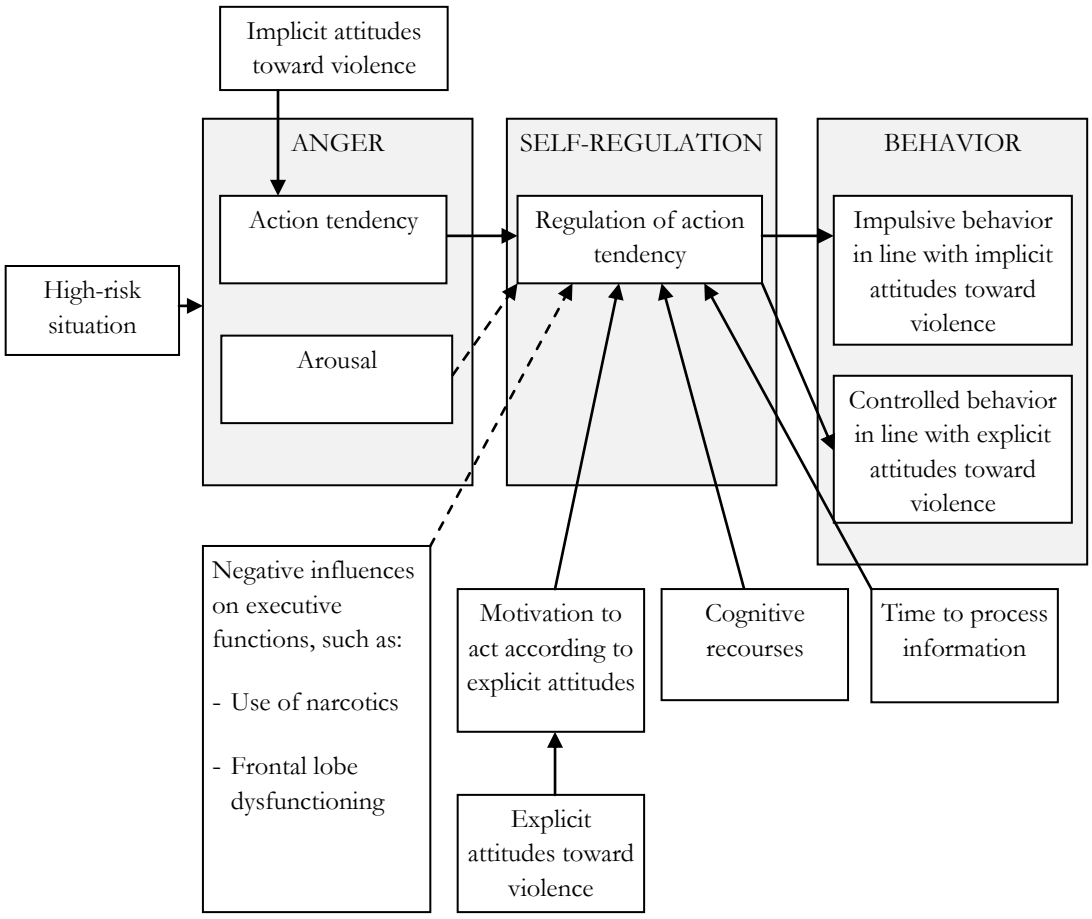

Figure 1. Model summarizing the factors that are related to the development of impulsive violence

Treatment of aggressive behavior: Aggression Replacement Training and psychomotor therapy

According to Andrews and Bonta (2010), effective treatment programs for violent offenders focus on dynamic criminogenic needs, such as antisocial cognitions, antisocial associates, familial/marital circumstances, school/work, leisure/recreation, and substance abuse. Furthermore, Ward and Brown (2004) have stated that an effective treatment program should also promote "a good life" and should therefore pay attention to positive issues such as physical health, knowledge, affectionate bonds, and the ability to make one's own decisions. In forensic psychiatry, cognitive-behavioral treatment programs are currently among the most common approaches for treating aggressive behavior in violent offenders. A meta-analysis by McGuire (2013) indicated that these programs result in small but significant positive changes. In FPC De Kijvelanden, a Dutch inpatient version of the Aggression Replacement Training (ART; Goldstein, Glick, & Gibbs, 1998; Hornsveld, 2004b) is provided to all patients with a cluster B personality disorder who have committed a violent offense. The main goals of this version of ART are to learn to control anger and aggressive behavior, and to promote prosocial behavior. The inpatient version of ART consists of 15 weekly sessions of 90 minutes and is provided by two experienced psychologists. The sessions can be divided into three modules which are related to various criminogenic factors (Hornsveld, Van Dam-Baggen, Leenaars, & Jonkers, 2004), namely anger management (recognizing and managing feelings of irritation and anger more adequately), social skills training (improving social skills), and development of moral reasoning (taking note of the prevailing norms and values and learn to solve moral problematic situations). The treatment effects of the inpatient version of ART have been investigated by Hornsveld, Nijman, and Kraaimaat (2008) in a sample of 72 forensic psychiatric inpatients. Results indicated that observed aggressive behavior decreased significantly in patients who followed treatment, whereas no differences were found between the pre-treatment and post-treatment measurement for a control group of forensic inpatients who received treatment as usual (TAU). Unfortunately, no significant improvement was found on observed social behavior in both groups. More recently, we found tentative support for the efficacy of an outpatient version of ART in violent young men in a forensic outpatient setting (Hornsveld, Kraaimaat, Muris, Zwets, & Kanters, 2014). In this group, the training resulted in a significant decrease in self-reported physical aggression.

In 2009, the inpatient ART was extended with four additional modules that focused on the treatment of proactive aggression (Hornsveld & De Vries, 2009), namely prosocial thinking

(converting cognitions which may lead to antisocial behavior into cognitions which may lead to prosocial behavior), character formation (focusing on the short-term and long-term consequences of prosocial and antisocial behaviors), prosocial network (engaging in prosocial contacts and how to hold off or to end antisocial contacts) and attitudes toward women (how to behave toward women). The addition of these modules resulted in a total treatment program of 35 sessions. The treatment effects of this prolonged version have not been investigated yet.

In the Netherlands, cognitive-behavioral treatment programs for aggression and anger are often supplemented with arts therapies (Smeijsters & Cleven, 2006), such as psychomotor therapy (PMT; e.g., Boerhout & Van der Weele, 2007), music therapy (Hakvoort & Bogaerts, 2013), drama therapy (Thompson, 1999), and creative therapy (Bennink, Gussak, & Skowran, 2003). PMT is an experience-based intervention during which patients learn to gain more control over their anger by recognizing and analyzing bodily sensations, which are associated with this specific emotion. Several studies have shown that problems in recognizing one's own emotions are related to aggressive behavior (e.g., Roberton, Daffern, & Bucks, 2015). As a result, the early recognition of anger-related bodily sensations as a method to prevent aggressive behavior has been mentioned by several authors (e.g., Novaco, 2007; Roberton, Daffern, & Bucks, 2012; Tyson, 1998). Heightened awareness of bodily sensations may help patients to cope with anger in time, when physiological arousal is still at a manageable level and persons are able to perform controlled behavior (see also Figure 1). Another aim of PMT is to learn how to regulate anger in an adequate way. To achieve this goal, exercises are provided which evoke bodily sensations that are associated with anger, such as an increased heart rate or an increased respiration rate, which patients then learn to handle by means of relaxation techniques (Jacobson, 1938; Sanderlin, 2001). Although this form of therapy is provided in most FPC's in the Netherlands, studies about the effectiveness of PMT on aggressive behavior are scarce (Boerhout & Van der Weele, 2007; Langstraat, Van der Maas, & Hekking, 2011). In this thesis, a first experimental study will be described about the applicability and feasibility of PMT as an addition to ART.

Psychopathy

Psychopathy is a multi-faceted construct that includes interpersonal and emotional deficits combined with a pattern of antisocial behavior. The Psychopathy Checklist-Revised (PCL-R; Hare, 1991, 2003; Dutch version: Vertommen, Verheul, De Ruiter, & Hildebrand, 2002) consists of 20 items that represent the characteristics of a psychopath and is currently the most widely

applied tool to assess the level of psychopathy. Due to the ability of the PCL-R to predict institutional aggressive behavior (Hildebrand, De Ruiter, & Nijman, 2004) and recidivism (Hare & Neumann, 2009; Hildebrand, Hesper, Spreen, & Nijman, 2005), it is often also included in risk assessment procedures. Furthermore, the utility of the PCL-R in clinical practice can be supported by its relation with treatment attrition (Olver, Stockdale, & Wormith, 2011), limited treatment response (Harris & Rice, 2006), and treatment dropout (Hemphill & Hart, 2002; Stokes, Dixon, & Beech, 2009), but also by its unique relation with different types of aggressive behavior. That is, violent forensic patients with relatively high PCL-R scores tend to be reactively and proactively aggressive, whereas violent forensic patients with relatively low PCL-R scores mainly show reactive aggression (Cima & Raine, 2009; Cornell et al., 1996; Woodworth & Porter, 2002). Therefore, violent psychiatric inpatients with a high PCL-R score should also receive treatment approaches that target the criminogenic needs that are related to proactive aggression (Hornsveld, 2008). Furthermore, several studies have indicated that psychopathy is related to deficits in the experience of emotions (e.g., Gao, Raine, & Schug, 2012; Nentjes, Meijer, Bernstein, Arntz, & Medendorp, 2013), which might hinder the effectiveness of body-oriented therapies (such as PMT) compared to other patients.

The factor structure of the PCL-R has been a research topic for the last two decades. At first, a two-factor structure (Hare, 1991; Harpur, Hakstian, & Hare, 1988) was applied, followed by a three-factor model (Cooke & Michie, 2001) that focused more on psychopathy as a personality construct and in which criminal behavior was considered as a secondary feature of psychopathy (Cooke, Michie, Hart, & Clark, 2004). However, the three-factor model was disputed by Hare and colleagues (Hare, 2003; Hare & Neumann, 2008, 2010; Neumann, Vitacco, Hare, & Wupperman, 2005; Vitacco, Rogers, Neumann, Harrison, & Vincent, 2005) and a four-factor structure (Hare & Neumann 2005, 2006) was proposed that consisted of four correlated factors, namely interpersonal (glib/superficial charm, grandiose self-worth, pathological deception, conning/manipulative), affective (lack of remorse or guilt, shallow affect, callous/lack of empathy, failure to accept responsibility for actions), lifestyle (need for stimulation/proneness to boredom, impulsivity, irresponsibility, parasitic lifestyle, lack of realistic long-term goals), and antisocial (poor behavior controls, early behavior problems, juvenile delinquency, revocation of conditional release, criminal versatility). The validity of this four-factor structure has been confirmed in several large samples (Hill, Neumann, & Rogers, 2004; Kosson, Cyterski, Steuerwald, Neumann, & Walker-Matthews, 2002; Neumann, Kosson, Forth, & Hare, 2006; Neumann, Hare, & Johansson, 2012; Neumann, Hare, & Newman 2007; Olver, Neumann,

Wong, & Hare, 2012; Vitacco, Neumann, & Jackson, 2005; Vitacco, Rogers et al., 2005), but has not yet been validated in a Dutch sample of forensic psychiatric inpatients.

Setting

The studies of this thesis were primarily carried out in FPC De Kijvelanden, a forensic psychiatric clinic (FPC) in the vicinity of Rotterdam with 178 beds for patients who are detained under TBS-hospital order. All patients stayed at a high-security ward with a maximum of eleven patients. During the first four months of their admission, psychiatric and psychological evaluations were carried out and a treatment plan was made. Then, cognitive-behavioral (group) treatment programs were provided which focused on the criminogenic needs of each patient, often combined with individual therapies, arts therapies, and sports. Furthermore, if indicated, psychopharmacological treatment was also provided.

Aim and outline of this thesis

As stated before, an aggressive action tendency, which is influenced by implicit attitudes toward violence, can result in impulsive aggressive behavior. Therefore, therapies that focus on the regulation of these action tendencies, such as PMT, may be needed in patients who are prone to display impulsive aggression. An important goal of PMT is to gain control over anger and to subsequently control the aggressive behavior, which is associated with anger. However, until now, the applicability of PMT as a part of a multi-modal treatment program for violent forensic inpatients has not been investigated yet.

The goal of the current study was to gain more insight in the determinants of reactive aggression and to explore the treatment effects of a multi-modal treatment program for violent forensic psychiatric inpatients, consisting of the extended ART (seven modules) and PMT. In order to perform the study on the determinants of reactive aggression, the relations between aggression on the one hand, and psychopathy and implicit attitudes toward violence on the other hand were first studied. Furthermore, the validity of the four-factor structure of the PCL-R was investigated to apply these factors as possible predictors of dropout in the intervention study, and a self-report questionnaire for bodily sensations during anger was developed to explore whether patients receiving PMT would improve on bodily awareness during anger.

In Chapter 2, the applicability and validity of the four-factor structure of the Dutch version of the PCL-R was first investigated. Therefore, we explored how the factors of the four-factor structure were related to aggression in Dutch forensic psychiatric inpatients. In line with the results of other studies, it was expected that the lifestyle and antisocial factor were significantly related to aggressive behavior. The psychometric properties of the four-factor model were investigated in a group of 411 forensic psychiatric inpatients, which were divided into two groups of patients: one group of patients with a personality disorder and another group of patients with a psychotic disorder as their main diagnosis. Measurement invariance was tested for the two groups and factor scores were correlated with external measures of aggression to examine the validity of the scale. The main research questions in this chapter are:

1) Is there support for a four-factor model in the total group of forensic psychiatric inpatients as well as in each of the two subgroups (patients with a personality disorder and patients with a psychotic disorder) separately?
2) Do the model parameters of the four-factor model meet the criteria for measurement invariance between the two subgroups?
3) Are the lifestyle factor and the antisocial factor significantly positively correlated with measures of aggression and anger in the total group and in each of the two subgroups?

Because of the assumed influence of implicit attitudes on impulsive behavior, the study presented in Chapter 3 investigated whether implicit attitudes toward violence are related to psychopathy, aggression and socially adaptive behaviors. In order to investigate this relation, an Implicit Association Test (IAT) was administered in a sample of 110 forensic psychiatric inpatients. IAT scores were subsequently related with PCL-R scores, and several self-report questionnaires measuring aggressive behavior and socially adaptive behaviors. The main research questions for this chapter are:

1) Are implicit attitudes toward violence positively related to psychopathy or any of the factors of the four-factor structure?
2) Are implicit attitudes toward violence positively related to aggressive behavior?
3) Are implicit attitudes toward violence negatively related to socially adaptive behaviors?

The recognition of anger-related bodily sensations during the onset of anger is one of the treatment goals of PMT. In order to assess specific improvements due to such an intervention, a newly self-report questionnaire was developed that assesses bodily awareness during anger, namely the Anger Bodily Sensations Questionnaire (ABSQ). Chapter 4 describes the

development and investigation on the psychometric properties of the ABSQ. The ABSQ and several other self-report questionnaires were completed by 70 forensic psychiatric inpatients and 100 secondary vocational students. The main research questions for this chapter are:

1) Is the ABSQ a reliable instrument in terms of the internal consistency and test-retest reliability?
2) Do the correlations with external measures provide evidence for the concurrent validity of the ABSQ?

Chapter 5 describes the first results of the multi-modal treatment program consisting of ART and PMT. A group of forensic psychiatric inpatients who received these two interventions were compared to a group of forensic psychiatric inpatients who were given ART and Sports. Observation scales were scored by staff members and all patients completed several self-report questionnaires at three points-in-time: before treatment, after treatment, and three months after treatment. These self-report questionnaires also included an abbreviated version of the ABSQ, as described in Chapter 4. Furthermore, the total score and the four factors of the PCL-R, as described in Chapter 2, were included as predictors of treatment dropout. The main research questions for this chapter are:

1) Does the addition of PMT to ART result in a decrease of anger and aggression, and an increase of social behavior, bodily awareness during anger, and coping scales?
2) Can treatment dropout be predicted by the PCL-R or any of the factors of the four-factor structure?

Finally, in chapter 6, the results of all studies will be summarized in the general discussion, which aims to merge the results of all chapters into a final conclusion. Furthermore, implications for clinical practice and suggestions for future research will be given for each individual study.

CHAPTER TWO

The four-factor model of the Psychopathy Checklist-Revised: Validation in a Dutch forensic inpatient sample

This chapter has been published as: Zwets, A. J., Hornsveld, R. H. J., Neumann, C. S., Muris, P., & Van Marle, H. J. C. (2014). The four-factor model of the Psychopathy Checklist-Revised: Validation in a Dutch forensic inpatients sample. *International Journal of Law and Psychiatry, 39,* 13-22. doi: 10.1016/j.ijlp.2015.01.016

Abstract

In the Netherlands, the Ministry of Security and Justice requires the assessment of the Psychopathy Checklist-Revised (PCL-R; Hare, 1991; 2003) in all forensic psychiatric inpatients. To examine the four-factor structure of the Psychopathy Checklist – Revised (PCL-R), confirmatory factor analysis (CFA) was conducted using a Dutch sample of forensic psychiatric inpatients (N = 411) and the results indicated acceptable fit. Also, using multiple group CFA, the results indicated that the four-factor model provided an acceptable fit in both patients with a personality disorder and patients with a psychotic disorder, and there was reasonably good evidence of measurement invariance between these two subgroups. Furthermore, correlations with external measures of aggression provided additional support for the validity of the four-factor model in patients with a personality disorder. In patients with a psychotic disorder fewer significant correlations with external measures were found. Taken together, the results support the use of the four-factor structure in Dutch offenders who are detained by hospital order.

Introduction

In Dutch forensic psychiatric settings, the Psychopathy Checklist-Revised (PCL-R; Hare, 1991; 2003) is required to be administered according to the Ministry of Security and Justice, given its ability to predict recidivism and disruptive institutional behavior (Hare & Neumann, 2009). A number of studies have indeed demonstrated that the PCL-R is a predictor of violent and non-violent recidivism (Douglas, Vincent, & Edens, 2006; Hare & Neumann, 2008; Hildebrand, Hesper et al., 2005; Mokros, Vohs, & Habermeyer, 2013). For example, the study by Hildebrand and colleagues (2005) demonstrated that the PCL-R (Hare, 1991) may be a better predictor of recidivism than the Historical Clinical Risk management 20 (HCR-20; Webster et al., 1997) and Historisch Klinisch Toekomst – 30 (HKT-30; Dienst Justitiële Inrichtingen, 2002). As a result of these studies, the PCL-R has important criminal justice implications in the Netherlands as it is often used as a tool in decision-making about leave or discharge.

The link between PCL-R scores and different forms of aggressive behavior has been the topic of multiple studies. Several authors have demonstrated that violent patients with a relatively low score on psychopathy mainly show reactive aggression, whereas those with a relatively high score tend to be both reactively and proactively aggressive (Cima & Raine, 2009; Cornell et al., 1996; Woodworth & Porter, 2002). These two forms of aggression seem to be related to different dynamic criminogenic needs and consequently require a different treatment approach (Andrews & Bonta, 2003). Therefore, whether a patient exhibits mainly reactive aggression or both reactive and proactive aggression requires a thorough assessment of the determinants of violent behavior, including the degree of psychopathy.

The Dutch Ministry of Security and Justice broadly distinguishes two groups in forensic psychiatric inpatients: patients with a (chronic) psychotic disorder and patients with a personality disorder as their primary diagnosis. Although these two groups have unique features which might lead to criminal behavior, like threat/control-override symptoms in the case of patients with a chronic psychosis (Link & Stueve, 1994; Nederlof et al., 2011), they also seem to share common risk factors such as psychopathy (Hill et al., 2004; Neumann, Hare, & Newman, 2007; Tengström, Grann, Långstrom, & Kullgren, 2000; Vitacco, Neumann, & Jackson, 2005). However, until now, no study can be found that examined the factor structure of the PCL-R and its relation to external measures while distinguishing between chronic psychotic and personality disordered patients. As discussed below, research has generally relied on studying combined subsamples of heterogeneous groups of forensic psychiatric patients.

Factor structure of the PCL-R

The underlying factor structure of the PCL-R has been a research topic for the last two decades. However, depending on the analytic approach that has been used (cf. Neumann, Kosson, & Salekin, 2007), studies about the factor structure have often resulted in variety of somewhat divergent conclusions. Initial studies with a 22-item version and the definitive PCL-R with 20 items yielded evidence for a two-factor structure (Hare, 1991; Harpur, Hakstian, & Hare, 1988; Harpur, Hare, & Hakstian, 1989). Although this two-factor structure was confirmed in several studies (e.g., Hobson & Shine, 1998; Pham, 1998), other researchers could not always find an adequate fit in samples of North American minimum-security inmates (McDermott, Alterman, Cacciola, Rutherford, Newman, & Mulholland, 2000), sex offenders (Weaver, Meyer, Van Nort, & Tristan, 2006), and Dutch violent forensic psychiatric inpatients (Hildebrand, De Ruiter, De Vogel, & Van der Wolf, 2002).

In 2001, Cooke and Michie noted that the available research "does not provide compelling evidence for the adequacy of a two-factor model for psychopathy" (p. 172). Consequently, they proposed an alternative model that they suggested was more focused on psychopathy as a personality construct and less on criminality. Using item-response theory, confirmatory factor analysis, cluster analysis, and various rational proposals for their analysis of 1,389 North American prisoners and forensic psychiatric inpatients, they suggested that a hierarchical three-factor model provided a better fit than the original two-factor model. In this three-factor model, the first factor of Hare's two-factor model was divided into two separate factors, whereas the third factor consisted of only five items. Other remaining items which they believed only measured criminal behavior were discarded, because criminal behavior was in their opinion best viewed as a secondary feature of psychopathy (Cooke, Michie, Hart, & Clark, 2004). This three-factor model was disputed by Hare (2003) and colleagues (Hare & Neumann, 2008, 2010; Neumann et al., 2005; Vitacco, Rogers, et al., 2005). Based on factor analysis, item response theory and multidimensional scaling, Hare and Neumann (2005, 2006) proposed a model with four correlated factors, namely interpersonal (glib/superficial charm, grandiose self-worth, pathological deception, conning/manipulative), affective (lack of remorse or guilt, shallow affect, callous/lack of empathy, failure to accept responsibility for actions), lifestyle (need for stimulation/proneness to boredom, impulsivity, irresponsibility, parasitic lifestyle, lack of realistic long-term goals), and antisocial (poor behavior controls, early behavior problems, juvenile delinquency, revocation of conditional release, criminal versatility). This four-factor model is highly comparable to the traditional two-factor model (Hare & Neumann, 2008), given each factor of this two-factor model is split up in two separate factors (factor 1 into an interpersonal

factor and an affective factor; Factor 2 into a lifestyle factor and an antisocial factor). Based on an extensive review of the literature, Hare and Neumann (2008) proposed that "the presence of early and persistent antisocial behavior is an important feature of the psychopathy construct" (p. 62). Relatedly, these authors suggested that psychopathy and its specific features could also be viewed in terms of extreme variants of normal personality traits and behaviors.

Hare's four-factor model has been confirmed in several large PCL-based studies, including forensic psychiatric inpatients (Hill et al., 2004), a combined sample of offenders and forensic psychiatric inpatients, which included both males and females (Neumann, Hare, & Newman, 2007), civil psychiatric patients (Vitacco, Neumann, & Jackson, 2005), mentally disordered offenders (Vitacco, Rogers, et al., 2005), and adolescents (Kosson et al., 2002; Neumann, Kosson et al., 2006). Recent research with Canadian (Olver et al., 2012) and Swedish offenders (Neumann, Hare, & Johansson, 2012) has further confirmed the validity of the four-factor PCL-R model. Furthermore, the four-factor model has been examined for invariance of model parameters across a wide range of samples and methodologies, including male and female offenders and psychiatric patients (Bolt, Hare, Vitale, & Newman, 2004), North American and German offenders (Mokros et al., 2011), male civil psychiatric patients (Jackson, Neumann, & Vitacco, 2007), and adolescents (Neumann et al., 2006; Kosson et al., 2012), as well as a mega-world general population sample using the Self-Report Psychopathy (SRP) scale (Neumann, Schmitt, Carter, Embley, & Hare, 2012). In all these studies the evidence for invariance across diverse groups has generally been good, as well as providing further support for the four-factor model.

PCL-R factors in relation to external measures

To provide a better understanding of the PCL factors, a number of studies have addressed their relation to external correlates of psychopathy, including mental disorders (e.g., Hildebrand & De Ruiter, 2004), criminality (Blackburn & Coid, 1998), normal-range personality traits (Lynam & Derefinko, 2006), different forms of aggression (Cima & Raine, 2009; Cornell et al., 1996; Woodworth & Porter, 2002), violence in the community (Vitacco, Neumann, & Jackson, 2005), and institutional aggression (Guy, Edens, Anthony, & Douglas, 2005; Hildebrand, De Ruiter, & Nijman, 2004; Hill et al., 2004). The relation between the original two PCL-R factors (Hare, 1991) and "institutional adjustment" was examined by Walters (2003b) by means of a meta-analysis of 41 studies in different populations such as maximum adult security forensic psychiatric patients and juvenile security state school inmates. Institutional adjustment had been operationalized as "verbal infractions" or "physical aggression". The original factor 2 of the PCL-

R appeared to have a moderately well positive correlation with institutional adjustment, whereas the original factor 1 showed less robust associations. Guy, Edens, Anthony, and Douglas (2005) refined this analysis and found less evidence for divergent relationships between the two original PCL-R factors and various types of aggressive and violent behavior. In their study, the relation between PCL-R total, factor 1, and factor 2 scores on the one hand, and "General aggression" on the other hand, yielded low mean weighted effect sizes.

Most of the research has also indicated that in particular the original factor 2, which primarily refers to socially deviant behavior, is a good predictor of problem behaviors such as alcohol abuse (e.g., Reardon, Lang, & Patrick, 2002), drug abuse (e.g., Lammers, 2009), aggressive behavior (e.g., Walters, 2003a), and even violent recidivism (e.g., Douglas et al., 2006; Hildebrand et al., 2005). Relations between the original factor 1 and these forms of problem behavior are often modest or even absent. However, given the emerging evidence that the four PCL-R factors may have differential links to various external correlates (Hare & Neumann, 2008), studies based on the older two-factor conception of the PCL may have missed the opportunity to uncover such a pattern of findings. Some studies employing the four-factor model of the PCL-R have shown similar results as the relation between the lifestyle factor and the antisocial factor with (violent) recidivism is often confirmed (e.g., Olver et al., 2012), while others have documented a more nuanced pattern of differential associations with violent (Vitacco, Neumann, & Jackson, 2005) or aggressive behavior (Hill et al., 2004).

PCL-R in forensic patients with a psychotic disorder

Several studies have specifically investigated the PCL-R in patients with a psychotic disorder. However, studies focused on the applicability of the four-factor model are limited in this subgroup of patients. Hill, Neumann, and Rogers (2004) applied a confirmatory factor analysis to investigate the two-, three-, and four-factor model of the PCL-R Screening Version (PCL-R:SV; Hart, Cox, & Hare, 1995) in a sample of 149 male forensic psychiatric inpatients with mainly psychotic disorders. Results showed that all models had a good fit, with the four-factor model displaying the best fit.

Furthermore, various studies have demonstrated that psychopathy is related to violent behavior among forensic inpatients with a psychotic disorder (Fullam & Dolan, 2006; Fullam & Dolan, 2008; Rice & Harris, 1992; Tengström et al., 2000; Volavka & Citrome, 2008). Although most investigations did not explore the relation between psychopathy and violence on a factor-level, there is some evidence indicating that especially the interpersonal and the antisocial factor are related to violent behavior in forensic inpatients with a psychotic disorder (Fullam & Dolan,

2008; Hill et al., 2004). Based on these and several other findings, the presence of psychopathy (or an antisocial personality disorder) has been proposed as one of the main trajectories for violent behavior in patients with schizophrenia.

The current study

We examined the PCL-R in a sample of Dutch forensic psychiatric patients with a psychotic disorder and a sample of patients with a personality disorder. Given the policy of the Dutch Ministry of Security and Justice, we choose to conduct multi-group confirmatory factor analysis based on the four-factor model of the PCL-R. In addition, the four factors were correlated with measures of prosocial behavior, aggressive behavior and anger. Given the diversity of the patient sample and the role of the PCL-R in forensic psychiatry, it is important that the measured underlying trait is concordant amongst subgroups of patients. This issue is often addressed in measurement invariance studies which, in case of the PCL-R, have focused on cultural differences, for instance between North American and German offenders (Mokros et al., 2011), African American and Caucasian inmates (Cooke, Kosson, & Michie, 2001) or psychiatric patients (Jackson et al., 2007), or on sex differences within general population samples (Neumann, Schmitt et al., 2012). Because measurement invariance is required to make meaningful comparisons, these studies play an important role in validating the use of the PCL-R within a variety of groups. Therefore, one of the goals of this study is to investigate if measurement invariance could be established between our samples of inpatients with a personality disorder and inpatients with a psychotic disorder.

Finally, external correlates of the four-factor model were explored for each group separately by relating the factor scores to prosocial behavior and aggressive behavior, measured with an observation scale, and self-report questionnaires on anger and aggression.

We tested the following hypotheses:

1) The four-factor model is supported in the total group of forensic psychiatric inpatients as well as in each of the two subgroups (personality disordered, psychotic disorder) separately.
2) The model parameters of the four-factor model meet the criteria for measurement invariance between the two subgroups.
3) The lifestyle factor and the antisocial factor are significantly positive correlated with measures of aggression and anger in the total group and in each of the two subgroups.

Method

Setting

The current study was conducted at "FPC De Kijvelanden", a forensic psychiatric center with 178 beds or places in Poortugaal, a village located in the vicinity of Rotterdam, the Netherlands. Patients are accommodated in nine wards at a rehabilitation unit department or in sheltered homes. During daytime, inpatients do not stay on the ward, but follow educational, vocational, and treatment programs elsewhere in the hospital.

Patients

The study was conducted among a group of 411 patients detained by hospital order who were admitted in "De Kijvelanden" between 1996 and 2011. In the Netherlands, patients are detained by hospital order, when the court has established a relation between a psychiatric disorder on the one hand and an offense on the other hand (e.g., Van Marle, 2000; Van Marle, 2002). These patients have committed an offense for which a maximum imprisonment of more than four years applies, for instance severe assault, manslaughter, or murder. Rulings are based on the evaluations of a psychiatrist and/or psychologist at a special assessment center of the Ministry of Security and Justice. Without care or treatment, recidivism should be deemed likely. In the Dutch forensic psychiatric hospitals, a distinction is often made in patients with a personality disorder and patients with a chronic psychotic disorder. This dichotomy is applied on the wards, but also in the treatment programs that are provided.

Of the 411 patients, 269 had a personality disorder as their primary diagnosis on Axis II of the DSM-IV-TR (American Psychiatric Association, 2000), whereas 142 patients had a psychotic disorder as their main diagnosis. Most patients of the first group had a cluster B personality disorder (177 patients; 65.8%), followed by a personality disorder not otherwise specified (72 patients; 26.8%). Their mean age was 37.79 years (SD = 10.05; range: 19-66 years). Most patients of the second group had a schizophrenic disorder (89 patients; 62.7%), followed by a psychotic disorder not otherwise specified (19 patients; 13.4%). The patients with a psychotic disorder were on average 36.63 years old (SD = 10.46; range: 21-76 years). All of the patients were classified by experienced psychiatrists after an extensive psychiatric evaluation that included clinical and psychological evaluations.

Measures

The *Psychopathy Checklist-Revised* (PCL-R; Hare, 1991; Dutch version: Vertommen et al., 2002) is a checklist with 20 items, which have to be rated on a three-point scale with 0 = "does not apply," 1 = "applies to some extent," and 2 = "applies." In a group of 1192 inmates, Cronbach's α for the total score appeared to be .87 and the average inter-item correlation .25 (Hare, 1991). Tentative evidence for the validity was found in a subgroup of 98 forensic psychiatric inpatients as there were modest, but meaningful correlations with self-report questionnaires such as the Minnesota Multiphasic Personality Inventory (MMPI; Dutch version: Derksen, De Mey, Sloore, & Hellenbosch, 1993).

For the current dataset, internal consistency of the PCL-R total score was good (George & Mallery, 2003) with Cronbach's alphas of .83 for both groups of patients. For the group of patients with a personality disorder, the internal consistency of the interpersonal, lifestyle and antisocial factor were acceptable (α's of .71, .71, and .70 successively) whereas the internal consistency of the affective factor was somewhat lower (.67). The internal consistency of the group of patients with a psychotic disorder was acceptable for the affective and lifestyle factor (α's of .76 and .77 successively) and lower for the interpersonal and antisocial factor (α's .60 and .69 successively). However, the use Cronbach's alpha for the factor scores can be problematic as the number of items may influence the outcomes (Schmitt, 1996). Therefore, mean inter-item correlations (MICs) were also calculated as this descriptive statistic is a true indicator of item homogeneity (Simms & Watson, 2007). The mean inter-item correlations indicated acceptable homogeneity for all factors in patients with a personality disorder (interpersonal = .39, affective = .34, lifestyle =.33, antisocial = .31) and in patients with a psychotic disorder (interpersonal = .29, affective = .45, lifestyle = .40, antisocial = .30). For the total PCL-R scale, mean inter-item correlations were acceptable for both groups (.20 for both groups) as MICs of .20 or above indicate acceptable homogeneity (Nunnaly & Bernstein, 1994).

For 370 patients, PCL-R scores were assessed on the basis of file information and frequent contacts with the patient, but without the structured interview. The PCL-R scores of the remaining 41 patients were assessed by means of a structured interview in combination with file study. However, there are indications that file information alone also yields reliable and valid PCL-R scores. According to Bolt, Hare, Vitale, and Newman (2004), the psychometric properties, correlates, and predictive ability of the PCL-R scored from file-only reviews are in general much the same as those scored with the standard protocol, although PCL-R assessments from file reviews are, on average, several points lower than those arrived at through the standard protocol (e.g., Grann, Långström, Tengström, & Stålenheim, 1998).

For the current study, the files that were used as a source of information for scoring on the PCL-R comprised detailed information about life history, committed offenses and elaborated reports from psychiatrists and/or psychologists. These reports were often made in a special forensic assessment center (Pieter Baan Centrum), in which the patient had to stay for observation by order of the court. The PCL-R was administered by certified clinical psychologists who had completed a 3-day PCL-R workshop. The PCL-R scores for the 41 patients who were interviewed were assessed independently by two trained psychologists. There was a strong agreement between raters (ICC = .81, CI^{95}: .67 - .89).

The *Observation Scale for Aggressive Behavior* (OSAB; Hornsveld, Nijman, Hollin, & Kraaimaat, 2007) measures behavior on the ward. The scale comprises 40 items that can be allocated to the subscales of irritation/anger, anxiety/gloominess, aggressive behavior, prosocial behavior, antecedent, and sanction. The staff of the ward rates frequency of the behavior of the patients in the preceding week on a four-point scale with 1 = "no," 2 = "seldom," 3 = "occasionally," and 4 = "frequently." In the current study we used the subscales aggressive behavior and prosocial behavior.

The Trait Anger subscale of Spielberger's (1980) *State-Trait Anger Scale* (STAS; Van der Ploeg, Defares, & Spielberger, 1982) was used to measure the general disposition to anger. Participants rate each item (e.g., "I am quick tempered") how they generally feel using a four-point Likert scale: 1 = "almost never," 2 = "sometimes," 3 = "often," and 4 = "almost always."

The *Aggression Questionnaire-Short Form* (AQ-SF; Bryant & Smith, 2001; Dutch version: Hornsveld, Muris, Kraaimaat, & Meesters, 2009) is a shortened version of the Aggression Questionnaire of Buss and Perry (1992) with 12 items that can be allocated to four subscales, i.e. physical aggression (e.g., "Once in a while I can't control the urge to strike another person"), verbal aggression (e.g., "My friends say that I'm somewhat argumentative"), anger (e.g., "I have trouble controlling my temper"), and hostility (e.g., "Other people always seem to get the breaks"). Respondents score the items using a five-point scale ranging from 1 = "entirely disagree" to 5 = "entirely agree". In the present study we only employed the scores of the physical aggression subscale and the verbal aggression subscales.

Procedure

During their stay in the institution, a comprehensive risk assessment is carried out for every patient, which includes the PCL-R. For the current study, the PCL-R item scores from these assessments were collected from the database of FPC De Kijvelanden and put in a separate dataset. The self-report questionnaires were administered individually by an experienced research

assistant. Patients with a psychotic disorder had to be sufficiently stable to take part in completing the questionnaires. Patients participated in the study on a voluntary basis and received a fee of 10 Euros in return for their participation. They were informed in advance about the purpose of the study and the anonymous use of the data. Only 230 of the 411 inpatients completed the questionnaires. Consequently, the AQ-SF scores of 225 patients (160 patients with a personality disorder; 65 patients with a psychotic disorder) and the STAS scores of 223 patients (159 patients with a personality disorder; 64 patients with a psychotic disorder) were available in the end. The OSAB was completed on the ward by group supervisors who had experience in completing this observation scale. The group supervisors were asked to fill out the measures in the same week that the patient completed the questionnaires.

Statistical analysis

To investigate the fit of the four-factor model, we conducted multiple group confirmatory factor analyses using the Mplus software (Version 7; Muthén & Muthén, 1998-2010). This method also offers the possibility of testing invariance between groups, in terms of item discrimination (factor loadings) and extremity (thresholds) (e.g., Neumann, Schmitt et al., 2012). In addition, we tested the four-factor PCL-R model (Hare, 2003) by conducting confirmatory factor analysis of the PCL-R item-level data for the total sample of patients, and conducted separate CFAs for the two subsamples. As recommended by Hu and Bentler (1999), an incremental and an absolute index were used to test model adequacy. As an incremental index, we used the Comparative Fit Index (CFI; Bentler, 1990), and the Root Mean Square Error of Approximation (RMSEA; Browne & Cudeck, 1993) was used as an absolute index. According to Hoyle (1995), CFI values equal to or greater than .90 and RMSEA values equal to or less than .08 can be considered to represent an acceptable fit. Given the ordinal data of the PCL-R items, the robust weighted least squares estimation procedure was applied for these analyses.

To compare the fit of the four-factor model in the two subgroups (personality disorder versus psychotic disorder) a standard approach for testing for measurement invariance was used (Olver et al., 2012). The basic assumption of measurement invariance is that the scale items provide the same information (e.g., discrimination) across different groups. To test for measurement invariance between the two groups, we conducted a series of multiple group CFAs: an unconstrained four-factor model which allowed item parameters to be freely estimated across the two groups (configural invariance), the same four-factor model in which the factor loadings were constrained but the thresholds were allowed to freely vary across groups (metric invariance), and a model in which both the factor loadings and thresholds were constrained to be equal across

the two groups (scalar invariance). The unconstrained model served as a baseline model for the comparison with subsequent analyses. For this model, the syntax in Mplus was encoded in such a way that factor loadings and item thresholds were freely estimated in both groups. Also, item factor scales were fixed to 1 and factor means were set to 0. Factor variance was fixed to 1 for identification. For this analysis, the subgroup of patients with a personality disorder served as a reference group in all analyses. For assessing the degree of measurement invariance, we used the chi-square difference test, and the recommendations by Cheung and Rensvold (2002), which state that the null hypothesis (invariance) is kept if the incremental change in CFI is equal or smaller than .01.

After conducting the multiple group CFAs, a broader structural equation modeling (SEM) approach was used to investigate the relations of the four factors of the PCL-R with external measures (observed aggressive behavior, observed prosocial behavior, self-reported physical and verbal aggression and self-reported trait anger). Given relatively limited sample sizes for conducting such analyses, each external measure was individually tested as a manifest variable in an SEM along with the four PCL-R factors to investigate its relation to these factors. Also, the relation between the four PCL-R factors and a latent variable containing measures of aggression (observed aggression and self-reported physical aggression) was tested.

Results

Four factor model in the current samples

Table 1 shows the mean PCL-R items scores, mean item scores and mean factor scores of the patients with a personality disorder and the patients with a psychotic disorder. The mean PCL-R total scores did not differ significantly from scores previously obtained in comparable forensic psychiatric samples with (Tengström et al., 2000) and without psychotic disorders (Hare, 2003). In the current study, patients with a personality disorder had a significantly higher mean total score on the PCL-R (M = 21.82) than patients with a psychotic disorder (M = 17.32; see table 1). This significant difference between the two groups was found for three factors of the four-factor model ($\chi 2 \geq 6.03$, $p < .05$), with the biggest difference emerging on the interpersonal factor ($\chi 2 = 60.40$, $p < .01$). The mean total scores on the antisocial factors were not significantly different between both subgroups ($\chi 2 = 2.72$, n.s.).

Table 1. *PCL-R total, factor, and item mean (SD) scores and item ratings (N) in personality disorder (n = 269) vs. psychotic disorder (n = 142) patients.*

		Personality disorder					Psychotic disorder					Analysis
	PCL-R item	*M (SD)*	0	1	2	-	*M (SD)*	0	1	2	-	$\chi 2$
1.	Glibness / Superficial charm	0.83 (0.80)	111	92	66	0	0.30 (0.58)	108	25	9	0	43.93**
2.	Grandiose sense of self worth	0.94 (0.80)	95	95	79	0	0.61 (0.76)	79	39	24	0	15.47**
3.	Need for stimulation	1.14 (0.83)	76	79	113	1	0.84 (0.82)	61	43	38	0	11.89**
4.	Pathological deception	0.71 (0.77)	131	86	52	0	0.33 (0.61)	104	27	10	1	23.50**
5.	Conning / Manipulative behavior	1.12 (0.83)	79	79	111	0	0.42 (0.67)	96	31	14	1	63.18**
6.	Lack of remorse or guilt	1.65 (0.54)	8	78	183	0	1.62 (0.56)	5	44	93	0	0.30
7.	Shallow effect	1.36 (0.63)	22	127	119	1	1.23 (0.62)	15	80	47	0	4.36*
8.	Callous / Lack of empathy	1.37 (0.67)	29	112	128	0	1.13 (0.66)	22	79	41	0	11.23**
9.	Parasitic lifestyle	0.92 (0.80)	95	94	74	6	0.69 (0.71)	64	58	20	0	8.13*
10.	Poor behavior controls	1.44 (0.74)	40	71	157	1	1.33 (0.75)	24	47	71	0	1.87
11.	Promiscuous sexual behavior	1.01 (0.91)	110	45	112	2	0.48 (0.76)	96	22	23	1	31.52**
12.	Early behavior problems	0.83 (0.84)	115	70	72	12	0.56 (0.80)	78	21	24	19	8.81**
13.	Lack of realistic long-term goals	0.97 (0.76)	80	114	73	2	1.15 (0.77)	32	54	53	3	4.90*
14.	Impulsivity	1.37 (0.77)	48	74	146	1	1.19 (0.74)	27	60	54	1	4.83*
15.	Irresponsibility	1.29 (0.75)	47	95	125	2	1.06 (0.75)	36	61	44	1	8.90**
16.	Failure to accept responsibility for actions	1.59 (0.61)	17	75	177	0	1.54 (0.65)	12	41	88	1	0.75
17.	Many short-term marital relationships	0.48 (0.74)	170	47	38	14	0.20 (0.50)	117	15	6	4	15.96**
18.	Juvenile delinquency	0.74 (0.85)	139	57	69	4	0.67 (0.86)	80	22	35	5	0.52
19.	Revocation of conditional release	1.18 (0.90)	88	42	135	4	1.05 (0.95)	60	14	67	1	1.77
20.	Criminal versatility	0.81 (0.78)	112	95	62	0	0.81 (0.77)	57	52	31	2	0.00
	PCL-R total score	21.82 (7.57)	-	-	-	-	17.32 (7.12)	-	-	-	-	31.60**
F1	Interpersonal	3.60 (2.35)	-	-	-	-	1.69 (1.84)	-	-	-	-	60.40*
F2	Affective	5.97 (1.74)	-	-	-	-	5.51 (1.90)	-	-	-	-	6.03*
F3	Lifestyle	5.70 (2.68)	-	-	-	-	4.92 (2.73)	-	-	-	-	7.59*
F4	Antisocial	5.01 (2.75)	-	-	-	-	4.53 (2.83)	-	-	-	-	2.72

Note: *$p < .05$, ** $< .01$ (two-tailed).

A four-factor model CFA was carried out for the total sample, and for both groups of patients. Results indicate that the four-factor model provided a moderate to acceptable fit to the data for the total sample (CFI = .90, RMSEA = .076, CI^{90} = .068 - .084; see table 2). Similar results were found for the two subgroups. Patients with personality disorder had an acceptable fit on the absolute index (RMSEA = .07, CI^{90} = .064 - .084), whereas the incremental index was just under the acceptable range (CFI = .89). The four-factor model had an acceptable fit for both the absolute index (RMSEA = .07, CI^{90} = .056 - .087) and the incremental index (CFI = .90) in patients with a psychotic disorder. Item-to-factor loadings and correlations (see figure 2 and figure 3) were all significant ($p < .001$) for both groups.

Table 2

Total sample and multi-sample confirmatory factor analysis model fit results.

Model	RMSEA [90% C.I.]	CFI	ΔCFI	χ2 Difference test (sign. value)
Total Group (*N* = 411)	0.076 [0.068 – 0.084]	0.90	NA	NA
Personality disorder (*n* = 269)	0.074 [0.064 – 0.084]	0.89	NA	NA
Psychotic disorder (*n* = 142)	0.072 [0.056 – 0.087]	0.90	NA	NA
Model 1 (unconstrained)	0.072 [0.064 – 0.081]	0.90	NA	NA
Model 2 (constrained factor loadings)	0.066 [0.057 – 0.074]	0.91	.01	13.23 (.51)
Model 3 (constrained factor loadings and thresholds)	0.071 [0.063 – 0.079]	0.89	-.01	61.41 (<.01)

Note: For the χ2 Difference test, Model 2 and model 3 are compared to model 1.

Threshold values for the PCL-R items were also examined for the total group and both subgroups. These 'extremity' values provide information about to what extent a certain behavior has to be present before an item-rating (a PCL-R rating of 2 in this case) is likely to be endorsed (Reise, 1999). Results (figure 4) indicate that items representing the interpersonal factor tend to have the highest threshold values for both subgroups. This might indicate that these items are rated when they are explicitly present. On the other hand, items of the affective factor in particular had low threshold values, which would indicate that these items tended to be rated a 2 when this behavior was already present in limited extent.

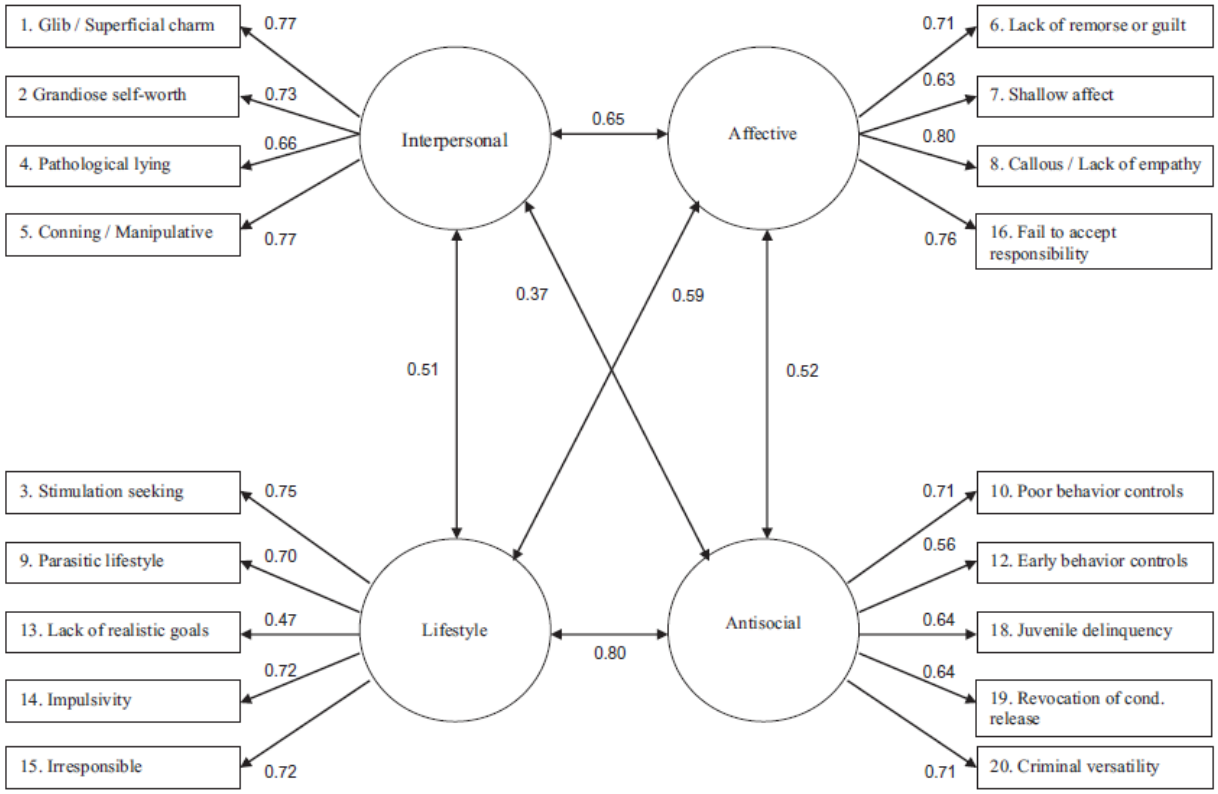

Figure 2. Factor loadings of the total group of patients.

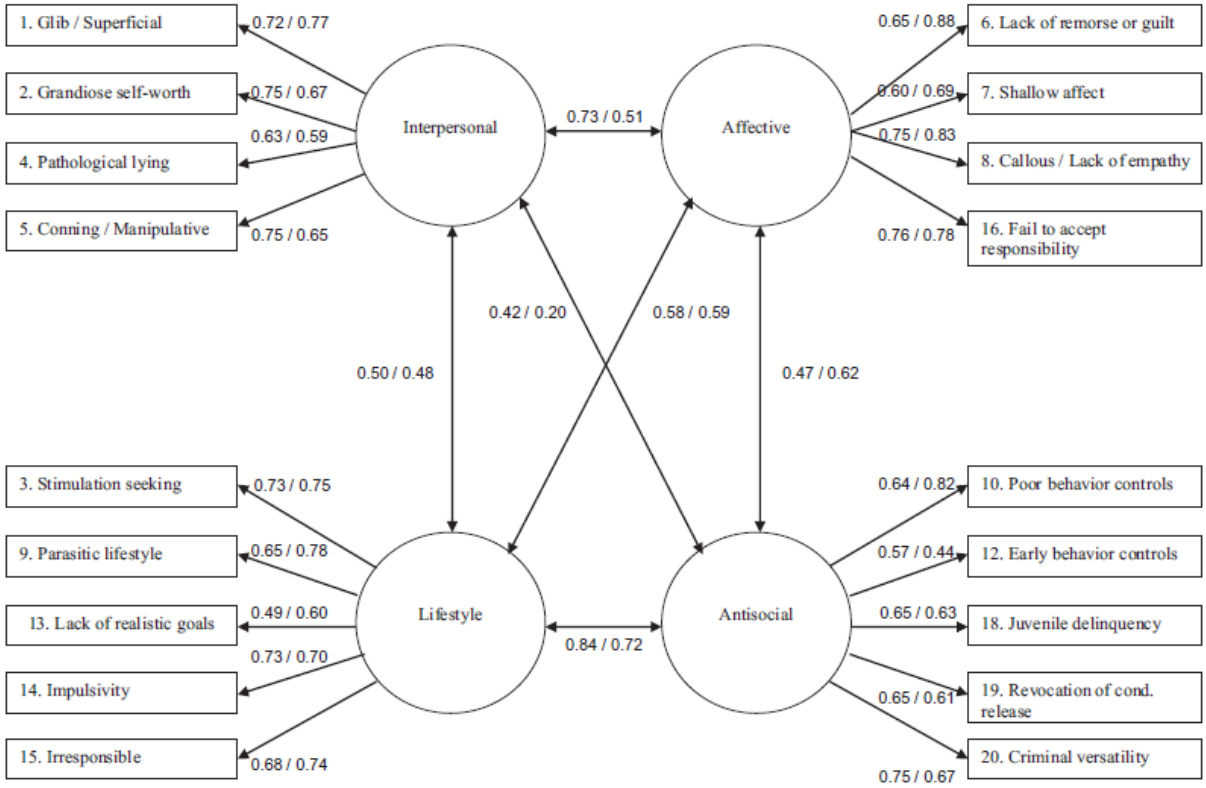

Figure 3. Factor loadings of patients with a personality disorder and patients with a psychotic disorder.

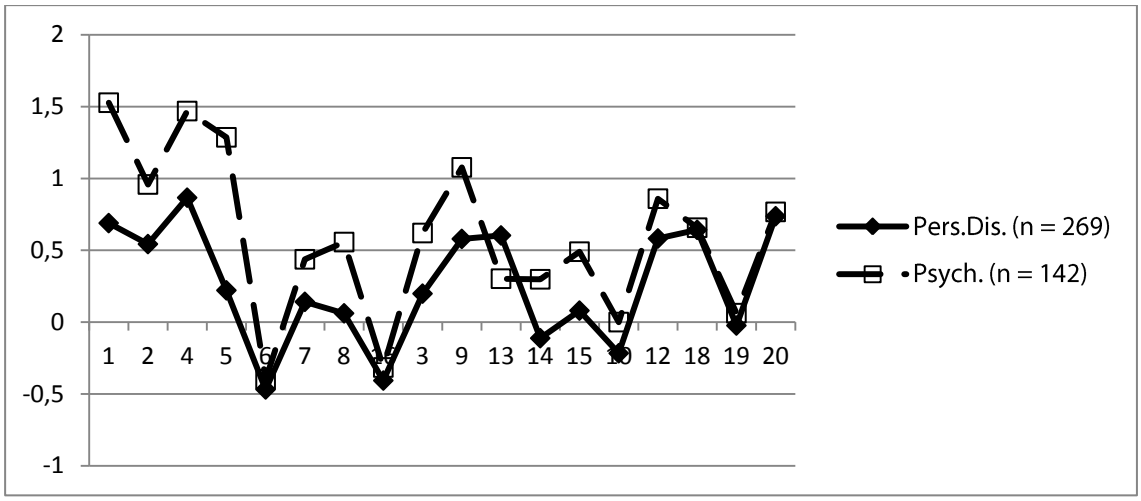

Figure 4. Thresholds values of the items of the PCL-R in the total sample (N = 411), patients with a personality disorder (n = 269) and patients with a psychotic disorder (n = 142). *Note*: Items are ordered in such a way as they represent the factors.

Differences between patients with a personality disorder and patients with a psychotic disorder

To determine measurement invariance, three multi-group CFAs of the four-factor model (configural invariance, metric invariance and scalar invariance) were tested. The unconstrained model (configural invariance) had acceptable model fit (CFI = .90, RMSEA = .07, CI^{90}= .06 - .08). Model fit of the model with constrained factor loadings and free thresholds (metric invariance) was also acceptable (CFI = .91, RMSEA = .07, CI^{90}% = .06 - .07), whereas the model fit of the model with constrained factor loadings and constrained thresholds (scalar invariance) was just under acceptable (CFI = .89, RMSEA = .07, CI^{90} = .06 - .08). Scalar measurement invariance could be confirmed as the change of CFI value in the two models with constrained factor loadings and/or thresholds, compared to the unconstrained model, was equal or under .01. However, according to the more traditional chi-square difference test, the model with constrained factor loadings and thresholds had significantly lower fit than the unconstrained model ($\Delta\chi2 = 61.41$; $p < .01$), whereas the model with constrained factor loadings did not result in a significantly lower fit compared to the unconstrained model ($\Delta\chi2 = 13.23$; $p = .51$).

Correlations with external measures

Table 3 shows the mean scores and standard deviations of the external measures. A significant difference was found on the prosocial subscale of the OSAB ($t = 3.42$, $p < .01$), with patients with a personality disorder having a higher score.

Table 3

Mean scores and standard deviates of external correlates.

		Total group (N = 411)	Personality disorder (n = 269)	Psychotic disorder (n = 142)	Statistical analysis
Measure	Subscale	*M (SD)*	*M (SD)*	*M (SD)*	*T*
OSAB	Aggressive	15.67 (4.99)	15.64 (4.98)	15.74 (5.02)	-0.18
	Prosocial	30.26 (7.67)	31.31 (7.28)	28.25 (8.02)	3.42**
AQ-SF	Physical	8.13 (2.78)	8.13 (2.89)	8.14 (2.51)	-0.03
	Verbal	7.48 (2.21)	7.34 (2.32)	7.80 (2.13)	-1.41
STAS	Trait anger	16.73 (5.47)	16.87 (5.57)	16.36 (5.23)	0.64

Note: * p < .05, ** p < .01 (two-tailed); PCL-R = Psychopathy Checklist-Revised; OSAB = Observation Scale Aggressive Behavior; AQ-SF = Aggression Questionnaire – Short Form; STAS = State-Trait Anger Scale.

Table 4

Pearson's r correlations between the PCL-R four-factor factors and external variables.

Group	PCL-R	OSAB		AQ-SF		STAS	Aggr.
		Aggr.	Pros.	Phys	Verb	Anger	LV
Pers.D.	F1 Interpersonal	.09	.14	.16	.09	.01	.33
	F2 Affective	.11	-.07	.03	.07	.09	.19
	F3 Lifestyle	.23**	.03	.39**	.12	.27**	.79**
	F4 Antisocial	.25**	.14	.41**	.18	.18	.85**
Psych.D.	F1 Interpersonal	.15	.22	-.02	-.18	-.30	.07
	F2 Affective	.06	.01	.21	.05	.03	.27
	F3 Lifestyle	.18	-.09	.30*	.05	.13	.40
	F4 Antisocial	.06	-.12	.45*	.02	.01	.49*

Note: * p < .05, ** p < .01 (two-tailed). Aggression LV = Aggression latent variable which includes OSAB aggression and AQ-SF physical aggression.

Correlations between the four PCL-R factors and the external correlate observed and self-reported measures are shown in Table 4. For the patients with a personality disorder, the interpersonal factor and the affective factor were not significantly correlated with any of the external correlates. The lifestyle and the antisocial factor where both correlated to observed aggression (r = .23, p < .01 and r = .25, p < .01, respectively) and self-reported physical

aggression (r = .39, p < .01 and r = .41, p < .01, respectively). When observed aggression and self-reported physical aggression were used as indicators for a single Aggression latent variable, high significant correlations were found with the lifestyle factor (r = .79, p < .01) and the antisocial factor (r = .85, p < .01). Self-reported trait anger was only significantly correlated to the lifestyle factor (r =.27, p < .01). Noteworthy, no significant correlations were found with self-reported verbal aggression and observed prosocial behavior.

For the patients with a psychotic disorder, self-reported physical aggression was significantly correlated with the lifestyle factor (r = .30, p < .05) and the antisocial factor (r = .45, p < .05). The latent Aggression variable (observed aggression and self-reported physical aggression) correlated significantly with the antisocial factor (r = .49, p < .05). No other significant correlations with any of the external measures were found.

Discussion

We examined the four-factor structure of the PCL-R (Hare & Neumann, 2008) in a forensic psychiatric sample containing patients with a personality disorder and patients with a chronic psychotic disorder as their main diagnosis. A multi-group confirmatory factor analysis of the four-factor model of the PCL-R was performed. We not only tested the goodness of fit of this model, but also the degree of measurement invariance between the two patient groups, and the relations between the four factors and the external correlates.

The results indicate that the four-factor model had an acceptable fit for the total sample and both subsamples (albeit just below acceptable for the incremental index for the patients with a personality disorder). This conclusion is in accordance with recent studies that have focused on the four-factor model (Hare & Neumann, 2006; Hill et al., 2004; Mokros et al., 2011; Neumann, Hare, & Newman, 2007; Neumann, Hare, & Johansson, 2012; Neumann et al., 2006; Olver et al., 2012; Vitacco, Neumann, & Jackson, 2005). Furthermore, the PCL-R items demonstrated a reasonable degree of invariance across inpatients with a personality disorder and inpatients with a psychotic disorder. This suggests that the instrument can be administered in both patient groups and that the scores of these subgroups can be compared in a valid way. However, the more traditional chi-square difference approach suggests less strong evidence of scalar invariance and might therefore raise some questions about the applicability of the PCL-R in this rather heterogeneous group of patients under hospital order, along with the PCL-R rating methodology used in this study.

Further comparisons revealed that patients with a personality disorder had significantly higher scores on the interpersonal factor, affective factor and lifestyle factor. There was no significant difference on the antisocial factor, which was in contrast to the expectations as patients with a psychotic disorder detaining under hospital order are more often first-offenders than patients detaining under hospital order without any psychotic disorder (Nijman, Van Marle, & Kavelaars, 2006).

The threshold values of the items showed interesting results across the two subsamples. In general the threshold values of the patients with a psychotic disorder were higher than those of the patients with a personality disorder. This result may indicate that it is likely that the expression of psychopathic traits had to be evident above and beyond the psychotic symptoms of the psychotic patients before they received threshold ratings of 2 on the PCL-R. The thresholds of the items of the interpersonal factor were relatively high for both groups of patients, but in particular for the patients with a psychotic disorder. This might indicate that high levels of these underlying traits must be present before these items can be scored as present (i.e., a charming and superficial communication style) on the PCL-R. These results are not surprising and might suggest that psychotic symptoms were not being confused with symptoms of psychopathy when the PCL-R was being administered to the patients with a psychotic disorder.

Several low threshold values also were evident. For both groups, the threshold values of item 6 (lack of remorse or guilt), item 10 (poor behavior controls) item 16 (failure to accept responsibility for own actions), and item 19 (revocation of conditional release) were rather low. However, these items also had high percentages of scores in which they were judged to apply to the patient (an item-score of 2). Therefore, these low threshold values may be scored as 2, even if an item does not fully apply. On the other hand, these low threshold values might be due, in part, to the specific samples used in the current study—i.e., high risk and severely disordered forensic psychiatric inpatients.

Another purpose of this study was to examine the relations between various factors of the PCL-R with external correlates. For this reason, the four PCL-R factors were correlated with indexes of observed and self-reported aggressive behavior and observed prosocial behavior. The correlations for the patients with a personality disorder showed a number of interesting findings in which the lifestyle factor and the antisocial factor were related to observed and self-reported (physical) aggression. Use of a latent variable approach to represent inpatient aggression provided the best evidence of an association between PCL-R factors and aggression across both samples. This association is in line with the results of other studies (e.g., Hornsveld et al., 2007; Walters, 2003a) and may provide support for the validity of the PCL-R in regard to aggression in patients

with a personality disorder as their main diagnosis.

The pattern of correlations between the PCL-R factors and the external correlates for the patients with a psychotic disorder was less clear-cut. The relation with observed aggression could not be confirmed, whereas earlier studies demonstrated an association between psychopathy and aggression for patients with schizophrenia (Rice & Harris, 1992; Tengström et al., 2000). Nevertheless, when a latent aggression variable was used, we did find a moderately strong association with the PCL-R antisocial factor (see also Fullam & Dolan, 2008; Hill, Neumann, & Rogers, 2004). Notably, most previous studies have focused on aggression in terms of violent recidivism, whereas the current study used hospital staff observations, carried out in an environment in which aggressive behavior was inhibited due to multiple factors. These inhibiting factors include, amongst others, an intensive day-program, a relatively high staff-patient ratio, and the use of antipsychotic medication, which is related to a decrease of aggressive behavior in patients with schizophrenia (e.g., Buckley, 1999; Lammers, 2006; Ruedrich et al., 2008). Nevertheless, the current study also revealed a significant association between self-reported physical aggression and the PCL-R, especially the lifestyle factor and the antisocial factor, in patients with a psychotic disorder.

Our study should be interpreted with respect to several limitations. First of all, the sample of this study was a very selective group of patients, which may have repercussions for the generalization of the findings. These patients had all committed a serious violent offence and were diagnosed with a severe mental disorder. Secondly, it should be noticed that PCL-R scores were largely based on file study and not on a combination of file study and a structured interview. According to Hare and Neumann (2006) this is a disadvantage because "there may not be sufficient information to adequately score the items that tap interpersonal and affective features" (p. 66). A third limitation of the study is that in our opinion the structured and controlled environment in an institution with a relatively high patient-staff ratio has an attenuating effect on the patients' behavior, and probably results in relatively low scores on the observation scale and certain self-report questionnaires (see also Hornsveld, Muris et al., 2009). Fourth, although the sample size of the total group and the subgroup of patients with a personality disorder were sufficient for the analyses, the sample size of the patients with a chronic psychotic disorder was rather small. Fifth, due to practical considerations, the external measures were limited to aggression related and personality measures and did not include other relevant measures like impulsivity, hostility or empathy (Bogaerts, Polak, Spreen, & Zwets, 2012).

To summarize, the four-factor model (Hare, 2003; Hare & Neumann, 2008) had an acceptable fit for the PCL-R data we collected in our institution. A reasonable degree of

measurement invariance could be established between patients with a personality disorder and patients with a psychotic disorder, which supports comparisons between these groups of patients. However, a more traditional approach suggests questionable evidence for invariance at the level of item thresholds. Thus, investigators, at this point should proceed with caution when assuming that PCL-R scores level among patients with personality disorders versus those with psychotic disorders and that these groups have equivalent levels of psychopathy when they have the same PCL-R score. Therefore, more research about the measurement invariance of the PCL-R is needed in a larger sample of Dutch patients under hospital order. At this moment, testing for measurement invariance is rarely done (See Cyders, 2013; Vandenberg & Lance, 2000), though measurement invariance has to be established to make valid comparison between groups. Furthermore, the validity of this model was partially supported by meaningful correlations with external measures of anger and aggression in the group of patients with a personality disorder. However, such results were absent in the group of patients with a psychotic disorder, possibly due to multiple confounding variables such as the effects of medication. Our results provide a contribution to the validation of the PCL-R in various subgroups of patients. In today's forensic psychiatry, very important decisions are based on PCL-R total and factor scores. Therefore, future research should focus on validating the PCL-R in different groups as these decisions should be supported by empiric evidence.

CHAPTER THREE

Implicit attitudes toward violence and their relation to psychopathy, aggression, and socially adaptive behaviors in forensic psychiatric inpatients

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Abstract

In order to investigate the relation between implicit attitudes toward violence and different aspects of violent and social behavior in Dutch forensic psychiatric inpatients, an implicit association test was related to measures of psychopathy, aggression, and socially adaptive behaviors. Results indicated that all patients had negative implicit attitudes toward violence. Although implicit attitudes toward violence were unrelated to several self-report measures of aggression, there was a significant positive relation between these attitudes and the antisocial factor of psychopathy. Furthermore, it was found that implicit attitudes toward violence were significantly negatively associated with coping behaviors and the level of moral awareness, indicating that patients with more negative implicit attitudes toward violence more often reported these behaviors, which can be assumed to inhibit aggression. As the present study was only correlational in nature, our findings need to be further explored in prospective research.

Introduction

According to Eagly and Chaiken (1993), an attitude can be described as 'a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor' (p. 1). In a similar vein, Olson and Fazio (2009) have defined an attitude as 'an association in memory between an object and one's evaluation of it' (p. 20). Although these definitions of attitudes somewhat differ, both seem to focus on the extent to which a psychological object, such as behavior, is evaluated as positive or negative (see Eagly & Chaiken, 2007, for a comprehensive overview).

Attitudes are assumed to be important determinants of behavior (Ajzen & Fishbein, 1977, 2000; Allport, 1954), including violent behavior (e.g., Anderson & Bushman, 2002; Anderson & Huesmann, 2007; Dodge, 1993; Kraus, 1995). A more positive attitude toward a particular type of behavior increases the likelihood that such behavior is performed, whereas a more negative attitude may result in the inhibition of that behavior. Anderson and Bushman (2002) stated that more positive attitudes toward violence against certain groups of people can prompt a person to become aggressive toward these people. For example, positive attitudes toward violence against women are assumed to be associated with the perpetration of aggressive acts against women (Flood & Pease, 2009). As a result, criminal attitudes, such as positive attitudes toward violence, are assumed to be among the most important criminogenic factors in the risk-need-responsivity model of offender rehabilitation (Andrews & Bonta, 2003, 2010; Bonta & Andrews, 2007), and are often targeted in rehabilitation programs for violent offenders (Polaschek, 2006).

Several studies that applied self-report questionnaires for assessing attitudes have indicated that positive attitudes toward violence are associated with a heightened frequency of overt violent behaviors (e.g., Connolly, Friedlander, Pepler, Craig, & Laporte, 2010; Markowitz, 2001; Vernberg, Jacobs, & Hershberger, 1999). For instance, Markowitz (2001) found that self-reported attitudes toward violence against spouses and children were related to the frequency of overt violent behavior against these family members. However, the use of self-report assessment has limitations when studying negatively valenced attitudes, and this is especially true for samples of offenders. Questionnaires – such as the Velicer Attitudes Toward Violence Scale (Velicer et al., 1989) and the Attitudes Toward Dating Violence Scales (Price et al., 1999) – probably depend on the respondents' ability for introspection (Nunes, Firestone, & Baldwin, 2007) and also may be vulnerable to social desirable response tendencies (e.g., Gannon, Ward, & Collie, 2007; Vigil-Colet, Ruiz-Pamies, Anguiano-Carrasco, & Lorenzo-Seva, 2012). Various studies have

demonstrated that explicit measures are only predictive of consciously carried out behaviors under conditions in which both sufficient cognitive resources and the motivation to act according to the explicit attitude are present (e.g., Friese et al., 2009). If these conditions are not met, individuals show impulsive behaviors that are not in line with their explicitly reported attitudes but more related to their implicit attitudes (Fazio, 1990; Gawronski & Bodenhausen, 2006; Olson & Fazio, 2009; Strack & Deutsch, 2004).

Implicit attitudes can be described as automatically and unintentionally activated evaluative associations with a psychological object (Gawronski & Bodenhausen, 2006) and can be assessed with implicit measures (Greenwald, Poehlman, Uhlmann, & Banaji, 2009) such as the implicit association test (IAT; Greenwald, McGhee, & Schwartz, 1998). This test is a reaction time-based categorization task that measures the strength of the implicit association between concepts in memory. Several studies have supported the validity of the IAT in the assessment of patients showing violent or otherwise aggressive behavior, indicating that more positive implicit attitudes toward violence are associated with higher levels of violent behavior. For example, a study by Eckhardt, Samper, Suhr, and Holtzworth-Munroe (2012) showed that male offenders involved in domestic violence had more positive implicit associations toward violence than non-violent men, whereas no difference between both groups was found on explicit attitudes toward violence. These results made the authors conclude that 'aggressogenic attitudes are likely to operate automatically and with little conscious deliberation' (Eckhardt et al., 2012, p. 472).

A more positive attitude toward violence has also been associated with psychopathy (e.g., Blair, 2004; Olanrewaju, Dominic, Julius, & Funmilola, 2014; Snowden, Gray, Smith, Morris, & MacCulloch, 2004), which is considered to be an important construct in forensic psychiatry because of its relation with aggressive behavior (Hare & Neumann, 2008, 2009; Hildebrand et al., 2005). Studies have shown that offenders with relatively high levels of psychopathic traits are more inclined to display both reactive and proactive aggressive behaviors (Cornell et al., 1996; Woodworth & Porter, 2002). According to the integrated emotions system (IES) model of Blair (2004), the aggressive behavior of psychopaths may be related to impairments of the amygdala and orbitofrontal cortex. The impairment of the amygdale results in the inability to recognize and respond to emotions of distress in their victims. As a result, aversive conditioning of their harmful behavior will not occur, causing the psychopathic offender to regard aggression as less aversive (Blair, 1995; Patil, 2015; Rothemund et al., 2012). To our knowledge, only one study has been conducted exploring the relationship between implicit attitudes toward violence and psychopathy in an offender sample. This study (Snowden et al., 2004) found that murderers who scored high on the Psychopathy Checklist-Revised (PCL-R;

Hare, 1991, 2003) indeed displayed more positive implicit attitudes toward violence, as measured by the IAT. However, no significant link between the IAT and psychopathy was found for offenders who had committed other crimes than murder. Nevertheless, in line with the IES model, Snowden et al. (2004) concluded that (aggressive) psychopaths on an implicit level less often link negative consequences to their violent behavior and as such display a more positive attitudes toward violence.

In summary, research on implicit and explicit attitudes toward violence in violent offenders has yielded interesting results, and such information may lead to a better insight in the role of attitudes in the onset and continuation of violent behavior. In the present study, implicit attitudes toward violence were measured by means of the IAT in Dutch violent forensic psychiatric inpatients and then related to indices of psychopathy, aggression, and hostility. In addition, it was examined whether implicit attitudes toward violence have incremental value over other relevant variables that were assessed via self-report questionnaires in the prediction of aggression. Finally, the relation between implicit attitudes toward violence and socially adaptive behaviors was also explored. These behaviors included moral awareness, social skills, and coping behaviors, and are often considered as targets in treatment programs for violent offenders because of their inhibitory influence on aggressive behavior (Goldstein et al., 1998; Hornsveld, 2004a, 2004b; Polaschek, 2006). It was hypothesized that more positive implicit attitudes toward violence would be related to higher levels of psychopathy (Snowden et al., 2004), aggression (Eckhardt et al., 2012), hostility and anger (Dodge, 1993). Further, implicit attitudes toward violence were expected to be negatively related to moral awareness and other socially adaptive behaviors such as social skills and adaptive coping behavior.

Method

Participants

The study was carried out in a sample of 110 male forensic psychiatric inpatients, who were detained under hospital order for a serious violent offence. 'Detained under hospital order' means that the court has established a relation between a psychiatric disorder, on the one hand, and the committed offense, on the other (e.g., Van Marle, 2002). The primary diagnosis of 82 patients was a cluster B personality disorder on Axis II of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; American Psychiatric Association, 2000). Most of these

patients had an antisocial personality disorder (44 patients), followed by a cluster B personality disorder not otherwise specified (27 patients), a borderline personality disorder (7 patients), and a narcissistic personality disorder (4 patients). Furthermore, 18 patients had a chronic psychotic disorder on Axis I as their main diagnosis, in combination with a cluster B personality disorder on Axis II, whereas five patients had a (chronic) psychotic disorder and did not meet the DSM-IV-TR criteria for a personality disorder. The psychiatric condition of the patients with a psychotic disorder had been stabilized at the time of the study. Finally, five patients met the DSM-IV-TR criteria for pedophilia. All patients were classified by experienced psychiatrists after an extensive evaluation that included various clinical and psychological evaluations. The mean age was 38.17 years (SD = 9.12; range = 22–59 years). In terms of the committed offenses, 26 patients had been convicted for (attempted) manslaughter, 24 for (attempted) rape, 20 for pedophilic offenses, 11 for theft with violence, 11 for assault, 10 for (attempted) murder, 3 for sexual harassment, 3 for arson, and 2 for threats with violence.

Measures

Implicit associations

The IAT (Greenwald et al., 1998) can be used to assess the strength between targets and attributes in memory, and has been applied in numerous studies including various forensic populations (e.g., Eckhardt et al., 2012; Gray, Brown, MacCulloch, Smith, & Snowden, 2005; Hempel, Buck, Goethals, & Van Marle, 2013; Kanters, Hornsveld, Nunes, Huijding, Zwets, Snowden, Muris, & Van Marle, 2014; Snowden et al., 2004; Van Leeuwen et al., 2013). During this computerized task, patients have to assign target stimuli (either a word or a picture) as quickly as possible to the appropriate target by pressing a left or a right button. The target stimuli are presented in the center of the computer screen, whereas the attribute and target labels are shown in the upper left corner and the upper right corner of the screen. Categorization performance is assumed to be faster and more accurate when the two categories that share a response key are associated (e.g., flower-peasant and insect-unpleasant), as compared with a condition in which they are not associated (e.g., flower-unpleasant and insect-pleasant). For the present study, two different IAT versions were used: a standard valence IAT and a violence-pleasant IAT. The standard valence IAT was included as an experimental control procedure. That is, the standard valence IAT scores were also correlated with the external measures, but no

significant correlations were expected. For the standard valence IAT, the target categories were flowers vs. insects, and the attribute categories were pleasant vs. unpleasant. The target categories consisted of eight pictures of flowers and eight pictures of insects. The attribute categories consisted of eight pleasant words (e.g., beautiful; see Appendix 1) and eight unpleasant words (e.g., accident). For the violence-pleasant IAT, the target categories were violence vs. peace, and the attribute categories were pleasant vs. unpleasant. Target categories consisted of eight violence words (e.g., attack) and eight peace words (e.g., calm). The words of the target and attribute categories of the valence IAT and the violence-pleasant IAT were Dutch translations of the stimulus words that were also used in the study of Snowden et al. (2004). During translation, it was taken into account that the average length of the words in categories was similar for various categories.

In total, participants had to complete seven blocks for each IAT. Blocks 1 and 2 were practice blocks to familiarize with the IAT procedure. In blocks 3 and 4, the congruent condition was assessed. During this condition, the left button was the correct response for the concept pairs flowers-pleasant (valence IAT) and peace-pleasant (violence-pleasant IAT), whereas the right button was the correct response for the concept pairs insects-unpleasant and violence-unpleasant. Block 5 was again a practice block to make participants familiar with the incongruent condition. During blocks 6 and 7, the incongruent condition was assessed. During this condition, the left button was the correct response for the concept pairs insects-pleasant (valence IAT) and violence-pleasant (violence-pleasant IAT), whereas the right button was the correct response for the concept pairs flowers-unpleasant and peace-unpleasant. During blocks 1, 2, 3, 5, and 6, each stimulus was presented once in a random order. During blocks 4 and 7, every stimulus was presented twice in pseudorandom order (all stimuli were presented once before they were presented again).

Psychopathy

The PCL-R (Dutch version: Vertommen et al., 2002; Hare, 1991, 2003) is a checklist used to assess the level of psychopathy. The checklist consists of 20 items, which have to be rated on a three-point scale with 0 = 'does not apply,' 1 = 'applies to some extent,' and 2 = 'applies.' Vertommen and colleagues (2002) found support for the reliability of the Dutch version of the PCL-R in a group of 1192 inmates. Cronbach's α was .87, and the average inter-item correlation was .25. In the present study, we used the total score as well as the four-factor structure (Hare, 2003; Hare & Neumann, 2006; Zwets, Hornsveld, Neumann, Muris, & Van Marle, 2015), which measures the following factors of psychopathy: interpersonal (e.g., 'grandiose self-worth'),

affective (e.g., 'callous and lack of empathy'), lifestyle (e.g., 'impulsivity'), and antisocial (e.g., 'juvenile delinquency'). In a recent study, a good inter-rater reliability for the PCL-R was demonstrated (ICC = .81; CI^{95} = .67–.89; Zwets et al., 2015).

Aggression, anger, and hostility

The *Reactive-Proactive Aggression Questionnaire* (RPQ; Cima, Raine, Meesters, & Popma, 2013; Raine et al., 2006) is a self-report questionnaire to assess reactive and proactive aggression. The RPQ consists of 23 items: 11items measuring reactive aggression (e.g., 'reacted angrily when provoked') and 12 items measuring proactive aggression (e.g., 'hurt others to win a game'). Respondents are instructed to rate for each item how often they exhibited this behavior in the past using a three-point scale: 0 = 'Never', 1 = 'Sometimes', and 2 = 'Often.' Cima et al. (2013) found good internal consistency for the reactive aggression (*a* = .83) and the proactive aggression subscale (*a* = .87).

The *Aggression Questionnaire-Short Form* (AQ-SF; Bryant & Smith, 2001; Dutch version: Hornsveld, Muris et al., 2009) is a shortened version of the aggression questionnaire of Buss and Perry (1992) and contains 12 items that can be allocated to four subscales, that is, physical aggression (e.g., 'Once in a while I can't control the urge to strike another person'), verbal aggression (e.g., 'My friends say that I'm somewhat argumentative'), anger (e.g., 'I have trouble controlling my temper'), and hostility (e.g., 'Other people always seem to get the breaks'). Respondents have to rate the items using a five-point scale ranging from 1 = 'Entirely disagree' to 5 = 'Entirely agree.' In a group of 208 violent forensic psychiatric outpatients, Hornsveld, Muris and colleagues (2009) found that the internal consistency (Cronbach's *a*) of the AQ-SF total score and subscale scores was .72, .52, .38, .60, and .69, respectively.

Socially adaptive behaviors

The *Inventory of Interpersonal Situations* (IIS; Van Dam-Baggen & Kraaimaat, 1999) assesses the level of anxiety people experience during social interactions (social anxiety) and how often they are able to actually perform the described behavior in such situations (social skills). In the present study, only the social skills scores were collected. For the social skills questions, a five-point Likert scale is used ranging from 1 = 'I never do' to 5 = 'I always do.' The five subscales are as follows: giving criticism, asking attention for your opinion, giving compliments, initiating contact, and appreciating yourself. Van Dam-Baggen and Kraaimaat (1999) demonstrated good internal consistency for this scale (Cronbach's *a* = .93) in a non-clinical sample.

The *Utrecht Coping Scale* (UCL; Schreurs, Van de Willige, Brosschot, Tellegen, & Graus, 1993) assesses several aspects of coping behavior. The respondent has to answer 47 items about specific coping behavior on a four point Likert scale ranging from 1 = 'Seldom or never' to 4 = 'Very often.' For the present study, we applied the six subscales that referred to positive coping: active problem solving, palliative response, avoidance, seeking social support, expression of emotions, and reassuring thoughts. One subscale, passive response, was considered as dysfunctional coping behavior and was not included in this study. In a non-clinical group of 1200 adults, Schreurs and colleagues (1993) found internal consistency (Cronbach's α) coefficients to range between .64 and .82 for various subscales of the UCL.

The *Sociomoral Reflection Measure-Adapted Version* (SRM-AV; Hornsveld, Kraaimaat, & Zwets, 2012) assesses the level of moral awareness. The questionnaire contains 20 propositions that have to be answered on a five-point Likert scale ranging from 1 = 'Very unimportant' to 5 = 'Very important.' Furthermore, respondents have to write down why they justify their opinion. These answers are evaluated by a research assistant on a seven-point scale ranging from 1 = 'phase 1: unilateral and physicalistic' to 7 = 'phase 4: systematic and standard.' The SRM-AV consists of four subscales: expecting decent behavior of others, addressing others with regard to their behavior, exhibiting decent behavior to others, and being helpful to others. Hornsveld et al. (2012) found an internal consistency (Cronbach's *a*) of .94 in a group of 132 forensic inpatients.

Data handling, preparation, and analyses

All collected data were anonymously processed by a research assistant. A total of 110 patients completed the IAT. Not all self-report questionnaires were fully completed, probably because patients had limited motivation or because they did not fully understand some items of the scales. Data of the incomplete questionnaires were removed from the data-set. Therefore, only 60 SRM-AV scores could be used because the written responses were often incomplete or too ambiguous to make a valid judgment.

For the IAT, trials with latencies above 10,000 ms were deleted from the data-set. Furthermore, the data of participants who had latencies below 300 ms on more than 10% of the trials were deleted, together with the data of patients who had a total error rate above 25% (error rate of all blocks). Nine patients had an error percentage of 25% or higher on the violence-pleasant IAT and were therefore excluded from the analyses. Furthermore, one patient had response latencies below 300 ms on more than 10% of the trials of the violence-pleasant IAT and

was also excluded from the analyses. The removal of these patients resulted in a total sample of 100 patients.

For the valence IAT and the violence-pleasant IAT, D-scores, which represent the IAT-effect, were calculated by expressing the difference between the mean latency of the congruent condition and the incongruent condition in terms of the pooled latency variance (Greenwald, Nosek, & Banaji, 2003). Before this analysis was conducted, errors were replaced with the mean latencies of that block together with a 600-ms penalty.

For the valence IAT, a positive D-score indicates that the flower-unpleasant and insect-pleasant association is stronger than the flower-pleasant and insect-unpleasant association. For the violence-pleasant IAT, a positive D-score indicates that the violence-pleasant and peace-unpleasant association is stronger than the violence-unpleasant and peace-pleasant association. In order to examine the relation between D-scores and the external measures, a correlational approach was applied which can be considered as appropriate for analyzing these cross-sectional data, although this method has the limitation that no conclusions on cause-effect relations can be drawn. Furthermore, multiple regression analyses were conducted to explore unique correlates of aggression and implicit attitudes toward violence scores. All scales had acceptable skewness and kurtosis values and could therefore be judged as having a normal distribution (with the exception of SRM-AV subscale 'Addressing others with regard to their behavior,' which had a kurtosis value of 2.7).

Procedure

The present study was approved by the scientific research committee of Forensic Psychiatric Center De Kijvelanden. All patients completed an informed consent form in which they were explicitly told that cooperation was on a voluntary basis and that the test results would not have any influence on their treatment. The IAT and self-report questionnaires were administered individually by an experienced research assistant. Furthermore, PCL-R (Hare, 1991) scores were collected from the database of FPC De Kijvelanden. Participation was rewarded with a monetary compensation of 15 Euros.

Both IAT versions were run using E-Prime 2.0 software on an Apple Mac book Pro 17-inch 2.53-GHz LED backlit widescreen notebook. An E-Prime PST Serial Response Box was used to collect the responses of the participants. Latencies and errors were registered for all trials and were analyzed using the Statistical Package for the Social Sciences, version 20.0.

Results

IAT-effects

On the valence IAT, an average D-score of −.86 (SD = .39; see Figure 5) was found. This score was significantly lower than 0 [one-sample t (99) = 22.12, $p < .01$], which indicates that patients had a stronger flower-pleasant (and insect-unpleasant) association than a flower-unpleasant (and insect-pleasant) association. No significant correlations were noted to be observed between the standard valence IAT D-score and any of the external measures, implying that significant correlations between the violence-pleasant IAT and external measures cannot be simply attributed to an artifact assessed using the IAT procedure (Table 5).

On the violence-pleasant IAT, an average D-score of −1.19 was found (SD = .27; range = −1.75 to −.46). This score was significantly lower than 0 [one-sample t (99) = 44.65, $p < .01$], which means that the patients had a stronger violence-unpleasant (or peaceful-pleasant) association than a violence-pleasant (or peaceful-unpleasant) association.

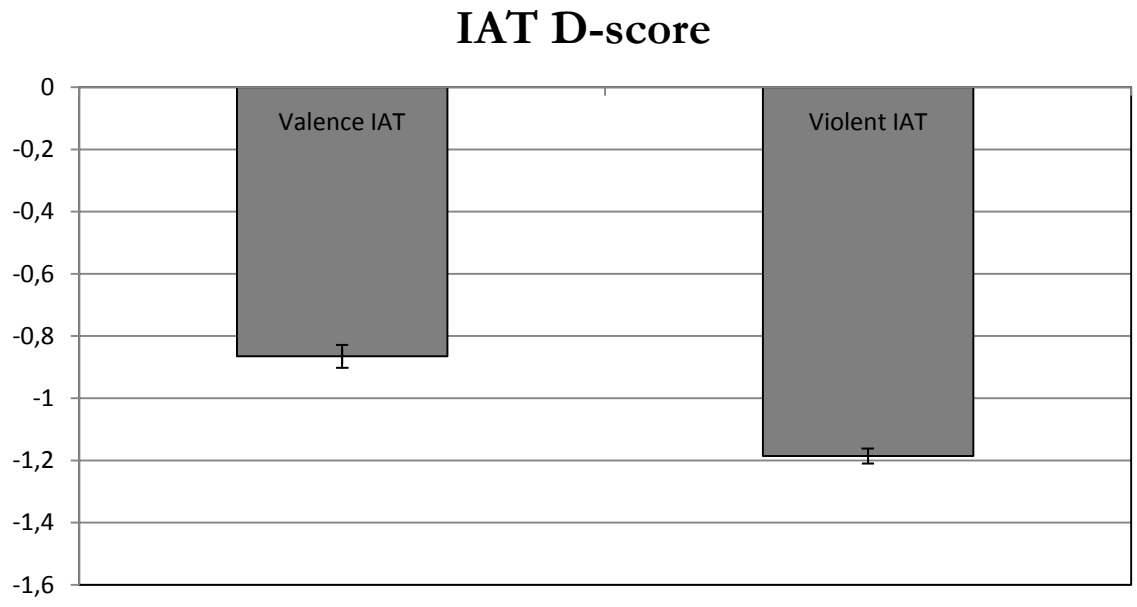

Figure 5. Mean D-scores and standard errors on the standard Valence IAT (flowers-unpleasant / insects-pleasant) and the Violence IAT (violence-pleasant / peace-unpleasant).

Table 5

Diagnoses of patients.

Disorder	*n*
Patients with a personality disorder	82
Antisocial personality disorder	44
Borderline personality disorder	7
Narcissistic personality disorder	4
Personality disorder not otherwise specified with cluster B traits	27
Patients with a chronic psychotic disorder and a personality disorder	18
Patients with a chronic psychotic disorder	5
Patients with a pedophilic disorder	5

Relations between violence-pleasant IAT, psychopathy, and aggression

Table 6 shows the Pearson correlations between the violence-pleasant IAT D-score, on the one hand, and the PCL-R (psychopathy), RPQ (reactive and proactive aggression), and AQ-SF (physical aggression, verbal aggression, anger, and hostility), on the other hand. Only the antisocial factor of the PCL-R (Hare, 2003; Hare & Neumann, 2006) was significantly positively correlated to the IAT D-score (r = .26). Furthermore, the IAT D-score was significantly positively correlated to the hostility subscale of the AQ-SF (r = .24). These results indicate that patients who have more positive implicit attitudes toward violence tend to have higher scores on the antisocial factor of the PCL-R and report higher levels of hostility. No further significant correlations were found between the IAT D-score and measures of aggression (AQ-SF and RPQ).

To determine the unique contribution of implicit associations toward violence in predicting aggressive behavior, a multiple regression analysis was conducted in which the antisocial factor of the PCL-R, which is a measure of the antisocial behavior pattern, was predicted from the IAT D-score and a number of other variables that showed a significant bivariate correlation with this self-report of aggression (p < .10). As shown in Table 7, only RPQ Proactive aggression made a significant contribution to the regression model, whereas the IAT D-score, AQ-SF Total aggression, and RPQ Reactive aggression did not.

Table 6

Pearson correlations between violence-pleasant IAT D-scores and measures of psychopathy and aggression.

Checklist or questionnaire	Factor /Subscale	Violence – Pleasant association	
		n	*r*
PCL-R	Total	99	.09
	Interpersonal	99	.01
	Affective	99	.03
	Lifestyle	99	.05
	Antisocial	99	.26*
RPQ	Reactive aggression	71	.09
	Proactive aggression	71	.07
AQ-SF	Physical	92	.13
	Verbal	92	.04
	Anger	92	.08
	Hostility	92	.24*

Note: PCL-R = Psychopathy Checklist – Revised, RPQ = Reactive Proactive Aggression Questionnaire, AQ-SF = Aggression Questionnaire - Short Form; * $p < .05$ (two-tailed).

Table 7

Main results of the multiple regression analysis predicting antisocial behavior (PCL-R Antisocial factor) from implicit attitudes toward violence (IAT), and self-reported aggression (AQ-SF; RPQ).

Questionnaire	Subscale	*β (SE)*	*p*
IAT	Violent-Pleasant	-.65 (1.24)	.55
AQ-SF	Total aggression	.05 (0.04)	.25
RPQ	Reactive	-.00 (0.11)	.99
	Proactive	1.97 (0.08)	.02

Note: PCL-R = Psychopathy Checklist – Revised, IAT = Implicit Association Test, AQ-SF = Aggression Questionnaire - Short Form, RPQ = Reactive Proactive Questionnaire, $R^2 = 20$.

Relations between IAT-effects and socially adaptive behaviors

Table 8 shows the correlations between the IAT D-score, on the one hand, and the IIS (self-reported social skills), UCL (coping behavior), and SRM-AV (moral awareness), on the other hand. A non-significant negative correlation was found between the IAT D-score and the IIS total score ($r = -.20$, $p = .06$), although the subscale giving someone a compliment ($r = -.26$) was significantly correlated to the IAT D-score. These results suggest that patients who have more negative implicit attitudes toward violence more often display this socially adaptive behavior. For coping behavior, significant correlations were found between the IAT D-score and the active coping subscale ($r = -.38$), the palliative reaction subscale ($r = -.36$), and the reassuring thoughts subscale ($r = -.27$), showing that patients who have more negative implicit attitudes toward violence report to apply these coping behaviors more often. Finally, the IAT D-score was significantly correlated to moral awareness as indexed by the SRM-AV total score ($r = -.40$) and two of its four subscales, namely exhibiting decent behavior to others ($r = -.37$) and being helpful ($r = -.29$). These findings indicate that patients who have more negative implicit attitudes toward violence display higher levels of moral awareness.

Table 8

Pearson correlations between violence-pleasant IAT D-scores and socially adaptive behaviors.

Questionnaire	Subscale	Violence – Pleasant association	
		N	*r*
IIS	Social skills	90	-.20
UCL	Active coping	73	-.38**
	Palliative coping	73	-.36**
	Avoidance	73	-.22
	Social support	73	-.19
	Expression of emotions	73	-.08
	Reassuring thoughts	73	-.27*
SRM-AV	Moral awareness	55	-.40**
	Expecting decent beh.	55	-.23
	Addressing others	55	-.23
	Exhibiting decent beh.	55	-.37**
	Being helpful	55	-.29*

Note: IIS = Inventory of Interpersonal Situations, UCL = Utrecht Coping Scale, SRM-AV = Sociomoral Reflection Measure – Adapted Version, * $p < .05$, ** $p < .01$ (two-tailed).

A multiple regression analysis was conducted to examine the relative contribution of all socially adaptive behaviors that were in the bivariate analysis associated with implicit attitudes toward violence ($p < .10$). As shown in Table 9, this analysis revealed that only UCL active coping and the SRM-AV total score made independent and significant contributions.

Table 9

Main results of the multiple regression analysis predicting implicit attitudes toward violence (IAT) from social behavior (IIS), Coping behaviors (UCL), and Moral awareness (SRM-AV).

Questionnaire	Subscale	*β (SE)*	*p*
IIS	Social behavior	.00 (.00)	.70
UCL	Active coping	-.02 (.01)	.03
	Palliative response	-.01 (.01)	.55
	Reassuring thoughts	-.00 (.02)	.79
SRM-AV	Moral awareness	-.01 (.00)	.02

Note: IIS = Inventory of Interpersonal Situations, UCL = Utrecht Coping Scale, SRM-AV = Sociomoral Reflection Measure – Adapted Version, $R^2 = .30$.

Discussion

The present study assessed implicit attitudes toward violence in a sample of 110 Dutch forensic psychiatric inpatients and their relation with measures of aggression and socially adaptive behaviors. Results showed that, in general, forensic patients had a negative violence-pleasant IAT score, which implies that patients on the whole had negative implicit attitudes toward violence. This is in line with previous studies that applied a violence-related IAT in offender populations (e.g., Eckhardt et al., 2012; Snowden et al., 2004). More positive implicit attitudes toward violence were associated with higher scores on the antisocial factor of psychopathy and self-reported hostility but unrelated to other indices of aggression and psychopathy factors. Furthermore, more negative implicit attitudes toward violence were found to be associated with socially adaptive behaviors, which are thought to inhibit the occurrence of aggression, namely prosocial behavior, positive coping behaviors, and moral awareness.

It was further hypothesized that psychopathy, as measured with the PCL-R (Hare, 1991, 2003) total score, would be related to more positive implicit attitudes toward violence because of deficits in aversive conditioning to aggressive behavior (Blair, 2004). However, in the present

study, the implicit attitudes toward violence were not significantly related to the PCL-R total score. This is not consistent with results obtained in a study of Snowden et al. (2004), who documented a significant relation between the PCL-R and more positive implicit attitudes toward violence. Although these findings may indicate that the relation between psychopathy and relatively positive implicit attitudes toward violence may be less strong than assumed, these inconsistent findings may well have to do with sample differences. That is, the Snowden et al. study observed the link between general psychopathy and positive implicit attitudes toward violence in a subsample of (attempted) murderers, whereas the subsample of (attempted) murderers in the present study was too small to conduct a comparative analysis. Furthermore, most patients in the present study had an antisocial personality disorder or a personality disorder not otherwise specified with antisocial traits. These disorders are often characterized by a lack of remorse (American Psychiatric Association, 2000), which is assumed to be associated with limited aversion to violence (e.g., Gleichgerrcht & Young, 2013).

In the current study, a significant relation did emerge between the PCL-R antisocial factor and the violence-pleasant IAT score. This finding indicates that patients who more clearly displayed an antisocial behavior pattern tended to show more positive implicit attitudes toward violence, which is in line with several other studies that have documented a link between positive attitudes toward violence and the likelihood to display actual violent behavior (Polaschek, Ward, & Hudson, 1997; Slaby & Guerra, 1988). However, a multiple regression analysis showed that self-reported proactive aggression was the only unique predictor of the antisocial factor, whereas the violence-pleasant IAT was not a meaningful addition to this model.

More positive implicit attitudes toward violence were found to be associated with higher levels of self-reported hostility. This relation was anticipated, as attitudes toward violence are assumed to be related to a tendency to focus on hostile aspects of social situations, thereby preparing someone to become aggressive (Dodge, 1993). Furthermore, hostility is typically associated with various aspects of aggression (e.g., Kaufmann, 1970; Smith, 1994; Tanzer, Sim, & Spielberger, 1996). For example, Smith (1994) described hostility as 'a devaluation of the worth and motives of others, an expectation that others are likely sources of wrongdoing, a relational view of being in opposition toward others, and a desire to inflict harm or see others harmed' (p. 26).

In contrast with our expectations, no significant relations were found between implicit attitudes toward violence and self-report measures of aggressive behavior. One explanation for this lack of association could be that the IAT and self-report measures of aggression tap into different processes. The IAT may be more a measure of automatic behavior, whereas a self-

report scale assesses explicit and controlled behavior in situations where behavior is self-regulated (Greenwald et al., 2009; Strack & Deutsch, 2004). Furthermore, as mentioned previously, an alternative explanation might be that self-report questionnaires of aggression are more susceptible to socially desirable response tendencies and depend on the motivation and capacity for introspection (Gannon et al., 2007). Note also that similar results have been found in other studies that explored the relation between the violence-related IAT and self-report instruments of aggression (Polaschek, Bell, Calvert, & Takarangi, 2010; Uhlmann & Swanson, 2004).

Besides psychopathy and aggressive behavior, we also included indices of socially adaptive behavior in our study. Interestingly, more negative implicit attitudes toward violence were related to several positive coping behaviors (UCL) and a heightened frequency giving someone a compliment (IIS). Furthermore, more negative implicit attitudes toward violence were also associated with heightened levels of moral awareness, in particular with the tendency to exhibit decent behavior to others. This relation also makes sense as persons with a more developed sense of morality are more likely to display more negative attitudes toward violence (Funk, Baldacci, Pasold, & Baumgardner, 2004).

The present study suffers from a number of limitations. First, it should be noted that the D-scores were composed of both violence-pleasant and peace-unpleasant associations. Therefore, during the IAT-test, the tendency to consider violence as pleasant seems also to be influenced by one's preference for peace. Second, as the present sample of male forensic psychiatric inpatients participated on a voluntary basis, self-selection bias may have occurred. Therefore, the results may not be fully representative of the total population of forensic psychiatric inpatients in the Netherlands. Third, the sample size was relatively small, so it was not possible to make comparisons between subgroups of patients based on their offense or diagnosis or to make any definitive conclusions. Fourth, not all patients completed all questionnaires, indicating that they were probably not equally motivated or not able to report on the constructs that were assessed this way. Fifth, the relatively large number of correlational analyses may have increased the probability of a type I error to occur. Finally, we did not include an observational measure of aggression (e.g., behavioral observations) but solely relied on self-report.

The results of the present study indicate that implicit attitudes toward violence are less clearly connected to self-reported violent behavior but are more likely linked to socially adaptive behavior that may be preventive of aggressive behavior. Interestingly, the promotion of social skills and morality is often a treatment objective in programs for aggressive offenders (e.g., Goldstein et al., 1998; Hornsveld, 2004a, 2004b; Polaschek, 2006). These results might also have clinical implications, although the correction of such attitudes is often hard to accomplish

(Bohner & Dickel, 2011). Nevertheless, several interventions such as persuasion techniques (Briñol, Petty, & McCaslin, 2009; Tormala, Briñol, & Petty, 2004) and evaluative conditioning (repeated pairing of an attitude object with positive or negative stimuli; Bohner & Dickel, 2011; Olson & Fazio, 2006) have been proposed to be beneficial in changing these implicit attitudes and may eventually have an effect on the onset and persistence of violent behavior, especially in situations when impulses take over and behavior is assumed to be guided by positive implicit attitudes toward violence (Strack & Deutsch, 2004). However, there are also several indications that these treatment methods do not apply to patients with high levels of psychopathy, as they benefit less from aversive conditioning (Flor, Birbaumer, Hermann, Ziegler, & Patrick, 2002), because of impairments of the amygdala (Blair, 2004).

The present study found indications that negative implicit attitudes toward violence are especially related to socially adaptive behaviors and the antisocial factor of psychopathy and hostility. Other relations with self-report measures of anger and aggression were not significant. In order to get more insight in the precise role of implicit attitudes toward violence in the onset and continuation of violent behavior, future studies should be conducted to investigate whether the IAT is prospectively related to aggressive and violent behavior. Further, although several studies have demonstrated the validity of the IAT (e.g., Eckhardt et al., 2012; Nunes, Hermann, & Ratcliffe, 2013), more studies are required to confirm its clinical and diagnostic usefulness.

CHAPTER FOUR

The psychometric properties of the Anger Bodily Sensations Questionnaire (ABSQ)

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Abstract

The Anger Bodily Sensations Questionnaire (ABSQ) is a newly developed self-report instrument for measuring bodily sensations related to anger in interpersonal situations. In this study, we investigated the psychometric properties of the ABSQ in a sample of 70 offenders and a sample of 100 secondary vocational students. Results indicated that the internal consistency and test-retest reliability of the instrument were good. An explorative factor analysis carried out on the ABSQ data of the combined sample yielded three factors. Support was found for the concurrent validity of the instrument. In both samples, the total score of the ABSQ showed positive correlations with measures of bodily awareness, social anxiety, anger, and aggression. Altogether, results suggest that the ABSQ appears to be a reliable and valid questionnaire. Further research is needed to examine the psychometric properties of the ABSQ in larger offender and non-clinical samples.

Introduction

Anger is a regularly experienced emotion that is often accompanied by physiological symptoms, such as changes in heart rate, blood pressure, and muscle tension (Frijda, 1986). According to Frijda (1986), emotions can be considered as action tendencies to achieve needs or solve problems. Therefore, anger is often seen as an emotional response to an alleged injustice, which may mobilize corrective action (Novaco, 1976, 1985). However, when anger levels are high, it may become maladaptive and trigger aggressive behavior (Anderson & Bushman, 2002; Cates & Shontz, 1996). More specifically, high levels of anger can have a detrimental effect on higher cognitive processes which play an important role in regulating impulsive behavior, including reactive aggression (e.g., Tyson, 1998; Zillmann, 1984). Because of the maladaptive effects of anger in (alleged) provocative situations, arousal reduction is often included as one of the core elements of cognitive-behavioral treatment programs for anger and aggression (e.g., Kassinove & Tafrate, 2002; Novaco, 1975, 2003). Arousal management includes cognitive restructuring and relaxation techniques, but in addition focuses on the recognition of bodily sensations which are associated with anger. The ability to adjust the level of arousal by using these skills is often seen as a prerequisite for emotion regulation (Gross, 1998).

While arousal reduction seems to be a standard element of cognitive-behavioral treatment programs for aggressive offenders, several programs are exclusively focused on the management of the physiological responses of anger. Psychomotor therapy (e.g., Boerhout & Van der Weele, 2007), for example, is an experience-based intervention during which aggressive patients first learn to recognize and analyze bodily sensations as part of specific emotions and then are taught how to regulate these emotions in an adequate way. By improving the skills to adequately identify and interpret their bodily sensations at an early stage, patients might learn to use these bodily sensations as 'signals' of anger and aggression, and to subsequently prevent, interrupt or modify their inadequate reactions to (alleged) provocations. Therefore, the early recognition of (changes in) bodily sensations may be essential for controlling anger and may contribute to the prevention of aggressive behavior (e.g., Novaco, 2007; Tyson, 1998).

To evaluate the efficacy of treatment programs for anger such as psychomotor therapy, it is necessary that treatment results are assessed by means of valid and reliable measures. Several instruments are available for assessing different aspects of anger (e.g., Novaco Anger Scale and Provocation Inventory; Novaco, 2003), hostility (e.g., Buss-Durkee Hostility Inventory; Buss & Durkee, 1957), aggression (e.g., Aggression Questionnaire; Buss & Perry, 1992), and coping skills (e.g., Coping Orientations to Problems Experienced Scale; Carver, Scheier, & Weintraub, 1989).

However, to our knowledge, no instrument is available for assessing anger-related bodily sensations. Therefore, the aim of the current study was to develop a reliable and valid self-report questionnaire for assessing bodily sensations that are associated with the emotional state of anger in socially provocative situations, namely the Anger Bodily Sensations Questionnaire (ABSQ).

For the development of the ABSQ, 42 anger-related physiological responses were derived from the literature on emotions (Frijda, 1986; Goleman, 1995; Lorber, 2004; Mauss & Robinson, 2009; Scarpa & Raine, 1997; Tyson, 1998). Several studies have demonstrated that anger is associated with an epinephrine/norepinephrine response (e.g., Schwartz, Weinberger, & Singer, 1981), which peripherally expresses itself in symptoms of increased heart rate (e.g., McCraty, Atkinson, Tiller, Rein, & Watkins, 1995; Min, 2008), increased breathing frequency and breathing amplitude (e.g., Bloch, Lemeignan, & Aguilera, 1991), dyspnoea (shortness of breath; e.g., Winkler et al., 2006), increased perspiration (e.g., Winkler et al., 2006), increased body temperature (e.g., Ekman, Levenson, & Friesen, 1983), and increased muscle tension (e.g., Ax, 1953).

In the present study, the following steps were taken to examine the psychometric properties of the ABSQ. First, the initial set of 42 items was evaluated by three clinical psychologists in terms of readability and ambiguity. Next, a pilot investigation was conducted which led to the removal of unsatisfactory items, after which an exploratory factor analysis was performed. To assess the concurrent validity of this ABSQ, correlations were computed with measures of body awareness, arousal, anger, and aggression. The strongest positive correlations were expected between the ABSQ and measures of body awareness and anxious arousal, because all these measures have in common that they assess awareness of bodily sensations (although in different emotional states; Frijda, 1986). Furthermore, we expected positive correlations between the ABSQ on the one hand, and anger and reactive ("hot-blooded") aggression (Dodge & Coie, 1987; Dodge, Lochman, Harnish, Bates, & Petit, 1997) on the other hand, as these constructs are thought to be associated with high levels of physiological arousal (e.g., Schore, 2003). Negative correlations were expected with proactive ("cold-blooded") aggression (Dodge & Coie, 1987), and with psychopathy, a construct which is typically characterized by deficient affective functioning (Hare, 1991, 2003). More specifically, we expected the ABSQ to be negatively correlated to primary psychopathy (Karpman, 1941), and not to secondary psychopathy, because of its exclusive association with reduced autonomic activation (Hansen, Johnsen, Thornton, Waage, & Thayer, 2007; Hare, 2003) and attenuated sensitivity to bodily sensations (Gao et al., 2012; Nentjes et al., 2013).

We performed our study in a sample of violent offenders and a sample of secondary vocational students. Therefore, it became possible to study differences between both samples in ABSQ scores and their relations to measures of anger and aggressive behavior. No hypotheses were formulated regarding the differences between both samples, because this part of the research was explorative in nature.

Method

Participants

The study was carried out in a sample of 70 offenders, who were "detained under hospital order" for a serious violent offense (e.g., murder, manslaughter, aggravated assault, or rape). "Detained under hospital order" means that the court has established a relation between a psychiatric disorder on the one hand and the committed offense on the other hand (e.g., Van Marle, 2002). Rulings are based on an extensive psychiatric and psychological evaluation in a special forensic assessment center, in which the offender had to stay for observation by order of the court. The offenders stayed in Forensic Psychiatric Center De Kijvelanden (in the vicinity of Rotterdam, The Netherlands) and participated in the current study between January 2011 and September 2012. Their mean age was 37.03 years (SD = 9.22; range = 21-57 years), which was somewhat younger than the total population of offenders "detained under hospital order" in the Netherlands (M = 41 years; Van Gemmert & Van Schijndel, 2011), $t(69) = 3.60$, $p < .01$. The primary diagnosis of the offenders was a cluster B personality disorder on Axis II of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; American Psychiatric Association, 1994). The offenders did not have a psychotic disorder on Axis I of the DSM-IV-TR.

Besides the offenders, 100 secondary vocational students also participated in the study. Their mean age was 19.22 years (SD = 1.99 years, range = 16-26 years). In the Netherlands, secondary vocational education can be followed after elementary school and concerns education for trades such as carpenter, housepainter, electrician, or administrative assistant.

All participants in the study were male and had sufficient command of the Dutch language in speech and in writing. The students were significantly younger than the offenders [$t(168) = 15.58$, $p < .01$].

Measures

The *Anger Bodily Sensations Questionnaire (*ABSQ; see Table 10), which was designed for the purpose of this study, measures specific bodily sensations as part of an anger reaction to an (alleged) provocation. The initial pilot version of the ABSQ consisted of 42 items which refer to the same anger-provoking situation, namely becoming tense because of someone else. The general introduction is stated on top of the form:

> *Everybody can become tense as the result of the behavior of someone else, such as during an argument. This questionnaire contains several statements about your bodily reactions when you become angry in such a situation. Each statement is followed by a 5-point scale ranging from "Not at all" to "Very much". You have to answer to what degree you generally experience these bodily sensations during situations when you become angry with another person. You may only choose one answer for each statement.*

Every ABSQ item begins with "When I get tense because of somebody, …" and is followed by a specific physiological response, e.g., "I notice that my heart starts beating faster". The participant has to answer to what degree the physiological response is experienced during an anger-provoking social situation on a Likert scale with 1 = "Not at all", 2 = "A little", 3 = "Somewhat", 4 = "Much", and 5 = "Very much".

The initial pool of 42 ABSQ items was evaluated by three clinical psychologists in terms of readability and ambiguity. This procedure resulted in the elimination of 10 items thus leaving 32 items for the pilot version of the ABSQ.

Table 10

The 18-item version of the ABSQ 1: Mean item scores and standard deviations in the offender and student samples, and factor loadings of various items for the three factor solution.

	Offenders (n = 70)		*Students (n = 100)*		*Factor loadings (N = 170)*		
Description	*M*	*SD*	*M*	*SD*	1	2	3
8. I notice that my head feels warmer	2.16	1.14	2.23	1.29	**.83**	-.20	.22
9. I notice that I start breathing faster	1.97	0.88	2.07	1.15	**.82**	-.11	.13
14. I notice that my heart starts beating harder	2.11	1.08	2.19	1.27	**.81**	.01	.01
13. I notice that my body becomes warmer	1.99	1.03	2.03	1.18	**.80**	.07	-.08

Table 10

(Continued)

Description	*Offenders (n = 70)*		*Students (n = 100)*		*Factor loadings (N = 170)*		
	M	*SD*	*M*	*SD*	1	2	3
10. I notice that I start to sweat more	1.94	0.98	1.82	1.10	**.74**	.17	-.24
1. I feel my heart starts beating faster	2.20	0.88	2.31	1.01	**.70**	-.01	.02
5. I notice that my breathing becomes irregular	1.99	1.03	2.02	1.11	**.59**	.18	.02
16. I notice that I start breathing deeper	1.71	0.80	1.86	1.03	**.51**	.15	.08
2. I notice that my hands are starting to sweat more	1.94	1.06	2.05	1.12	**.50**	.37	-.06
4. I get light-headed	1.53	0.81	1.44	0.88	-.06	**.69**	.20
17. I notice that I get a dry mouth	1.71	0.80	1.68	0.94	.03	**.68**	.06
12. I notice that my hands start shaking	1.90	1.12	1.69	0.97	.11	**.65**	-.01
3. I notice that my body freezes	1.73	0.95	1.41	0.74	.14	**.64**	-.26
6. I notice that my body starts shaking	2.03	1.10	1.66	0.92	.36	.44	.12
18. I notice that I clench my fists	1.96	1.26	2.16	1.30	.03	.01	**.85**
7. I notice that I get an adrenaline kick	2.43	1.20	2.63	1.39	.29	.06	**.60**
15. I notice that my jaw muscles become tensioned	1.76	0.84	1.76	1.12	-.03	.49	.50
11. I notice that my muscles become tensioned	2.41	1.07	2.00	1.01	.38	.10	.47

Note: ABSQ = Anger Bodily Sensations Questionnaire. The items with factor loadings in bold are included in the factor structure. Items with factor loadings ≥ .30 on two or more factors were removed from the corresponding factors.

The *Body Sensations Questionnaire* (BSQ; Chambless, Caputo, Bright, & Gallagher, 1984; Dutch version: Arrindell, 1993) assesses fear of bodily sensations in situations in which people are aroused or afraid. The questionnaire contains 17 items which have to be scored on a 5-point Likert scale ranging from 1 = "Not frightened or worried by this sensation" to 5 = "Very much frightened by this sensation". A study on the psychometric properties of the BSQ (Chambless et al., 1984) demonstrated an internal consistency (Cronbach's *a*) of .87 and a test-retest reliability of .67. Validity was demonstrated by correlations with measures of avoidance behavior, panic and depression. In the current study, the internal consistency (Cronbach's *a*) of the total BSQ was .91 in the offender sample.

The *Inventory of Interpersonal Situations* (IIS; Van Dam-Baggen & Kraaimaat, 1999) assesses how much anxiety people experience during social interactions (i.e., social anxiety) and how often they are able to actually perform the described behavior in such situations (i.e., social skills). The anxiety questions have to be answered on a 5-point Likert scale ranging from 1 = "No discomfort" to 5 = "Very much discomfort". In the present study, only the social anxiety scale was used, which produced a good internal consistency coefficient (Cronbach's a = .95) in the offender sample and .96 in the student sample. This is in line with a previous psychometric evaluation by Van Dam-Baggen and Kraaimaat (1999) who also demonstrated good internal consistency (Cronbach's a = .93) as well as good test-retest reliability (r = .84) of the IIS Social anxiety scale.

The trait scale of the *State-Trait Anger Scale* (STAS; Spielberger, 1980; Dutch version: Van der Ploeg, Defares, & Spielberger, 1982) was used to measure the general disposition of anger. Participants have to rate each item using a 4-point Likert scale: 1 = "Almost never", 2 = "Sometimes", 3 = "Often", and 4 = "Almost always". In a group of 150 Dutch male university students, Van der Ploeg et al. (1982) found good internal consistency (Cronbach's a = .86) and good test-retest reliability (r = .78). In the current study, Cronbach's alphas of the STAS were .96 for the offenders and .88 for the students.

The *Aggression Questionnaire-Short Form* (AQ-SF; Bryant & Smith, 2001; Dutch version: Hornsveld et al., 2009) is a shortened version of the Aggression Questionnaire of Buss and Perry (1992; Dutch version: Meesters, Muris, Bosma, Schouten, & Beuving, 1996) which contains 12 items that can be allocated to four subscales, i.e., Physical Aggression, Verbal Aggression, Anger, and Hostility. Respondents have to rate the items using a 5-point scale ranging from 1 = "Entirely disagree" to 5 = "Entirely agree". In the current study, we employed the total score of the AQ-SF and the Anger subscale, which both demonstrated good reliability in both samples (all Cronbach's α's between .76 and .89).

The *Reactive-Proactive Aggression Questionnaire* (RPQ; Raine, Dodge, Loeber, Gatzke-Kopp, Lynam, Reynolds, Stouthamer-Loeber, & Liu, 2006; Dutch version: Cima et al., 2013) is a self-report questionnaire to assess reactive and proactive aggression. The RPQ consists of 23 items, with 11 items measuring reactive aggression and 12 items assessing proactive aggression. Respondents are instructed to rate for each item how often they exhibited this behavior in the past using a 3-point scale with 0 = "Never", 1 = "Sometimes", and 2 = "Often". Cima and colleagues (2013) found good internal consistency coefficients for the reactive subscale (Cronbach's a = .83) and the proactive subscale (Cronbach's a = .87). In the current study, similar reliability coefficients were obtained (all Cronbach's alphas between .81 and .88).

The *Psychopathy Checklist-Revised* (PCL-R; Hare, 1991, 2003; Dutch version: Vertommen et al., 2002) is a checklist to assess the level of psychopathy. The checklist consists of 20 items, which have to be rated on a three-point scale with 0 = "does not apply," 1 = "applies to some extent," and 2 = "applies". Vertommen and colleagues (2002) found support for the reliability of the Dutch version of the PCL-R in a group of 1,192 inmates. Internal consistency (Cronbach's *a*) was .87 and the average inter-item correlation was .25. In the present study we used the total score as well as the four-factor structure as proposed by Hare (Hare, 2003; Hare & Neumann, 2006), which implies the following factors: interpersonal, affective, lifestyle, and antisocial. The interpersonal and affective factors can be considered most indicative of primary psychopathy, whereas the lifestyle and antisocial factors are most indicative of secondary psychopathy (Levenson, Kiehl, & Fitzpatrick, 1995).

Procedure

The current study was approved by the scientific research committee of FPC De Kijvelanden. All offenders were individually approached on their wards by a research assistant. They received an informed consent letter in which they were explicitly told that cooperation was on a voluntary basis and that the test results would not have any influence on their clinical evaluation or treatment as these were processed anonymously. Participation was rewarded with a monetary compensation of 10 Euros. The ABSQ was completed for a second time after one week in order to assess test-retest reliability.

The secondary vocational students were recruited on a college in Rotterdam. These participants received information about the study one week prior to the day of the data collection by means of an informed consent letter, in which it was clearly stated that participation was on a voluntary basis and that participation would be rewarded with 10 Euros. One week later, students who agreed to participate in the study completed a similar set of questionnaires as the patients (except for the BSQ and the PCL-R, which were only obtained in the offender sample) in specially organized classes.

Statistical analysis

All analyses were carried out using the Statistical Package for the Social Sciences (SPSS), version 20.0, including AMOS, version 18.0 (Arbuckle, 2009). Descriptive statistics were calculated to investigate the distribution of the ABSQ item scores. Pearson correlations were computed to assess the test-retest reliability of the ABSQ total and item scores and to examine the relations between the ABSQ and other measures in the offenders sample and the student sample separately. To explore the factor structure of the ABSQ, an explorative factor analysis (EFA) was carried out using a direct oblimin rotation, as factors were expected to be correlated. Furthermore, a confirmative factor analysis (CFA) was performed to test the fit of the obtained factor model. Goodness of fit was evaluated by means of the Comparative Fit Index (CFI; Bentler, 1990), the Root Mean Square Error of Approximation (RMSEA; Browne & Cudeck, 1993), and the Standardized Root Mean Square Residual (SRMR). CFI values ≥ .90, RMSEA values ≤ .08, and SRMR values < .08 can be considered as indicators for an acceptable fit (Hoyle, 1995; Hu & Bentler, 1999). Because the offender sample size was too small (n = 70) in order to conduct a factor analysis, EFA and CFA were performed in the combined sample of offenders and students (N = 170).

Finally, analyses of covariance (ANCOVAs), in which age was included as the covariate, were conducted to compare the sample of offenders with the sample of students on the ABSQ and other scales. As several offenders refused to complete all questionnaires according to the instructions, the number of participants varied per questionnaire.

Results

Scale development and factor structure

The item pool of the ABSQ version with 32 items was refined by selecting items that were normally distributed (i.e., skewness and kurtosis values between -2 and +2) and displayed sufficient one-week test-retest reliability. Based on the skewness and kurtosis statistics within the sample of offenders (n = 70), 13 items were removed. A total of 60 offenders (85.7%) completed the ABSQ for a second time after a period of one week. One item did not meet the criteria for a moderate to good test-retest reliability (Pearson's r < .40) and was also removed. Consequently, the definitive version of the ABSQ comprised 18 items.

To explore the factor structure of the ABSQ, an EFA was conducted (direct oblimin rotation) using the data from the combined sample of 70 offenders and 100 students. This analysis yielded a three factor solution (see Table 10). Four items had a factor loading ≥ .30 on two or more factors and were therefore removed from the corresponding factors, but not from the total score. Factor 1 contained eight items about changes related to respiration (four items), body heat (two items), transpiration (one item) and heart beat (one item). Factor 2 contained four items about physical responses related to a light-headed feeling (one item), a dry mouth (one item), and shaking and freezing of the body (two items). Factor 3 contained two items about changes in muscle tension (one item) and adrenaline (one item). A CFA of 14 items, which was performed in the combined sample of offenders and students (N = 170), indicated that the model fit was acceptable with a CFI of .93, a RMSEA of .08 (CI^{90} = .06 - .09), and a SRMR of .05. The item-to-factor loadings were all significant and varied from .57 to .86 (see Figure 6).

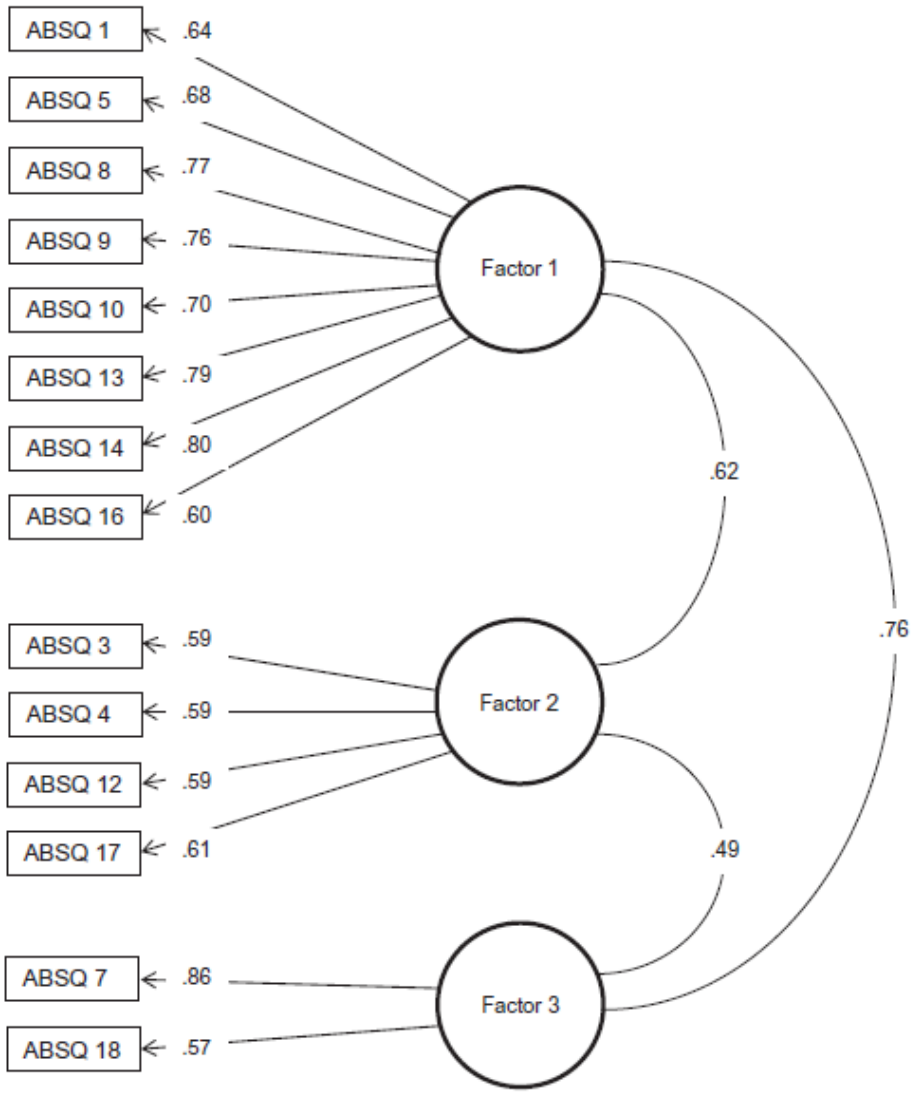

Figure 6. Factor structure of the ABSQ factor loadings.

Internal consistency and test-retest reliability

The internal consistency (Cronbach's α) of the total ABSQ (18 items) was .93 for the offenders and .91 for the students. The total score of the ABSQ also had a good test-retest reliability within the offender sample [r (60) = .82]. For the offenders, the three factors had acceptable to high internal consistency (.90, .67, and .73, respectively) and moderate to high test-retest reliability (.84, .67, and .81, respectively). For the students, the three factors had acceptable to high internal consistency (.90, .68, and .61, respectively).

Relations to other constructs (concurrent validity)

The concurrent validity of the ABSQ was first of all examined by relating the total score to an instrument for measuring awareness of bodily sensations, namely the BSQ (this was only done in the offender sample). Although the ABSQ and the BSQ are both related to bodily sensations, they only have two items in common (i.e., "Pressure on the chest" and "Starting to sweat more"). As expected, a positive correlation between the ABSQ and BSQ total score was documented (see Table 11). Similar results were found for the correlations among the ABSQ factor scores and the BSQ total score.

Furthermore, it was hypothesized that the ABSQ would be positively related to a measure of social anxiety (IIS), as both questionnaires are related to experienced emotional arousal during a social situation. Indeed, the expected positive correlation between the ABSQ and IIS total scores was found for the offenders as well as for the students. The ABSQ factor scores and the IIS total score were also significantly and positively correlated in the offender sample, whereas only factor 1 and factor 2 of the ABSQ were significantly and positively correlated to the IIS in the student sample.

The ABSQ total score was also significantly and positively correlated to trait anger as measured with the STAS for both offenders and students. The expected positive correlation between the ABSQ total score and anger, as measured with a subscale of the AQ-SF, was also confirmed for the offenders and the students. Furthermore, the ABSQ total score was significantly and positively correlated to aggressive behavior in general, as measured with the total score of AQ-SF, for both offenders and students. The ABSQ total score displayed also significant and positive correlations with RPQ reactive aggression for the offenders and the students, while the correlations with proactive aggression were non-significant for both offenders and students.

In contrast to our expectations, there were no significant correlations between the ABSQ total score and the PCL-R total or factor scores, although all correlations were in the

expected negative direction. Similar correlations were found between the ABSQ factors and the PCL-R.

Table 11

Pearson correlations between ABSQ scales and other measures in the samples of forensic offenders and vocational students.

		Offenders (n = 70)					*Students (n =100)*				
Measure	Scales	*n*	*Total*	*F1*	*F2*	*F3*	*n*	*Total*	*F1*	*F2*	*F3*
BSQ†	Bodily sens.	69	.59**	.58**	.51**	.42**					
IIS	Anxiety	61	.45**	.46**	.56**	.57**	100	.45**	.38**	.51**	.17
STAS	Trait anger	64	.30*	.22	.14	.48**	100	.40**	.31**	.23*	.41**
AQ-SF	Total score	67	.39**	.26*	.23	.60**	100	.27**	.18	.12	.43**
	Anger	67	.38**	.24*	.23	.60**	100	.23*	.12	.14	.41**
RPQ	Reactive	61	.27*	.18	.17	.46**	100	.22*	.12	.11	.37**
	Proactive	61	-.06	-.14	-.15	-.26*	100	.07	-.02	.01	.32**
PCL-R†	Total score	62	-.17	-.22	-.16	.05					
	Interpers.	62	-.12	-.16	-.11	.04					
	Affective	62	-.16	-.19	-.13	.01					
	Lifestyle	62	-.04	-.07	-.05	.10					
	Antisocial	62	-.17	-.22	-.14	.10					

Note: ABSQ = Anger Bodily Sensations Questionnaire, F1: Factor 1, F2: Factor 2, F3: Factor 3, BSQ = Body Sensations Questionnaire, IIS = Inventory of Interpersonal Situations, STAS = State-Trait Anger Scale, AQ-SF = Aggression Questionnaire Short Form, RPQ = Reactive Proactive Questionnaire, PCL-R = Psychopathy Checklist-Revised; * $p < .05$; ** $p < .01$ (two-tailed). † The BSQ and PCL-R were not completed in the student population.

Offenders versus students

Table 12 shows the mean scores (and standard deviations) on all instruments for the offenders and the students. For the ABSQ, no significant differences were found between the two samples with regard to the total score, factor 1, and factor 3. However, offenders had a significantly higher score on the factor 2. Note also that the offenders had significantly higher scores on STAS trait anger, RPQ reactive aggression, and RPQ proactive aggression. No significant differences between both samples were found regarding social anxiety (IIS), aggression (AQ-SF), and anger (AQ-SF).

Table 12

Mean scores (standard deviations) on the ABSQ scales and various other measures in the samples of forensic offenders and vocational students.

		Offenders (n = 70)			Students (n = 100)			ANCOVA	
Measure	Subscale	n	M	SD	n	M	SD		
ABSQ	Total score	70	35.47	12.30	100	35.01	12.54	F (2,163) =	00.90
	Factor 1	70	16.07	5.99	100	16.53	6.92	F (2,163) =	00.35
	Factor 2	70	6.87	2.64	100	6.22	2.54	F (2,163) =	04.01*
	Factor 3	70	4.39	2.18	100	4.79	2.28	F (2,163) =	00.71
BSQ†	Bodily s.	69	31.26	12.09					
IIS	Anxiety	61	62.28	19.66	100	65.75	23.00	F (2,158) =	00.60
STAS	Tr. anger	64	19.75	7.93	100	17.83	5.93	F (2,157) =	04.98*
AQ-SF	Total	67	30.10	9.80	100	26.42	9.67	F (2,160) =	01.60
	Anger	67	7.28	3.07	100	6.66	3.41	F (2,160) =	00.38
RPQ	Reactive	61	23.70	4.13	100	20.60	4.89	F (2,154) =	10.19**
	Proactive	61	20.18	5.58	100	16.33	3.74	F (2,154) =	12.45**
PCL-R†	Total	62	23.05	8.15					
	Interpers.	62	3.61	2.57					
	Affective	62	5.08	2.03					
	Lifestyle	62	4.61	1.83					
	Antisocial	62	6.45	2.48					

Note: ABSQ = Anger Bodily Sensations Questionnaire, BSQ = Body Sensations Questionnaire, IIS = Inventory of Interpersonal Situations, STAS = State-Trait Anger Scale, AQ-SF = Aggression Questionnaire Short Form, RPQ = Reactive Proactive Questionnaire, PCL-R = Psychopathy Checklist-Revised; * $p < .05$; ** $p < .01$ (two-tailed). † The BSQ and the PCL-R were not completed in the student population.

Discussion

The ABSQ was specifically developed for the assessment of the awareness of physical responses during anger, using a sample of 70 violent offenders and a sample of 100 secondary vocational students. The initial version of the instrument contained 42 items describing different forms of bodily sensations that can be experienced during anger-eliciting social situations. Ten items were removed following a readability and ambiguity check by three clinical psychologists, leaving 32 items for the pilot version of the ABSQ. Because of a skewed distribution or moderate test-retest reliability, 14 further items were removed from the questionnaire, yielding a final instrument of 18 items. An explorative factor analysis revealed three provisional factors. Internal consistency

and test-retest reliability of the questionnaire were modest to good. An exploration of the concurrent validity, which was not only conducted in the offender sample but also in a sample of secondary vocational students, revealed significant positive correlations with the BSQ, which measures fear of bodily sensations during anxiety, and the IIS, which measures social anxiety. Although individual physiological response patterns to anxiety and anger provoking situations differ to some extent, there is quite some overlap with respect to somatic symptoms (e.g., Frijda, 1986). However, while the ability to identify bodily sensations might be equal for various emotions, it should also be noted that the bodily sensations might be interpreted in a different way for each type of emotion (Nemiah, Freyberger, & Sifneos, 1976). In addition, there are indications that these different interpretations are related to the context in which these emotions are experienced (e.g., Stemmler, Heldmann, Pauls, & Scherer, 2001). All in all, these results seem to support the ability of the ABSQ to assess bodily sensations which are associated with the emotional response of anger.

As expected, the ABSQ total score was also positively correlated to indices of anger and aggression, and this appeared true for offenders as well as students. Moreover, the expected significant positive correlation between the ABSQ and reactive aggression was found in both samples, whereas no significant associations with proactive aggression emerged. Although the expected negative relationship between the ABSQ and proactive aggression was not found, these findings are largely in line with earlier studies (e.g., Blair, 2003; Houston, Stanford, Villemarette-Pittman, Conklin, & Helfritz, 2003; Scarpa & Raine, 1997, 2000). It can be concluded that autonomic arousal is mainly present in individuals who exhibit reactive aggression and minimal in persons who display proactive aggression, and this can be taken as support for the convergent and divergent validity of the ABSQ. The hypothesized (negative) relation with psychopathy, as measured with the PCL-R in the offender sample, was not substantiated by the data. That is, correlations between ABSQ and the PCL-R scores were all non-significant (even those between ABSQ and PCL-R factors assessing primary psychopathy). Yet, the sample size was fairly small and therefore further exploration of the relation between psychopathy and its factors and the ABSQ in larger samples is recommended.

Offenders and students did not substantially differ from each other on the total ABSQ score. Offenders only scored higher on one of the three ABSQ factors. However, the reliability of this finding has to be corroborated in other and larger samples. Notwithstanding this, an explanation with respect to the present findings might be the rather heterogeneous samples of offenders, including both reactive and proactive offenders. For offenders who primarily display reactive aggression, relatively low scores on the ABSQ may be indicative for a low level of

awareness of bodily sensations during anger. Furthermore, these patients may be inclined to display an aggressive response pattern during anger. Therefore, for these offenders, the focus of anger therapy should not only be on improving awareness of bodily sensations and their interpretation, but also on teaching them more adaptive response patterns during anger.

The current study has several limitations. First, as mentioned before, the two investigated samples had a relatively small sample size. To further examine psychometric qualities of the ABSQ, a larger sample is needed. A second limitation is that not all offenders who were approached for the study actually participated. This might have resulted in a selection of offenders who were more cooperative than the offenders who refused. Third, all concurrent validity measures were based on self-report. Therefore, it remains unclear to what extent the parameters of physiological arousal and the awareness of specific bodily sensations are related. Research using the ABSQ in combination with psychophysiological assessments (e.g., skin conductance reactivity or heart rate reactivity) in conflict situations (e.g., Gottman et al., 1995) might shed more light on this relationship. Fourth, discriminant validity was not addressed, although no significant correlations were found with proactive aggression which can be considered as a form of aggression with minimal physiological activation (Scarpa & Raine, 1997). Fifth, the factor analysis was conducted in a combined sample of 70 offenders and 100 vocational students, whereas it would be preferable to conduct such analysis in the separate samples. However, due to the limited number of participants, this was not possible in the current study. Finally, two ABSQ factors had only moderate alpha coefficients. However, it should be noted that the results of the factor analysis were preliminary and therefore need to be interpreted with caution. It remains unclear whether factors can be regarded as subscales and hence should receive labels. More research in larger and more homogeneous samples of offenders is certainly needed.

In our opinion the ABSQ might have the potential for being useful during the diagnostic process as well as for the evaluation of treatment outcome. Relatively high scores on the ABSQ might indicate that treatment should include strategies to lower physiological arousal or activation and to improve emotion regulation skills, especially in individuals who display reactive aggressive behavior (Lochman & Wells, 2004). The regulation of emotions to a more optimal level can result in a better appraisal and a more socially acceptable response (Anderson & Bushman, 2002; Gross, 1998), and is therefore often included in cognitive behavioral treatment programs for aggressive offenders (e.g., Kassinove & Tafrate, 2002; Novaco, 1975, 1994). On the other hand, relatively low scores on the ABSQ might indicate under awareness, denial, or even an absence of physical sensations during anger-eliciting social situations, and may also be an indication for the presence of alexithymia which is a personality construct that includes the

difficulty to identify and distinguish between feelings and bodily sensations of emotional arousal (Nemiah et al., 1976). Furthermore, scores on the ABSQ may provide information about the nature of an offenders' aggressive behavior. In contrast to reactive aggression (e.g., Schore, 2003), proactive aggression is characterized by the absence of heightened levels of autonomic arousal (Scarpa & Raine, 1997). As described in Damasio's somatic marker hypothesis (Damasio, 1996), bodily sensations may have an important function in guiding decision-making. According to this theory, persons who have attenuated sensitivity to bodily sensations may not be warned by their somatic markers when they are about to exhibit risky behaviors, like aggressive behavior. Therefore, unlike offenders whose aggressive behavior is preceded by elevated levels of emotions, the focus of the treatment of these so-called "cold-blooded" offenders (Dodge et al., 1997) should rather be on changing the expectation of positive outcomes of aggression in the long term than on emotion regulation. In spite of the shortcomings, it can be concluded that the first results of the psychometric properties of the ABSQ are promising and that this instrument provides a useful tool for measuring anger-related bodily sensations.

CHAPTER FIVE

Psychomotor therapy as an additive intervention for violent forensic psychiatric inpatients: a pilot study

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Abstract

The first results of psychomotor therapy (PMT) as an additional component to Aggression Replacement Training (ART) were explored in a group of forensic psychiatric inpatients (*N* = 37). Patients were divided into two groups: ART+PMT (experimental group) and ART+Sports (control group). Primary outcome measures of aggression, anger, and social behavior, and secondary outcome measures of coping behavior and bodily awareness during anger were administered on three occasions: pre-treatment, post-treatment (after 35 sessions), and follow-up (15 weeks after the final session). The combined group (experimental and control group) showed clinically significant improvements on observed social behavior, observed aggressive behavior and self-reported anger, but there were no differences in treatment effects between the experimental group and the control group on these primary outcome measures. However, on secondary outcome measures of bodily awareness during anger and coping behavior, the experimental group displayed somewhat more improvement than the control group. Altogether, the results of this pilot study indicate that the addition of PMT to a treatment program for violent forensic inpatients may indeed result in improvements on specific treatment goals of PMT, whereas its effects on aggressive behavior needs further examination.

Introduction

Several treatment programs for forensic psychiatric inpatients with a personality disorder as their main diagnosis have yielded promising results (Bernstein, Nijman, Karos, Keulen-De Vos, & Lucker, 2012; Hornsveld, 2004a). Most of the interventions that appear to be beneficial for aggressive forensic inpatients include cognitive behavioral techniques (CBT; e.g., Lipsey, Landenberger, & Wilson, 2007; Lipton, Pearson, Cleland, & Yee, 2003). In the Netherlands, a special intervention has been developed for Dutch forensic psychiatric inpatients, which is largely based on the Aggression Replacement Training of Goldstein, Glick, and Gibbs (1998). This intervention comprises seven modules of five weekly sessions each, namely Anger management, Social skills, Moral reasoning, Prosocial thinking, Character formation, Prosocial network, and Attitudes towards women (Hornsveld, 2004a; Hornsveld, Soe-Agnie, Donker, & Van der Wal, 2008). The main objectives of this inpatient version of ART are that patients become more aware of their dysfunctional emotions, cognitions, and overt behaviors, and that they learn to alter their behavior in such a way that they can achieve their goals in a socially acceptable way. A study on the effects of the ART-version that only included the first three modules indicated that ART indeed produces positive results in both forensic psychiatric in- and outpatients (Hornsveld, Nijman, & Kraaimaat, 2008), although the authors also note that programs such as ART preferably should be a part of a more intensive intervention program that also targets other criminogenic factors.

Frequently applied additive interventions to CBT programs for violent offenders are arts therapies (Smeijsters & Cleven, 2006), such as music therapy (Hakvoort & Bogaerts, 2013), drama therapy (Thompson, 1999), and creative therapy (Bennink, Gussak, & Skowran, 2003). Another commonly indicated intervention for violent offenders is psychomotor therapy (PMT), which is an experience-based intervention during which patients learn to gain more control over their anger to prevent them from engaging in aggressive behavior (e.g., Boerhout & Van der Weele, 2007; Langstraat, Van der Maas, & Hekking, 2011). Whereas cognitive-behavioral interventions focus on cognitive change and the improvement of social skills to prevent aggression, the main target of PMT for violent offenders is the physiological component of anger. A high level of anger-related arousal is considered to be a determinant of (impulsive) aggressive behavior because of its undermining effect on cognitive control processes (Kahneman, 2003; Olson & Fazio, 2009; Strack & Deutsch, 2004; Tyson, 1998). When patients are able to recognize bodily sensations as a component of anger and learn to deal effectively with these symptoms, they may gain more control over this emotion (e.g., Novaco, 2007; Tyson, 1998) and

for this reason PMT has been proposed as a viable intervention for aggressive behavior (e.g., Langstraat et al., 2011; Zwets, Hornsveld, Kraaimaat, Kanters, Muris, & Van Marle, 2014).

The goal of the present study was to explore the results of PMT as an additive intervention for violent forensic psychiatric inpatients with a personality disorder who received ART. While ART focused on aggression-related cognition and behavior using a variety of generic CBT techniques, the main objective of PMT was to improve emotion regulation skills (bodily awareness during anger and coping behavior). Participants were randomly assigned to two groups: an experimental group that received ART+PMT or a control group that received ART+a placebo intervention that also focused on physical activity, namely Sports. So far, controlled studies on the treatment effects of PMT on aggressive behavior are sparse (e.g., Boerhout & Van der Weele, 2007; Langstraat et al., 2011) and most of these studies have only included primary outcome measures of anger or aggression. In the present study, secondary outcome measures for the evaluation of specific PMT treatment goals (i.e., recognition of bodily sensations during anger and improvement of coping skills) were also included. Because the present study only included a relatively small number of patients, which in addition were divided in two treatment groups, its statistical power was rather limited. Therefore, treatment effects were evaluated by the minimum clinically important difference (MCID) method (Jaeschke, Singer, & Guyatt, 1989), which provides a threshold for the smallest difference that can be regarded as a clinically meaningful change as compared to the pre-treatment assessment (Lee, Whitehead, Jacques, & Julious, 2014).

It was hypothesized that both groups (ART+PMT and ART+Sports) would show a decrease in anger and aggression and an increase of prosocial behavior, with the ART+PMT group exhibiting more improvements than the ART+Sports group on measures related to the specific goals of PMT, namely bodily awareness during anger and adaptive coping skills. Meanwhile, it should be kept in mind that although treatment programs for violent offenders often produce positive results, effect sizes are often fairly small (Dowden & Andrews, 2000; McGuire, 2013) and that this is particularly true for offenders with a personality disorder as their main diagnosis (e.g., Derks, 1996; Timmermans & Emmelkamp, 2005).

Since various studies have indicated that psychopathy (Hare, 1991) is associated with poor treatment outcome (e.g., Harris & Rice, 2006; Hemphill & Hart, 2002; Stokes, Dixon, & Beech, 2009; Olver, Stockdale, & Wormith, 2011), it was also explored whether psychopathy would be associated with a higher dropout rate. This is especially relevant within the context of the present study, because research has shown that psychopathy is related to deficits in the experience of emotions (e.g., Gao, Raine, & Schug, 2012; Nentjes, Meijer, Bernstein, Arntz, & Medendorp, 2013).

Method

Setting

The present study was conducted at Forensic Psychiatric Center "De Kijvelanden", a facility with 178 beds in Poortugaal, the Netherlands. The patient-staff ratio is 1-1.8. Patients are accommodated on high-security wards for seven to fourteen patients. During a period of approximately four months after admission, the patients' behaviors are observed on the ward, psychiatric and psychological evaluations are carried out, and a treatment plan is established. Depending on their dynamic criminogenic needs, patients receive specialized treatment programs (mostly cognitive-behavioral in nature) that focus on (sexual) violence (Hornsveld & Kanters, 2015; Hornsveld, Soe-Agnie et al., 2008), addiction, or chronic psychotic disorders (Liberman, Wallace, & Blackwell, 1994). When indicated, they also follow additional treatment programs such as creative art therapy, and/or general education and occupational training. Pharmacotherapy is applied to patients with a psychotic disorder and to personality-disordered patients for whom it is indicated and who do not refuse medication.

Participants

In the Netherlands, offenders who have committed a crime that is punishable with a maximum imprisonment of more than four years (e.g., murder, manslaughter, aggravated assault, or rape) can be detained under TBS order. It concerns offenders who, based on an extensive psychiatric and/or psychological evaluation at a special assessment center of the Ministry of Security and Justice, are judged to have diminished responsibility for the offense that they have committed (Van Marle, 2002). The current study included 37 male inpatients who were detained under TBS order because they had committed a severe violent offense. All of them were assigned to an ART intervention to reduce aggressive behavior. Patients with a psychotic disorder and patients with intellectual disabilities (IQ < 80) were excluded. These patients were offered an alternative program. In the current study, most patients met the criteria of an Axis II personality disorder as defined in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; American Psychiatric Association, 2000). Twenty two of them (59.5%) had an antisocial personality disorder, 11 (29.7%) had a personality disorder not otherwise specified with cluster B traits (mostly antisocial), 2 (5.4%) had a narcissistic personality disorder, and 2 (5.4%) had a personality disorder not otherwise specified with cluster C traits. Furthermore, 20 of these patients (54.1%) had a substance abuse diagnosis on Axis I of the DSM-IV-TR, which was in remission at the

time of the study. Twenty-two patients received the ART+PMT intervention (mean age = 35.45 years; *SD* = 9.26; range = 19-52 years) and 15 patients received ART+Sports (mean age = 33.73 years; *SD* = 8.21; range = 24-55 years). The mean psychopathy score of the total group, as measured with the Psychopathy Checklist-Revised (PCL-R; Hare, 1991, 2003), was 23.53 (*SD* = 8.42). This average score was comparable to the mean PCL-R score of a larger sample of 269 Dutch forensic inpatients (*M* = 21.82; Zwets, Hornsveld, Neumann, Muris, & Van Marle, 2015). The ART+PMT group and the ART+Sports group did not differ significantly from each other with respect to age and psychopathy scores.

Twenty-seven patients (73.0%) completed the multi-modal program (the extended version of ART in combination with either PMT or Sports). The data of two of these patients were incomplete because they refused to fill out the self-report questionnaires during the follow-up assessment. Ten patients (27.0%) were considered to be non-completers as they did not finish the intervention. Three of these patients did not complete the full program because they appeared to show very low levels of aggression on the ward and therefore the ART intervention was no longer considered to be indicated. One other patient dropped out because of a decision of the court to terminate treatment. Six patients were forced dropouts because they continuously displayed serious misbehavior during the therapy sessions. Eventually, a total of 16 patients completed the combined ART+PMT program, and 11 patients completed the ART+Sports program.

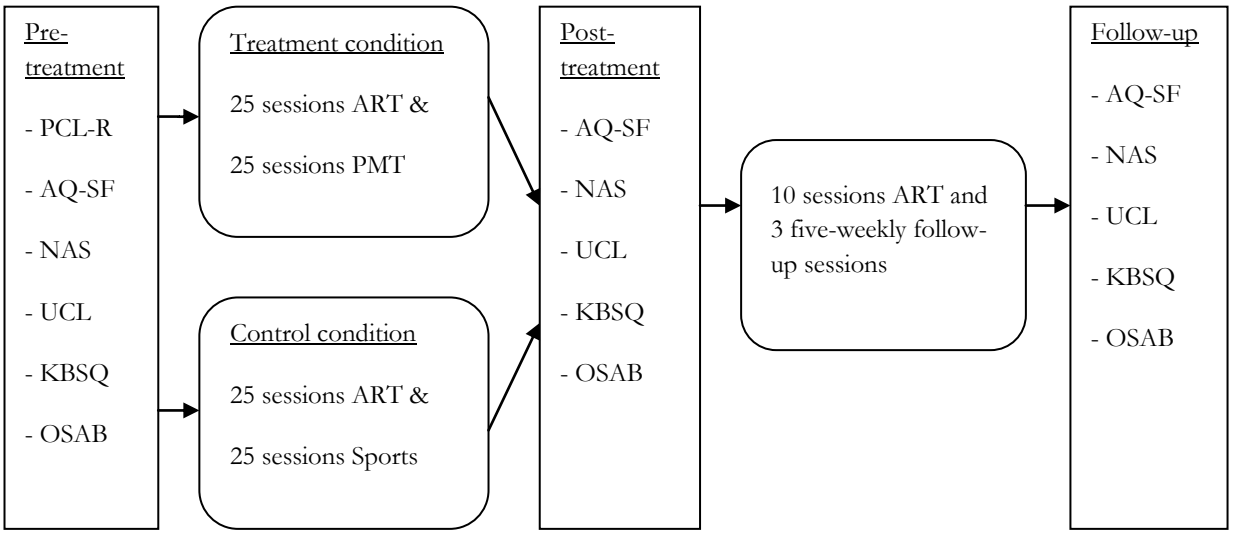

Figure 7. Study design: Measures applied at the pre-treatment, post-treatment and follow-up assessment.

Measures

In this study, four self-report questionnaires, an observation scale, and a semi-structured diagnostic interview were used for the evaluation of both conditions. Measures of aggressive behavior, anger, and prosocial behavior were considered as primary outcome measures, whereas measures of bodily awareness during anger and coping behavior were considered as secondary outcome measures. All outcome measures were administered on three occasions (Figure 7): pre-treatment, post-treatment (after 25 sessions), and follow-up (15 weeks after the completion of 35 ART sessions).

Primary outcome measures

The Aggression Questionnaire-Short Form (AQ-SF; Bryant & Smith, 2001; Dutch version: Hornsveld, Muris, Kraaimaat, & Meesters, 2009) is a short version of the Aggression Questionnaire (Buss & Perry, 1992) and contains 12 items that can be allocated to four subscales, namely Physical Aggression, Verbal Aggression, Anger, and Hostility. Respondents rate the items using a five-point scale ranging from 1 = "entirely disagree" to 5 = "entirely agree." In the present study, only the AQ-SF total score was applied. Internal consistency was acceptable (α = .73) and comparable with that obtained by Hornsveld, Muris et al. (2009) in a sample of 138 male forensic psychiatric inpatients. Furthermore, these authors found that the validity of the AQ-SF total score was good as demonstrated by meaningful correlations with alternative measures of aggression.

The NAS part of the Novaco Anger Scale-Provocation Inventory (NAS-PI; Novaco, 1994; Dutch version: Hornsveld, Muris, & Kraaimaat, 2011) was used to measure self-reported anger. The 48 items of the NAS-PI are scored on a three-point Likert scale: 1 = "never true," 2 = "sometimes true," and 3 = "always true." In the present study, the internal consistency of the NAS-PI at the pre-treatment measurement was excellent (α = .91). This is in line with a study by Hornsveld et al. (2011) who also found very good internal consistency (α = .90) and validity for this questionnaire in a sample of 142 male forensic psychiatric inpatients.

The Observation Scale for Aggressive Behavior (OSAB; Hornsveld, Nijman, Hollin, & Kraaimaat, 2007) assesses patients' behavior on the ward. The scale comprises 40 items representing the following subscales: Irritation/anger, Anxiety/gloominess, Aggressive behavior, Prosocial behavior, Antecedent, and Sanction. A staff member rates the behavior of the inpatients in the preceding week on a four-point scale ranging from 1 = "never" to 4 = "frequently." The OSAB was completed by experienced staff members in the same week when the patients filled out the self-report questionnaires. In the present study, only the Aggressive

behavior and the Prosocial behavior subscales were used. Internal consistency could not be computed for the present study because subscales were automatically created by the OSAB computer program. However, the psychometric properties of the OSAB were studied in a sample of 74 male forensic psychiatric inpatients (Hornsveld et al., 2007). Results indicated that the Aggressive behavior subscale had acceptable internal consistency (α = .79) and moderate test-retest reliability (*r* = .57), whereas the Prosocial behavior subscale displayed excellent internal consistency (α = .93) and acceptable test-retest reliability (*r* = .79). Furthermore, significant correlations were found with self-report measures of aggressive behavior and social behavior to support the validity of both subscales.

Secondary outcome measures

The Utrecht Coping Scale (UCL; Schreurs, Van de Willige, Brosschot, Tellegen, & Graus, 1993) assesses several aspects of coping behavior. The respondent has to answer 47 items about specific coping behaviors on a four-point Likert scale ranging from 1 = "seldom or never" to 4 = "very often." The questionnaire contains seven subscales that refer to coping strategies: Active problem solving (e.g., "Regarding problems as a challenge"), Social support (e.g., "Sharing your worries with somebody else"), Expression of emotions (e.g., "Showing your annoyance"), Reassuring thoughts (e.g., "Thinking that after rain there will be sunshine"), Palliative response (e.g., "Trying to relax"), Avoidance (e.g., "Admitting in order to avoid difficult situations"), and Passive response (e.g., "Isolating yourself completely from others"). The subscales Avoidance and Passive response were considered as dysfunctional coping behaviors, whereas all other subscales were considered as adaptive coping behaviors. In the present study, the internal consistency coefficients of the subscales Palliative response (α = .71) and Social support (α = .80) were acceptable to good, whereas the internal consistency of the subscales Avoidance (α = .66), Active problem solving (α = .65), Expression of emotions (α = .62), Reassuring thoughts (α = .59), and Passive response (α = .56) were in the modest to sufficient range. The psychometric properties of the UCL have not been studied in other forensic psychiatric samples. However, good validity and reliability have been demonstrated in the general population (Schreurs et al., 1993).

An abbreviated, three-item version of the Anger Bodily Sensations Questionnaire (ABSQ; Zwets et al., 2014), namely the Kijvelanden Bodily Sensations Questionnaire (KBSQ), was used to measure bodily awareness during anger. The items were: "Certain bodily sensations tell me that I am tense," "Anger is accompanied by sweating, a red skin, or shaking," and "When I am tense, I have physical symptoms, such as headache, muscle aches or stomach aches." They had to be

scored on a five-point Likert-scale ranging from 1 = "entirely disagree" to 5 = "entirely agree." The applicability of this three item version was investigated in a sample of 46 other forensic psychiatric patients with a cluster B disorder. Test-retest reliability was found to be sufficient (r = .72) and validity was supported by a positive correlation (r = 0.31, p < 0.05) with the Somatic Awareness Questionnaire (SAQ; Kolk, Schagen, & Hanewald, 2004).

Other measures

The Psychopathy Checklist-Revised (PCL-R; Hare, 1991, 2003; Dutch version: Vertommen, Verheul, De Ruiter, & Hildebrand, 2002) was employed to measure psychopathy. The checklist consists of 20 items, which have to be rated on a three-point scale with 0 = "does not apply," 1 = "applies to some extent," and 2 = "applies." Vertommen et al. (2002) found support for the reliability of the Dutch version of the PCL-R in a group of 1,192 inmates. In the present study, the four-factor structure was used (Hare, 2003; Hare & Neumann, 2006), which implies the following facets: Interpersonal, Affective , Lifestyle, and Antisocial. Support for this four-factor structure was also found in a comparable Dutch sample of 411 forensic psychiatric inpatients (Zwets et al., 2015).

Interventions: Psychomotor Therapy, Sports, and Aggression Replacement Training

PMT (Langstraat et al., 2011) consisted of 25 weekly sessions of 90 minutes for a maximum of six patients per group (for an overview of the PMT treatment program, see Appendix A). Groups were trained by experienced psychomotor therapists, who all had a master's degree in psychomotricity. The therapists had a training protocol at their disposal, and patients had a workbook that included homework assignments. The goal of PMT is (1) to better recognize situations in which anger may occur, (2) to increase awareness of bodily sensations related to anger, (3) to be more accepting of anger as a normal emotional reaction, and (4) to improve anger and aggression regulation skills. In order to achieve the first goal, a personal inventory was constructed that included triggers and events that may result in anger and aggression. Patients received a registration form and had to make notes of each situation in which they experienced anger or aggression. Constructing an inventory of anger- or aggression-eliciting situations is considered to be the first step towards better emotion regulation (e.g., Feindler & Ecton, 1986).

Since offenders with an antisocial personality disorder usually show little emotional awareness in relation to their aggressive behavior (e.g., Gao, Raine, & Schug, 2012; Nentjes et al., 2013), improvement of their ability to recognize anger-related bodily sensations is also regarded

as an important element of treatment programs for aggressive behavior (e.g., Novaco, 2007; Tyson, 1998). Therefore, during PMT, patients had to engage in situations that evoke emotions (i.e., role-playing in which the patient is confronted with anger-eliciting triggers) in order to improve awareness. During these exercises, the PMT therapist prompted the awareness of bodily sensations by asking the patients to focus on and describe their sensations.

To improve the acceptance of anger as a normal emotion, psycho education was provided in which it was explained that anger is an emotion which may be expressed in an appropriate way. Patients were explained that when people do not allow themselves to become angry and tend to suppress this emotion, this might increase the risk of aggressive outbursts to occur (Chambers, Gullone, & Allen, 2009). Therefore, patients had to learn to express their irritations and anger without becoming aggressive. These skills were first practiced during PMT sessions, but also had to be applied in real-life situations on the wards.

For the improvement of emotion regulation skills, patients practiced coping skills to reduce the evoked bodily sensations. This was achieved by using relaxation techniques (Jacobson, 1938; Sanderlin, 2001), impulse regulation exercises (Kuin, 2000), and elements from Sensory Awareness training. Finally, patients learned that emotion-related bodily sensations often reduce automatically after a certain period and that a time-out procedure may therefore also be helpful to reduce arousal.

The Sports intervention consisted of 25 weekly sessions of 90 minutes for a maximum of six patients per group, and included cardio workouts, such as running and cycling. The sports intervention was guided by at least one sports instructor. There were no treatment goals for this intervention and exercises were purely recreational. During the sessions, patients were allowed to communicate with each other.

The inpatient version of the ART consisted of 35 weekly training sessions of 90 minutes, 35 homework sessions of 45 minutes, and three follow-up sessions of 90 minutes (Hornsveld, Soe-Agnie et al., 2008). The follow-up sessions were provided at five, ten, and fifteen weeks after the final session. The inpatient ART is meant for groups with a maximum of six forensic psychiatric inpatients who have committed a violent offense, and was guided by two experienced clinical psychologists. Treatment manuals were available with detailed descriptions of each session, and patients received a workbook containing homework assignments (Hornsveld, 2004b; Hornsveld & De Vries, 2009). A more detailed description of the extended ART (Hornsveld, Soe-Agnie et al., 2008) is provided in Appendix B. In the present study, PMT and Sports sessions were provided in the same 25 weeks as the first 25 ART sessions.

Data analysis

As noted earlier, the present study applied the minimum clinically important difference (MCID) method (Jaeschke et al., 1989) because comparative statistical testing (i.e., between-group analyses of variance with repeated measures) was considered to be seriously underpowered given the small sample size. The MCID is an estimation of the clinically meaningful difference between measurements on various occasions. In this study, the distribution-based method was used to determine the MCID, which implies that the mean baseline SD score of the total sample has to be multiplied with 0.2 (i.e., small effect size; Samsa et al., 1999). When the mean difference between the pre-treatment measurement and the post-treatment or follow-up measurement is larger than the MCID, that would suggest a clinically meaningful change between both measurement moments (Jaeschke et al., 1989). Furthermore, effect sizes (Cohen's *d*; Cohen, 1988) were calculated with the adjusted means and standard deviations to evaluate differences in change scores between measurements.

To explore whether psychopathy was related to treatment dropout, multiple binomial regression analyses were carried out with the PCL-R. First, the total dataset was used to compare completers with non-completers, who were defined as patients who did not complete the program due to any reason. For the second analysis, completers were compared with dropouts, who were defined as patients who dropped-out prematurely because they were forced by the therapists to stop with the program. It was expected that the PCL-R would be predictive in differentiating completers from non-completers, and completers from dropouts.

Results

Differences between groups at the pre-treatment assessment

Before the start of treatment, *t*-tests were conducted to compare the pre-treatment scores between the ART+PMT and the ART+Sports groups. It was found that the mean OSAB Social behavior score of the ART+Sports group, $M = 34.21$, $SD = 5.37$, was significantly higher than the mean score of the ART+PMT group, $M = 30.36$, $SD = 5.58$, $t(34) = 2.05$, $p = .048$. No further significant differences between both groups were found for any of the primary and secondary outcome measures at the pre-treatment measurement.

Table 13.

Mean scores and effect sizes on primary outcome measures in the total group (N = 27), the ART+PMT group (n = 16), and ART+Sports group (n = 11).

Variable	Subscale	Group	Pre-treatment	Post-treatment	Follow-Up	Pre-treatment vs. Post treatment Cohen's *d* [95% CI]	Pre-treatment vs. Follow-up Cohen's *d* [95% CI]
AQ-SF	Total aggression	Total (*n* = 25)	29.20 (5.89)	29.12 (8.29)	28.72 (8.32)	0.01 [-0.54, 0.57]	0.07 [-0.49, 0.62]
	(MCID = 1.18)	PMT (*n* = 14)	29.50 (5.50)	31.71 (7.31)$^{-}$	29.43 (8.73)	-0.34 [-1.09, 0.40]	0.01 [-0.73, 0.75]
		Sports (*n* = 11)	28.82 (6.62)	25.82 (8.61)$^{+}$	27.82 (8.08)	0.39 [-0.36, 1.14]	0.14 [-0.61, 0.88]
NAS	Anger	Total (*n* = 25)	84.56 (11.50)	81.76 (11.05) $^{+}$	82.08 (11.06) $^{+}$	0.25 [-0.31, 0.80]	0.22 [-0.34, 0.78]
	(MCID = 2.30)	PMT (*n* = 14)	88.07 (9.68)	84.29 (10.52) $^{+}$	82.29 (13.10) $^{+}$	0.37 [-0.37, 1.12]	0.46 [-0.13, 1.05]
		Sports (*n* = 11)	80.09 (12.50)	78.55 (11.34)	81.82 (8.38)	0.13 [-0.71, 0.97]	-0.16 [-1.00, 0.67]
OSAB	Aggressive beh.	Total (*n* = 27)	17.81 (6.10)	17.56 (6.52)	16.33 (4.57) $^{+}$	0.04 [-0.49, 0.57]	0.27 [-0.26, 0.81]
	(MCID = 1.22)	PMT (*n* = 16)	18.06 (6.10)	18.63 (6.28)	17.44 (5.22)	-0.09 [-0.79, 0.60]	0.11 [-0.58, 0.80]
		Sports (*n* = 11)	17.45 (6.15)	16.00 (6.84) $^{+}$	14.73 (2.94) $^{+}$	0.22 [-0.62, 1.06]	0.56 [-0.29, 1.42]
	Social beh.	Total (*n* = 27)	31.15 (5.99)	33.81 (6.15) $^{+}$	33.74 (5.17) $^{+}$	-0.44 [-0.98, 0.10]	-0.46 [-1.00, 0.08]
	(MCID = 1.20)	PMT (*n* = 16)	29.56 (6.06)	35.25 (6.60) $^{+}$	35.75 (4.22) $^{+}$	-0.90 [-1.63,-0.17]	-1.19 [-1.94, -0.43]
		Sports (*n* = 11)	33.45 (5.32)	31.73 (4.98) $^{-}$	30.82 (5.19) $^{-}$	0.33 [-0.51, 1.18]	0.50 [-0.35, 1.35]

Note: MCID = minimum clinically important difference, AQ-SF = Aggression Questionnaire Short Form, NAS = Novaco Anger Scale, OSAB = Observation Scale for Aggressive Behavior, − = Clinically meaningful deterioration in comparison to the pre-treatment assessment, + = Clinically meaningful improvement in comparison to the pre-treatment assessment

Primary outcome measures

Table 13 shows the mean scores and Cohen's *d* effect sizes on the four primary outcome measures (i.e., AQ-SF Aggression, NAS Anger, OSAB Aggressive behavior, and OSAB Social behavior). Based on the MCID values, the combined group (ART+PMT and ART+Sports) showed improvements on two primary outcome measures (NAS Anger and OSAB Social behavior) at the post-treatment measurement and on three measures (NAS Anger, OSAB Aggressive behavior, and OSAB Social behavior) at the follow-up measurement. The combined group did not display deterioration on any of the primary outcome measures. The ART+PMT group showed improvements on two subscales (NAS Anger and OSAB Social behavior) at the post-treatment measurement, but at the same time also displayed a deterioration on AQ-SF Aggression. The ART+Sports group improved on two primary outcome measures (AQ-SF Aggression and OSAB Aggressive behavior) and deteriorated on one outcome variable (OSAB Social behavior). At the follow-up measurement, the ART+PMT group improved on two primary outcome measures (NAS Anger and OSAB Social behavior) and deteriorated on none of the measures, whereas the ART+Sports group improved on one (OSAB Aggressive behavior) and showed deterioration on another primary outcome measure (OSAB Social behavior).

It should be noted that the effect sizes for the improvements that were documented on the primary outcome measures were mostly in the small to moderate range. The only exception to this rule concerned the treatment effect found within the PMT group on the OSAB social behavior measure, for which large effect sizes were observed for the improvement from pre- to post-treatment (d = -0.90) and from pre-treatment to follow-up (d = -1.19).

Secondary outcome measures

Table 14 shows the mean scores and Cohen's *d* effect sizes on the secondary outcome measures (UCL and KBSQ). Based on the MCID values, the combined group (ART+PMT and ART+Sports) improved on two secondary outcome measures (UCL Expression of emotions and UCL Avoidance) at post-treatment, and on four measures (three UCL subscales and KBSQ Bodily awareness) at the follow-up measurement. The combined group did not display deterioration on any of the secondary outcome measures.

Table 14.

(Continued)

Variable	Subscale	Group	Pre-treatment	Post-treatment	Follow-Up	Pre-treatment vs. Post treatment Cohen's *d* [95% CI]	Pre-treatment vs. Follow-up Cohen's *d* [95% CI]
UCL	Palliative	Total (*n* = 20)	18.80 (3.24)	19.05 (3.80)	18.40 (2.87)	-0.07 [-0.69, 0.55]	0.13 [-0.49, 0.75]
	Response	PMT (*n* = 9)	20.00 (2.69)	20.11 (2.93)	18.89 (2.93) −	-0.04 [-0.96. 0.88]	0.39 [-0.54, 1.33]
	(MCID = 0.65)	Sports (*n* = 11)	17.82 (3.43)	18.18 (4.33)	18.00 (2.90)	-0.09 [-0.93, 0.74]	-0.06 [-0.89, 0.78]
	Avoidance	Total (*n* = 20)	17.65 (2.43)	17.15 (2.52) +	16.50 (2.09) +	0.20 [-0.42, 0.82]	0.51 [-0.12, 1.14]
	(MCID = 0.49)	PMT (*n* = 9)	18.00 (2.96)	17.44 (1.74) +	16.56 (2.40) +	0.23 [-0.70, 1.16]	0.53 [-0.41, 1.47]
		Sports (*n* = 11)	17.36 (2.01)	16.91 (3.08)	16.46 (1.92) +	0.17 [-0.66, 1.01]	0.46 [-0.39, 1.30]
	Passive	Total (*n* = 20)	12.55 (2.33)	12.30 (2.49)	12.15 (1.93)	0.10 [-0.52, 0.72]	0.19 [-0.43, 0.81]
	response	PMT (*n* = 9)	12.56 (2.60)	13.67 (2.60) −	12.11 (1.76)	-0.43 [-1.36, 0.51]	0.20 [-0.72, 1.13]
	(MCID = 0.47)	Sports (*n* = 11)	12.55 (2.21)	11.18 (1.83) +	12.18 (2.14)	0.68 [-0.18, 1.53]	0.17 [-0.67, 1.01]
KBSQ	Bodily	Total (*n* = 20)	9.45 (2.78)	9.85 (2.37)	10.25 (2.51) +	-0.15 [-0.78, 0.47]	-0.30 [-0.93, 0.32]
	awareness	PMT (*n* = 9)	9.22 (3.42)	9.89 (2.37) +	10.56 (2.74) +	-0.23 [-1.15, 0.70]	-0.43 [-1.37, 0.50]
	(MCID = 0.56)	Sports (*n* = 11)	9.64 (2.29)	9.82 (2.48)	10.00 (2.41)	-0.08 [-0.91, 0.76]	-0.15 [-0.99, 0.68]

Note: MCID = minimum clinically important difference, UCL = Utrecht Coping List, KBSQ = Kijvelanden Bodily Sensations Questionnaire, − = Clinically meaningful deterioration in comparison to the pre-treatment assessment, + = Clinically meaningful improvement in comparison to the pre-treatment assessment

Table 14.

Mean scores and effect sizes on secondary outcome measures of the total group (N = 27), the ART+PMT group (n = 16), and ART+Sports group (n = 11).

Variable	Subscale	Group	Pre-treatment	Post-treatment	Follow-Up	Pre-treatment vs. Post treatment Cohen's *d* [95% CI]	Pre-treatment vs. Follow-up Cohen's *d* [95% CI]
UCL	Active problem	Total (*n* = 20)	17.60 (2.62)	18.00 (3.29)	17.20 (2.65)	-0.13 [-0.76, 0.49]	0.15 [-0.47, 0.77]
	Solving	PMT (*n* = 9)	18.11 (2.62)	18.56 (3.78)	17.33 (2.69) −	-0.14 [-1.06, 0.79]	0.29 [-0.64, 1.22]
	MCID = 0.52)	Sports (*n* = 11)	17.18 (2.68)	17.55 (2.95)	17.09 (2.74)	-0.13 [-0.97, 0.71]	0.03 [-0.80, 0.87]
	Social support	Total (*n* = 20)	14.25 (2.43)	14.15(3.12)	14.80 (3.50) +	0.04 [-0.58, 0.66]	-0.18 [-0.80, 0.44]
	(MCID = 0.49)	PMT (*n* = 9)	14.22 (1.56)	14.78 (3.46) +	15.44 (2.30) +	-0.21 [-1.14, 0.72]	-0.62 [-1.57, 0.33]
		Sports (*n* = 11)	14.27 (3.04)	13.64 (2.87) −	14.27 (4.29)	0.21 [-0.63, 1.05]	0.00 [-0.84, 0.84]
	Expression of	Total (*n* = 20)	6.90 (1.52)	7.55 (1.47) +	7.35 (1.18) +	-0.43 [-1.06, 0.19]	-0.33 [-0.95, 0.29]
	Emotions	PMT (*n* = 9)	6.89 (1.05)	7.22 (1.30) +	7.56 (1.01) +	-0.28 [-1.21, 0.65]	-0.65 [-1.60, 0.30]
	(MCID = 0.30)	Sports (*n* = 11)	6.91 (1.87)	7.82 (1.60) +	7.18 (1.33)	-0.52 [-1.37, 0.33]	-0.17 [-1.00, 0.67]
KBSQ	Reassuring	Total (*n* = 20)	11.40 (2.09)	11.60 (2.52)	11.65 (2.18)	-0.09 [-0.71, 0.53]	-0.12 [-0.74, 0.50]
	Thoughts	PMT (*n* = 9)	11.22 (1.30)	12.33 (2.00) +	12.33 (1.94) +	-0.66 [-1.61, 0.29]	-0.67 [-1.62, 0.28]
	(MCID = 0.42)	Sports (*n* = 11)	11.55 (2.62)	11.00 (2.83) −	11.09 (2.30) −	0.20 [-0.64, 1.04]	0.19 [-0.65, 1.02]

Note: MCID = minimum clinically important difference, UCL = Utrecht Coping List, KBSQ = Kijvelanden Bodily Sensations Questionnaire, − = Clinically meaningful deterioration in comparison to the pre-treatment assessment, + = Clinically meaningful improvement in comparison to the pre-treatment assessment

The ART+PMT group improved on five secondary outcome measures (four UCL subscales and KBSQ Bodily awareness) at the post-treatment measurement and deteriorated on one (UCL Passive response), whereas the ART+Sports group improved on two secondary outcome measures (UCL Expression of emotions and Passive response) but also showed a deterioration on two measures (UCL Social support and Reassuring thoughts). At the follow-up measurement, the ART+PMT group improved on five secondary outcome measures (four UCL subscales and KBSQ Bodily awareness) and deteriorated on two subscales (UCL Active problem solving and Palliative response). The ART+Sports group improved on one measure (UCL Avoidance) but also deteriorated on another (UCL Reassuring thoughts). The effect sizes of the within-treatment improvements on the secondary outcome measures were all in the small to medium range.

Completers and non-completers

To determine whether the PCL-R total score and facet scores could differentiate completers (n = 27) from non-completers (n = 10), several binomial logistic regression analyses were carried out. Results show that the PCL-R could not significantly differentiate between completers and non-completers. In a second analysis, it was investigated whether completers (n = 27) could be differentiated from dropouts who were forced to drop out of the program because of their behavior during therapy (n = 6). For this analysis, four patients who dropped out prematurely because of a valid reason were removed from the dataset. Results (see Table 15) indicated that the PCL-R could independently differentiate completers from dropouts, B = 0.35, OR = 1,41, p = .037. More specific, the interpersonal facet, B = 0.45, OR = 1.57, p = .046, and the lifestyle facet, B = 1.24, OR = 3.45, p= .027, of the PCL-R could differentiate completers from dropouts.

Table 15

Main results of the Binary Logistic Regression Analyses predicting completers versus dropouts out of PCL-R scores.

		Completers (n = 22) vs. dropouts (n = 6)		
Variable	Subscale	B	OR [95% CI]	p
PCL-R	Total	0.35	1.41 [1.02, 1.96]	.037
	Interpersonal	0.45	1.57 [1.01, 2.43]	.046
	Affective	1.36	3.89 [0.78, 19.41]	.098
	Lifestyle	1.24	3.45 [1.15, 10.31]	.027
	Antisocial	0.21	1.24 [0.83, 1.86]	.302

Note: PCL-R = Psychopathy Checklist – Revised.

Discussion

The first results of Psychomotor Therapy (PMT) were explored by comparing a group of forensic psychiatric inpatients who were treated with ART+PMT with a group of forensic psychiatric inpatients who received ART+Sports. Because of the small sample size, results were evaluated by the minimum clinically important difference (MCID) method. Although both groups showed some progression on the primary outcome measures, patients who completed the ART+PMT intervention showed more improvement than the patients of the ART+Sports condition on the secondary outcome measures. The ART+PMT group did not show better results than the ART+Sports group on the primary outcome measures referring to anger and aggression. Improvements were found on self-reported anger and observed social behavior in the ART+PMT group, but no meaningful differences were found on measures of self-reported and observed aggressive behavior. Altogether, this seems to indicate that the combination of ART and PMT did not result in additional reductions of aggressive behavior.

One explanation for the lack of a decrease in aggressive behaviour in the ART+PMT group compared to the ART+Sports group might be related to certain treatment goals of PMT, namely the improvement of bodily awareness in anger-eliciting situations and the expression of anger in a socially accepted way. In order to achieve these goals, patients were repeatedly asked to practice these skills on the ward and had to report on how they showed their anger in their homework assignments. Psychomotor therapist and psychologists who provided ART and PMT also noted that some patients often showed their anger on the ward and that staff members reported to be surprised by the new way these patients expressed their feelings. As a result, it may well be that the increase in self-reported and observed aggression as observed by the staff members was actually a socially accepted expression of anger.

For the ART+Sports group, a decrease in observed and self-reported aggression was found which may be explained by the fact that sports is often associated with improvements in mood (e.g., Berger & Motl, 2000) and an amelioration of deficits in executive functions (Dishman et al., 2006), which both play a key role in the control of aggressive impulses (Krämer, Kopyciok, Richter, Rodriguez-Fornells, & Münte, 2011). Therefore, the ART+Sports group may actually have profited from the additional sports exercises.

The overall results on the primary outcome measures were mainly in the positive direction for the combined groups (ART+PMT and ART+Sports). Improvements were found on self-reported anger, observed aggression, and observed social behavior, whereas self-reported aggression did not change. These results are in line with several other studies which have

concluded that treatment programs on violent behavior generally only show small positive effects in violent offenders (e.g., Dowden & Andrews, 2000; Lipsey, Chapman, & Landenberger, 2001; McGuire, 2013). However, it has to be kept in mind that changes in aggressive behavior are often difficult to assess in a clinical environment. For example, a study by Hornsveld et al. (2014) showed that observed aggressive behavior did not change over a period of three years in a group of 70 forensic psychiatric inpatients with a personality disorder, whereas their prosocial behavior improved.

The results on the secondary outcome measures showed several clinically meaningful increases for the ART+PMT group, whereas most of these improvements were not found in the ART+Sports group. Improvements were particularly found on scales measuring the specific treatment goals of PMT, namely self-reported bodily awareness during anger, expression of emotions and reassuring thoughts. These findings would indicate that PMT may produce an additional effect to cognitive-behavioral programs for violent forensic psychiatric inpatients. However, although several improvements were found on coping behaviors, it should be noted that the instrument used to assess coping (i.e., the UCL) displayed modest reliability for several subscales. This means that the results involving these measures should be interpreted with caution.

Six patients were removed from the treatment group because of their disruptive behavior during the sessions, and tentative support was found suggesting that psychopathy may be predictive of these dropouts. This result is in line with previous studies (Hemphill & Hart, 2002; Olver & Wong, 2009; Stokes, Dixon, & Beech, 2009), although one should be careful with drawing firm conclusions on the basis of the relatively small sample size of the present study. Psychomotor therapists regularly reported that patients with relatively high levels of psychopathy often had difficulties in recognizing bodily sensations during the exercises, which might be related to their deficits in the affective experience of emotions (e.g., Gao, Raine, & Schug, 2012; Nentjes et al., 2013). As a result, these patients repeatedly showed their discomfort during therapy to such an extent that they could no longer participate in the program and had to be removed from the treatment group. However, this disruptive behavior was not only displayed during PMT sessions but also during ART group sessions, which supports the assumption that psychopathy is related to treatment attrition in general (e.g., Olver, Stockdale, & Wormith, 2011).

The present study suffers from several limitations. First, it was not possible to compare a treatment group with a non-treatment control group, mainly because the primary goal of a forensic psychiatric clinic is to provide treatment. Second, only a selection of patients completed the full program and were also willing to complete the questionnaires on all measurement

moments, which points at the presence of a selection bias. We only evaluated the patients who completed the full treatment program (Treatment Received method; Sherman, 2003) and could not evaluate the results for the initial group, including non-completers. Third, multiple self-report questionnaires were applied, which might be susceptible to socially desirable response tendencies (Gannon, Ward, & Collie, 2007; Kroner, Mills, & Morgan, 2007) and demand a certain level of insight from the respondents regarding their own psychological functioning (Hollin & Palmer, 2001). This limitation applies especially to the secondary outcome measures, which did not include any observed measures. Fourth, the self-reported and observed measures were probably influenced by the controlled environment of a forensic psychiatric hospital. Particularly aggression is difficult to assess in a highly structured environment, such as the FPC in the present study, because of its attenuating effect on aggressive behavior, resulting in a low base rate (e.g., Hornsveld et al., 2014; Vitacco et al., 2009). Fifth, several other factors which may have contributed to the treatment results were not assessed, such as motivation for treatment (Prochaska, Diclimente, & Norcross, 1992), length of stay in the hospital, living group climate, and applied pharmacotherapy (e.g., Coccaro & Kavoussi, 1997; Comai, Tau, Pavlovic, & Gobbi, 2012; Salzman et al., 1995). Sixth, the sample of the present study mainly consisted of patients with a personality disorder. Therefore, generalizabiliy of the results to other violent offender samples cannot be done without caution. Seventh, the psychometric properties of several measures, including the PCL-R and OSAB could not be calculated in the present study. Although other studies (Hornsveld et al., 2007; Zwets et al., 2015) have indicated that these measures have sufficient psychometric properties in forensic psychiatric inpatients, it remains unclear whether this was also true in the current sample.

To our knowledge, the present study is the first to explore possible additional treatment effects of PMT as a component of a multi-modal program for aggressive forensic inpatients. The present study indicated that the ART+PMT group may show the expected improvement on the secondary outcome measures, but that there may be no differences between the addition of PMT or Sports on the primary outcomes measures of aggression. Thus, for the time being, it remains unclear to what extent the inclusion of PMT may have additional positive effects for the main goal of a treatment program for violent forensic psychiatric inpatients, i.e. the prevention of aggressive recidivism. However, the present study may point to possible directions for future research. For instance, the relation between improvements on bodily awareness and coping skills on the one hand and (future) anger and aggression on the other still can be a topic for further investigation. Furthermore, future research might also focus on the most optimal assessment of aggression in closed settings. At this moment, it remains unclear whether it is possible to assess

aggression in a valid and reliable way in a closed setting (e.g., Hornsveld et al. 2014). Finally, because the present study was one of the first to explore the possible treatment effects of PMT, research with larger samples (e.g., multi-center studies) is needed to further evaluate the additional value of PMT as a supplementary treatment program for violent forensic inpatients.

CHAPTER SIX

General discussion, limitations, implications for clinical practice, and suggestions for future research

Rationale

Treatment programs on (reactive) aggression are provided to forensic psychiatric inpatients in all forensic psychiatric clinics in the Netherlands. The studies of the current thesis investigated whether psychopathy and implicit attitudes toward violence are determinants of aggression. Furthermore, the additional treatment effects of psychomotor therapy (PMT) to a cognitive-behavioral treatment program for violent forensic psychiatric inpatients (Aggression Replacement Training; ART) were examined. **Chapter 1** provided a general theoretical introduction on aggression, including its definition, and that of related constructs. Information about attitudes toward violence and treatment of aggressive behavior was also provided, and a newly developed model of impulsive violence was presented, which explains how arousal and implicit attitudes toward violence are related to violent behavior. **Chapter 2** described a validation study of the four-factor structure of a frequently used measure of psychopathy, the Psychopathy Checklist-Revised (PCL-R), in Dutch forensic inpatients. This was considered important for the present research project as it was our intention to investigate the relation between the PCL-R factors and aggression, and to investigate whether the PCL-R is a predictor of treatment dropout in the ART+PMT intervention. **Chapter 3** presented a study that explored the relation between implicit attitudes toward violence on the one hand, and psychopathy, aggressive behavior and socially adaptive behaviors on the other. This study was conducted to investigate to what extent implicit attitudes toward violence guide violent behavior. **Chapter 4** described the development and psychometric evaluation of the Anger Bodily Sensations Questionnaire (ABSQ), a self-report measure which enabled us to measure treatment progression with regard to one of the main treatment goals of PMT, namely awareness of the bodily symptoms associated with anger. Finally, **Chapter 5** contained the treatment outcome study and presented the first results of the multi-modal treatment program consisting of ART and PMT.

General discussion

Validity of the four-factor structure of the Psychopathy Checklist-Revised

The examination of the factor structure of the Psychopathy Checklist-Revised (PCL-R) is especially important for forensic clinical practice, because this instrument - according to the Ministry of Security and Justice in the Netherlands - has to be administered to every individual patient detained under the Dutch hospital order TBS (Terbeschikkingstelling). The current study confirmed the four-factor structure of the PCL-R in a sample of Dutch forensic psychiatric inpatients. This result is in line with previous studies on the construct validity of this measure that were performed in forensic samples from various countries, including the United States (e.g., Hare & Neumann, 2006; Neumann, Hare, & Newman, 2007; Vitacco, Rogers et al., 2005; Weaver et al., 2006), Canada (e.g., Olver et al., 2012), Germany, (e.g., Mokros et al., 2011), and Sweden (e.g., Neumann, Hare, & Johansson, 2012). Furthermore, because it was still unclear whether scores on the PCL-R reflect a similar construct of psychopathy in both forensic inpatients with a personality disorder and forensic inpatients with a psychotic disorder, we investigated if measurement invariance could be established between both groups. With regard of the PCL-R, measurement invariance had already been established between different cultures (Cooke, Kosson, & Michie, 2001; Jackson et al., 2007; Mokros et al., 2011) and between sexes (Neumann, Schmitt et al., 2012), but not between groups of forensic psychiatric patients with different types of psychiatric disorders. The results of our study indicated that measurement invariance could also be established between patients with a personality disorder and patients with psychotic disorder as their main diagnosis. This result seems to indicate that the PCL-R can be administered to both groups of patients and that it should be possible to make valid comparisons between the scores of these two groups on the PCL-R and its factors of these two groups of forensic inpatients.

A number of previous studies have indicated that the PCL-R is predictive for several clinically relevant behaviors, such as treatment attrition (Olver et al., 2011), aggressive behavior in clinical settings (e.g., Hildebrand, De Ruiter, & Nijman, 2004; Reiss, Grubin, & Meux, 1999), and violent recidivism (e.g., Hemphill, Hare, & Wong, 1998; Hildebrand et al., 2005; Olver et al., 2012). In our study, we found that the PCL-R was related to several measures of aggression (an observation scale and self-report questionnaires) in forensic psychiatric inpatients with a personality disorder. However, these relations were only found for the lifestyle and antisocial factors, whereas the interpersonal and affective factors were not significantly related to any of the aggression measures. These findings may highlight the value of using the separate factors of

psychopathy, as these seem to show differential relations to specific types of behavior. In other studies, specific relations between the four factors of the PCL-R and clinically relevant external measures have also been found. For example, a number of studies have documented that the interpersonal factor of the PCL-R is related to instrumental violence (Declercq, Willemsen, Audenaert, & Verhaeghe, 2012; Walsh, Swogger, & Kosson, 2009), whereas the antisocial factor is related to violence in general. These results may help us to get a better insight in how scores on the PCL-R factors are related to specific types of problematic behaviors.

Implicit attitudes toward violence and their relation with aggressive behavior and socially adaptive behaviors

Several authors have pointed out that attitudes toward violence may play an important role in the onset of aggressive behavior (e.g., Anderson & Bushman, 2002; Dodge, 1993, Flood & Pease, 2009, Markowitz, 2001; Taylor & Novaco, 2005). Within attitudes, a differentiation can be made between explicit attitudes and implicit attitudes. Explicit attitudes are conscious attitudes that are typically assessed with self-report measures, whereas implicit measures are automatically activated attitudes that are measured with implicit measures such as the lexical decision task (Wentura, 2000), the affective priming task (Fazio, Jackson, Dunton, & Williams, 1995), and the Implicit Association Test (IAT; Greenwald et al., 1998). Whereas explicit attitudes seem to be involved in controlled behaviors, implicit attitudes seem to play a role in impulsive behaviors (e.g., Friese et al., 2009). In our study, we found that implicit attitudes toward violence, as measured with the IAT, were related to the antisocial factor of the PCL-R, although it should be immediately acknowledged that this link was rather small. Nevertheless, this finding within a sample of Dutch forensic inpatiens under hospital order was well in line with other studies indicating that there seems to be a relation between implicit attitudes toward violence and psychopathy (e.g., Eckhardt et al., 2012).

Even more interestingly, implicit attitudes toward violence were found to be related to socially adaptive behaviors, such as coping skills and certain prosocial behaviors, but also to the level of moral awareness, especially to normative values that were related to exhibiting decent behavior to others. The possible relation between implicit attitudes and aggressive and socially adaptive behaviors may highlight the importance of this type of attitudes in forensic psychiatric patients as the focus of treatment is often on influencing and promoting socially adaptive behaviors.

The development of the Anger Bodily Sensations Questionnaire (ABSQ) and the evaluation of its psychometric properties

For the current research project, the ABSQ was especially developed to evaluate a specific treatment goal of PMT, namely improving forensic patients' awareness of bodily sensations during anger. As described in the Model of impulsive violence (Chapter 1), arousal has a detrimental effect on behavior control and may therefore result in impulsive behavior, including impulsive violence (e.g., Tyson, 1998; Zillmann, 1984). A basic assumption of PMT is that an improved awareness of anger-related bodily sensations may result in the ability to control anger in time. Other studies had already shown that increased awareness of bodily sensations is indeed associated with effective behavior regulation (e.g., Werner, Jung, Duschek, & Schandry, 2009).

The psychometric properties of the ABSQ were examined in forensic psychiatric offenders and secondary vocational students. A pilot study showed that an initial version of the ABSQ did not have satisfactory psychometric properties. Possible explanations for these results were that (1) a clear introduction of the scale was lacking, (2) the described situation in which a certain bodily sensation occurred was ambiguous, (3) a double negation was used for several items, and (4) patients did not fully understand the description of several bodily sensations. Therefore, a new version of the ABSQ was created. This new version had sufficient reliability and validity in both forensic psychiatric inpatients and secondary vocational students.

The ABSQ was developed because in our opinion, evaluations of treatment programs should also focus on secondary outcome measures that assess specific goals of a treatment program. In recent years, we had already developed two other secondary outcome measures which can be applied to evaluate the effects of specific treatment modules that are employed in forensic psychiatry. First, we construed a new self-report instrument for measuring moral awareness, namely the Sociomoral Reflection Measure (SRM-AV; Hornsveld, Kraaimaat, & Zwets, 2012). Because several meta-analyses have indicated that a low level of moral awareness is associated with delinquency (e.g., Jolliffe & Farrington, 2004; Stams et al., 2006; Van Vugt et al., 2011), modules that aim to promote moral reasoning are often included in cognitive behavioral treatment programs for violent offenders, such as in the Dutch version of ART. The second measure that we developed was the Attitudes towards Women Inventory (AWI; Hornsveld, Timonen et al., 2014), which can be employed to evaluate changes in the general attitudes toward women, which is also specifically addressed in a module of the Dutch version of ART. Two studies in Dutch forensic psychiatric inpatients indicated that the psychometric properties of the SRM-AV and AWI were good and that their validity could be supported by significant

correlations with relevant measures (Hornsveld, Kraaimaat, & Zwets, 2012; Hornsveld, Timonen et al., 2014).

Psychomotor therapy as an additive intervention for violent forensic psychiatric inpatients: A pilot study

To our knowledge, the current study was the first to investigate the effects of PMT as an add-on intervention within a multi-modal treatment program for violent forensic psychiatric inpatients. Unfortunately, the politically-driven decrease in newly admitted patients under hospital order in recent years (Van Gemmert & Van Schijndel, 2014) made it impossible to perform a high-standard randomized controlled trial with sufficient power to draw any valid conclusions. Furthermore, attempts to conduct a multi-centered study were abandoned as other forensic psychiatric clinics provided different treatment programs for violent offenders, such as schema-focused therapy (Bernstein, Arntz, & De Vos, 2007) and Equip (Elling, 2004). Given its limitations, the current study was only suitable for providing information on the preliminary effects of PMT as an additive intervention for violent forensic inpatients.

The results of the PMT study indeed yielded support for the possible usefulness of PMT for violent forensic inpatients as improvements were observed for coping behavior and bodily awareness. However, at the same time, the reduction of aggressive behavior was minimal. This seems to indicate that the addition of PMT to a program for violent forensic inpatients mainly results in an improvement of skills that probably inhibit aggression, but not directly diminish aggressive behavior in a clinical setting. However, possible explanations for this disappointing finding may have to do with methodological issues. For example, the mean scores on the measures of aggression were already rather low at the pre-treatment assessment. This is in line with one of our recent studies (Hornsveld, Kraaimaat, Bouwmeester et al., 2014), which indicated that aggressive behavior of forensic psychiatric inpatients did not decrease during their stay in a forensic psychiatric hospital, because levels of aggression were already fairly low at the beginning (and first measurement) of their stay. Interestingly, in that study, observed prosocial behavior did increase during their stay, which underlines the importance of applying measures of positive behaviors in effect studies performed in forensic settings.

Both groups (i.e., ART+PMT and ART+Sports) showed some improvements on observed measures of aggressive and prosocial behavior, but changes on self-reported measures of aggression were limited. Although the results on the observed measures are in keeping with those of an earlier study about the effects of ART (Hornsveld, Nijman, & Kraaimaat, 2008), the results on the self-report measures not only raise questions concerning the usefulness of PMT, but also about the applicability of self-report questionnaires in samples of forensic psychiatric

patients. Self-report questionnaires demand a high level of introspection (i.e., the ability to examine one's own feelings, thoughts, and behaviors) and are vulnerable to social desirable response tendencies (e.g., Gannon et al., 2007; Kroner et al., 2007; Vigil-Colet et al., 2012). Especially questionnaires assessing negative behaviors may be susceptible to yield relatively low scores in samples of severely disordered forensic psychiatric patients. There is an increasing number of studies indeed (but surprisingly) demonstrating that detained offenders do not score significantly higher on measures of aggression than non-offenders (e.g., Smith & Waterman, 2006). This result was also found in one of our own studies in which forensic psychiatric inpatients under hospital order were compared with non-offenders (Hornsveld, Kraaimaat, Muris et al., 2014).

In the current study, some indications were found to suggest that psychopathy was a predictor of treatment dropout, although these results were only based on a relatively small number of patients. Nonetheless, this result is in agreement with the results of other studies evaluating treatment programs in this type of setting (e.g., Olver & Wong, 2009). In the current study, all dropouts were forced by the therapists to leave the treatment program because of their disruptive behavior during the therapy sessions, which was as anticipated because psychopathy has been previously related to treatment attrition (Hobson, Shine, & Roberts, 2000). Furthermore, the therapists who provided PMT in the current study regularly indicated that patients with relatively high PCL-R scores complained about the body-oriented exercises, because they did not experience any bodily sensations at all. As a result, these patients began to question the usefulness of the therapy and incidentally even showed verbally aggressive behavior. This observation fits well with previous studies indicating that psychopathy is related to deficits in the experience of emotions and the accompanying bodily sensations (e.g., Blair, Mitchell, & Blair, 2005; Gao et al., 2012; Nentjes et al., 2013).

Limitations

The current research in this thesis has several limitations that deserve attention. A first limitation is that all studies were performed in forensic psychiatric inpatients under TBS hospital order. These patients were all convicted for a severe (i.e., sexual and/or violent) offense and were held not fully accountable since a relation was established between a psychiatric disorder and the committed offense (e.g., Van Marle, 2002). The sample selection of the studies about the ABSQ (Chapter 4) and the treatment effects of PMT (Chapter 5) were more specific, as these studies

only included inpatients with a personality disorder. Although the explicit set of inclusion and exclusion criteria may have resulted in a reducement of the probability of several confounding factors, this selection of participants also has consequences for the generalizability of the results. Therefore, the findings of the current research project only apply to forensic psychiatric inpatients under hospital order and should not be generalized without caution to other samples, such as forensic psychiatric outpatients or offenders in general.

A second limitation is that the sample selection may have been biased. The studies were based on voluntary participation, which may have resulted in a sample of patients who were more cooperative than the patients who refused to participate. Furthermore, in two studies, participants received a reward of 10 Euros in return for completing self-report questionnaires and a computer task. As a result, patients may have been only externally motivated to complete the questionnaires, making it uncertain to what extent they were motivated to answer the questions truthfully. However, in order to ensure the quality of these self-reports to a certain degree, three researchers who were 'blind' for the outcome of the research were present during the completion of the questionnaires. These researchers were instructed to help patients with the questionnaires when questions were unclear and to prevent a hurried completion of the questionnaires.

Third, it was unclear for the researchers on which basis patients were assigned to follow ART and PMT. This may have resulted in a rather heterogeneous group of patients with different individual criminogenic needs (Andrews & Bonta, 2010), such as antisocial cognitions, antisocial associates or a lack of social skills. Therefore, in our research it is not possible to make any conclusions about the treatment effects of ART and PMT in terms of progression on specific criminogenic needs.

A fourth limitation is that the studies were performed in a highly controlled environment, namely a forensic psychiatric clinic. This situation makes it difficult to assess behavior change step-by-step because the base rate of aggressive behavior is often already relatively low at the start (Hornsveld, Kraaimaat, Bouwmeester et al., 2014). This low base-rate of aggression may be a result of patients being more aware of their own behavior (Friese et al., 2009), and a result of the structure that is provided by the hospital setting. In addition, another problem with studies that are performed in clinical settings is that it is difficult to interpret behavior changes in terms of risk of future aggression (Von Borries, 2014). It remains unclear whether the progression which is made in a clinical setting will be continued and generalized when patients return to a society which has less structure and cohesion.

Implications for clinical practice

The main focus of the current thesis was on the determinants of reactive aggression (psychopathy and implicit attitudes toward violence), and on the additive value of PMT to a cognitive-behavioral treatment program for violent forensic psychiatric inpatients. The results of these studies have several implications for clinical practice, which are discussed below.

The four factor structure of the PCL-R

The PCL-R study was the first to investigate the four-factor structure of the PCL-R in a relatively large Dutch sample of forensic psychiatric inpatients, and may therefore have important clinical repercussions. At this moment, the two-factor structure (Hare, 1991) is still the most commonly applied factor structure in clinical practice. Our study indicated that the four-factor structure (Hare, 2003) may also be applicable in Dutch forensic psychiatric inpatients and that the PCL-R may well be administered to the two main patient groups in Dutch forensic clinics, namely patients with a personality disorder and patients with a psychotic disorder.

Several items of the PCL-R had rather low threshold values (lack of remorse or guilt, poor behavior controls, failure to accept responsibility for own actions, and revocation of conditional release), which may indicate that these items are often judged as being present. A possible explanation might be that these features are highly prevalent in high-risk forensic psychiatric patient group under study. An alternative explanation may be that these items were overrated by clinicians. This may imply that proper supervision is essential in a clinical setting in order to prevent that these items are scored too often as being present.

In the current study, the PCL-R scores were largely based on file studies, and not on file studies in combination with structured interviews which can be applied in order to get additional information about someone's self-presentation. The confirmation of the four-factor structure in our study may support the applicability of the PCL-R without an interview. Although the guidelines of the PCL-R state that an interview is required in all PCL-R assessments, it remains questionable if an interview is necessary to be performed in a closed setting such as forensic psychiatric center (R. D. Hare, personal communication, June 7, 2012). The interview mainly provides information about the interpersonal communication style of a patient, which is of course valuable, especially for scoring items related to the interpersonal and affective factors. Yet, in forensic psychiatric settings, the (interpersonal) behaviors of patients are already well-monitored and additional information can often be derived from the reports of the psychological evaluations that were carried out by order of the court. Furthermore, in Dutch forensic

psychiatric centers, clinicians who rate the PCL-R sometimes already have had several meetings with the patient, and therefore may already have enough information to score the items related to the interpersonal and affective factors. Note that this is also in line with the manual of the PCL-R, which states that the parts of the interview can be skipped when information on these items is already available (Hare, 1991; Vertommen et al., 2002). Therefore, it can be argued that the interview should only be conducted when certain items cannot be scored because sufficient information is lacking. This would also be in accordance with the current situation in Dutch forensic psychiatric settings, in which budget cuts in recent years have led to an increased workload and may therefore demand an efficient but valid procedure in conducting assessments.

Implicit attitudes toward violence

The study on the implicit attitudes toward violence provided indications for a relation between implicit attitudes toward violence and a violent behavior pattern as indexed by the antisocial factor of the PCL-R. Furthermore, attitudes toward violence were negatively related to several socially adaptive behaviors. These results may indicate that implicit attitudes are related to aggression, albeit to a limited degree, and may therefore raise questions about the inclusion of treatment approaches that aim to modify implicit attitudes in aggressive forensic inpatients. In order to change these implicit attitudes, several approaches have been proposed, such as evaluative conditioning (De Houwer, Baeyens, Randell, Eelen, & Meersmans, 2005) according to which automatically and unintentionally activated attitudes toward violence can be changed by rewarding positive (non-aggressive) behaviors that are not in line with these attitudes. This approach is also in line with recent studies, which have suggested that changing overt behavior may be important in order to change implicit or explicit cognitions (e.g., Longmore & Worell, 2007). In the case of attitudes toward violence, this would also mean that the performance of violent behavior has to be linked to negative experiences (or consequences). Within an inpatient setting, this demands a multi-disciplinal approach, in which violent behavior is repeatedly related to negative consequences, while positive behavior (e.g., solving a conflict situation without aggression) should be related to positive consequences. Milieu therapy which is carried out by the staff on the wards might play an important role in changing antisocial behavior. However, because several authors have stated that forensic psychiatric inpatients, especially those who are psychopaths (e.g., Blair, Mitchell, Leonard, Budhani, Peschardt, & Newman, 2004; Peschardt, Morton, & Blair, 2003), are less susceptible to punishment, the focus should be on the encouragement of prosocial behaviors by means of reinforcement and reward.

The current study provided some evidence for the applicability of implicit measures for diagnostic purposes. A review by Roefs and colleagues (2011) had already confirmed the predictive validity of the implicit association test (IAT) in various domains of psychopathology, and in one of our recent studies, we found that an IAT can differentiate between child abusers and non-sexual offenders (Kanters et al., 2014). However, a better understanding of the construct validity of the IAT is required before this measure can be applied for diagnostic purposes or risk assessment on an individual level. On a group level, the application of an IAT in assessing implicit attitudes toward violence has led to interesting results, with some studies showing that violent offenders have a less negative implicit attitude toward violence compared to non-violent comparison groups, whereas no differences can be found on explicit measures (e.g., Eckhardt et al., 2012; Robertson & Murachver, 2007). This seems to indicate that the majority of the violent offenders may disapprove violent behavior on an explicit level, and that they are reluctant to exhibit violent behavior if only they would be able to control their behavior. These offenders may be more likely to show violent behavior in situations when they react impulsively because they do not have the motivation, cognitive resources or time to control their behavior. This confirms that the ability to control impulsive behavior and to avoid certain high-risk situations may be important treatment goals in forensic psychiatry. A promising method to control impulsive behavior is the 'Early Recognition Method' (ERM; Fluttert, Van Meijel, Webster, Nijman, Bartels, & Grypdonck, 2008). By applying this self-management tool, patients learn to recognize early signs of aggression and to prevent further escalation at a moment on which they are still able to control their behavior. A recent study in forensic psychiatric patients showed that the number of seclusions declined after the ERM was implemented (Fluttert, Van Meijel, Nijman, Bjorkly, & Grypdonck, 2010). Furthermore, the mean severity of the inpatient incidents decreased, in particular for patients with personality disorders.

The Anger Bodily Sensations Questionnaire

In the current study, a self-report questionnaire to assess awareness of bodily sensations during anger was designed and its psychometric properties were investigated. Unfortunately, the final version of the ABSQ was not yet developed when the treatment study started, and so scores were based on three (validated) items of the initial version. In our opinion, treatment effect studies should not only include primary outcome measures of aggressive or prosocial behavior, but also incorporate secondary outcome measures that are related to specific treatment goals (i.e., dynamic criminogenic needs).

At this moment, the ABSQ is used by several PMT therapists in the Netherlands and it has been included in the master program for PMT students. Although the ABSQ was originally developed as an evaluation measure for a specific treatment goal of PMT (bodily awareness during anger), the ABSQ has also been applied for other purposes in clinical practice. PMT therapists have recommended the ABSQ as a diagnostic tool to explore certain problems in bodily awareness and as a tool to use during therapy sessions. For example, these therapists first ask the patient to complete the ABSQ and then discuss notable absences of bodily sensations. This is in accordance with the application of the two aforementioned measures that we developed for measuring moral awareness (SRM-AV; Hornsveld et al., 2012) and attitudes towards women (AWI; Hornsveld, Timonen et al., 2014), which can also be used for diagnostic purposes, for the evaluation of treatment as well as during treatment sessions.

Psychomotor therapy as an additive intervention for violent forensic psychiatric inpatients

The pilot study about PMT indicated that the addition of PMT to a treatment program for violent forensic psychiatric inpatients may result in positive effects on awareness of bodily sensations during anger and on coping behaviors. The effects on the aggression measures were limited. As mentioned before, the scores on the measures of aggression were already relatively low at the pre-treatment measurement, making it rather difficult to realize any progress on these measures. The low scores are probably a result of the presence of situational factors that have an attenuating effect on aggressive behavior, such as the presence of high numbers of staff members (Hornsveld, Kraaimaat, Bouwmeester et al., 2014). According to several authors, situational factors, such as the presence of staff members, play an important role in motivating people to behave in accordance with rulings and expectations (e.g., Friese et al., 2009). In addition, the Model of impulsive violence, which states that impulsive aggression is only shown in situations in which a person is not able or not motivated to control behavior. As a result, enhancing the motivation to control behavior is often an important treatment goal in treatment programs for violent offenders. A technique to achieve this goal is learning to focus on the long term positive consequences of behavior (Hornsveld & De Vries, 2009). During this treatment intervention, patients may become more motivated to control their anger on the short term in order to achieve positive long term consequences.

During the PMT study, several observations were done by therapists and researchers that participated in this study on factors that may have had a significant impact on the results. First, during therapy sessions, it became clear that several patients had only limited motivation to be involved in treatment. This seems highly relevant as treatment motivation is often considered

as one of the most important predictors of treatment outcome (Prochaska et al., 1992). According to Howells and Day (2007), motivation for treatment is particularly low in high-risk offenders with personality disorders. Therefore, it is advisable that a module to enhance motivation for treatment is provided before the start of the actual intervention (e.g., Preston, 2000). According to Chambers and colleagues (2008) such motivational modules may best be given individually because patients are likely to support the resistance that is displayed by other patients.

Furthermore, the level of adherence to the treatment protocol seemed to vary considerably across the therapists participating in the study. Several authors have indicated that treatment integrity is often limited in clinical settings, due to therapists' lack of knowledge about and negative attitude toward evidence-based CBT protocols (e.g., Van Dam, 2014). Although the psychologists who provided the ART program were supervised by an experienced clinical psychologist every two weeks, they often had to be reminded that they should provide the intervention according to the guidelines. This was especially the case for role-playing exercises, a treatment element that is often regarded as one of the most important features of CBT (e.g., Lipsey, Landenberger, & Wilson, 2007; Longmore & Worell, 2007). Ensuring a certain level of treatment integrity may be especially important because of the positive relation with treatment effects (Lipsey & Wilson, 1998).

Suggestions for future research

The studies of this thesis have yielded valuable information about the determinants of aggression and the possible treatment effects of PMT as an additional treatment module of a treatment program for violent forensic psychiatric inpatients. However, several questions that concern aggression and related constructs (such as psychopathy and attitudes toward violence) remain unanswered. Therefore, future studies on these topics are needed and should be encouraged.

The four-factor structure of the PCL-R

In the study about the PCL-R we validated the four-factor structure in a sample of Dutch forensic psychiatric inpatients. Unfortunately, we were only able to validate the factors of the PCL-R against measures of aggression. While this yielded interesting results (i.e., the lifestyle factor and the antisocial factor were significantly related to measures of aggression in the sample

of patients with a personality disorder), future research should also include other measures, especially those that are related to the items of the PCL-R that are less directly related to aggression. In a recent study, we investigated the relation between the factors of the two-factor model and hostility, impulsivity and lack of empathy (Bogaerts, Polak, Spreen & Zwets, 2012). Results indicated that hostility is related to the original factor one, impulsivity to the original factor two (socially deviant lifestyle) of the two-factor model (Hare, 1991), and a lack of empathy to both original factors. The applicability of the four-factor structure provides the opportunity to relate these clinically relevant behaviors to more specific factors, which may result in more valid risk assessment and may even contribute to a more effective treatment approaches. More recently, we already applied the four-factor structure to investigate the criminogenic factors of different types of sexually violent forensic inpatients (Hornsveld, Gerritsma, Kanters, Zwets, & Roozen-Vlachos, 2014). Results showed that a group of rapists had significantly higher scores on the lifestyle factor and the antisocial factor than a group of child abusers. Because the rapists did score significantly higher on these factors than (non-sexually) violent forensic psychiatric inpatients, we therefore concluded that rapists may be assigned to treatment programs for both sexual and general aggression.

Furthermore, the study about the validation of the PCL-R four-factor structure indicated that the PCL-R may be assessed without an interview. However, in order to draw definitive conclusions about the additional value of the interview, future research should include a comparison between a procedure in which the interview is included and a procedure which is only based on file study.

Implicit attitudes toward violence

The relation between implicit attitudes toward violence and aggressive behavior was confirmed in our study: scores on an implicit association test about positive associations toward violence were negatively related to socially adaptive behaviors and positively to the antisocial factor of the PCL-R, although this correlation was rather low. These results were in accordance with the model of impulsive violence, which was presented in Chapter 1. According to this model, implicit attitudes toward violence tend to influence impulsive aggression, especially in situations when cognitive resources to restructure intentions, motivation to act according to explicit attitudes, and time to process information are lacking. However, although several studies have demonstrated the validity of the IAT in addressing attitudes toward violence (e.g., Eckhardt et al., 2012; Nunes, Hermann, & Ratcliffe, 2013), more studies about its relation with aggression are required. Furthermore, although a relation with the antisocial factor was found, it has to be kept in mind

that this factor also includes items that are not directly related to impulsive violence. Therefore, future studies should also focus on the relation between implicit attitudes toward violence and a measure that only focuses on impulsive violence.

The Anger Bodily Sensations Questionnaire

The study about the development and psychometric properties of the ABSQ indicated that the ABSQ is a valid instrument to assess the level of bodily awareness during anger. This measure makes it possible to address the relation between bodily awareness during anger and aggressive behavior, which has not yet been well established in literature. The psychometric properties of the ABSQ have to be studied in other and larger samples in order to apply this measure in those types of patients. Therefore, the psychometric properties of the ABSQ are currently studied in Dutch female offenders and Dutch mentally disabled offenders. These studies are performed together with PMT therapists who already have positive experiences with the ABSQ in these offender samples.

Psychomotor therapy as an additive intervention for violent forensic psychiatric inpatients

The PMT study showed promising results on the secondary outcome measures of awareness of bodily sensations during anger and coping behavior. However, we were only able to conduct a pilot study because of the limited number of participants. Therefore, research in larger samples is needed to evaluate PMT as an addition to a treatment program for violent forensic psychiatric inpatients. In order to achieve a sufficient sample, multi-center study designs may be needed.

Our studies suggest that it may be difficult to assess aggression in a valid way. In a study about the treatment progress of forensic psychiatric patients in terms of aggression and prosocial behavior, we found that aggressive behavior did not change, whereas prosocial behavior improved during the first three years of their stay in a forensic psychiatric clinic (Hornsveld, Kraaimaat, Bouwmeester et al., 2014). Given the low base rate of aggression in a structured environment, it can be advised that effect studies on treatment programs in forensic psychiatric inpatients should not only focus on assessing the decrease of aggressive behavior, but should also include measures of prosocial behaviors. Furthermore, self-report measures require a certain level of introspection (Nunes, Firestone, & Baldwin, 2007) and are also vulnerable to socially desirable response tendencies (e.g., Gannon et al., 2007; Vigil-Colet et al., 2012). This may especially be a problem in severely disordered offenders who assume that they will benefit from picturing a positive view. Therefore, secondary outcome measures, such as the ABSQ, SRM-AV (Hornsveld

et al., 2012), and AWI (Hornsveld, Timonen et al., 2012) may be needed to assess possible progression on determinants of (sexually) aggressive behavior. Therefore, the development and psychometric evaluation of secondary outcome measures should be encouraged.

The results of the PMT study further suggested that psychopathy is a predictor of treatment dropout, which is in line with other treatment outcome studies (Olver & Wong, 2009). Patients with relatively high PCL-R scores often complained about the exercises, because they did not experience the evoked bodily sensations. It is known that psychopathy is related to deficits in emotional experience (e.g., Gao et al., 2012; Nentjes et al., 2013), which may cause this type of problems during therapy. However, it still remains unclear whether these patients are capable of learning to better sense their bodily sensations. Therefore, future research is needed to address this issue, in which biofeedback training can be considered as a possible treatment.

Conclusions

In conclusion then, this thesis provided important information about specific determinants of aggressive behavior of forensic psychiatric inpatients. The studies showed that implicit attitudes toward violence and the level of psychopathy are to some extent related to aggressive behavior. Based on the main findings of this thesis, future research regarding the determinants of aggression in forensic patients is certainly warranted. A better insight in the determinants of impulsive aggression (including implicit attitudes toward violence and features of psychopathy) may result in more efficient treatment programs for forensic psychiatric inpatients as interventions may focus on medication of these determinants. For example, the current study indicates that implicit attitudes toward violence may be related to aggression and socially adaptive behaviors. This might indicate that milieu therapy is an important factor in the treatment of forensic psychiatric inpatients and that staff members, who provide milieu on a daily basis, should receive intensive training and supervision. This may include learning to focus on rewarding positive behaviors instead of punishing negative behaviors. The change of focus in treatment programs became especially important in recent years, since budget cuts have resulted in a need for more efficient treatment methods for patients detained under hospital order. Evidence-based protocols that are studied in RCTs may also become increasingly important. Because of the relatively small number of patients in each forensic psychiatric clinic, multi-centered effect studies should be performed as they increase statistical power. At this moment, such multi-centered studies are still fairly scarce (Hornsveld, Nijman, & Kraaimaat, 2008). More

recently, Bernstein and colleagues (2007) who explored the effectiveness of Schema Focused Therapy (SFT) for forensic patients with a personality disorder in a randomized clinical trial study including seven Dutch forensic clinics. Yet, conducting a multi-centered study also comes with several problems. For example, in order to perform a multi-centered study, standard programs (including manuals and a standard set of evaluation measures) should be implemented in multiple forensic clinics, whereas different treatment programs are being provided at this moment. Furthermore, an additional problem when conducting a multi-centered RCT concerns treatment integrity (De Beurs & Barendregt, 2008). Therefore, a multi-centered study demands measures to ensure treatment integrity and quality. These should not only include supervision by an experienced clinicians, because supervision does not always seem to guarantee good treatment integrity (e.g., Brosan, Reynolds, & Moore, 2007), but also make use of video- or audio-recordings of therapy sessions.

Furthermore, due to difficulties in measuring treatment response in terms of aggressive behavior, we also focused on a new measurement instrument that measures secondary treatment goals. This has resulted in the development and psychometric evaluation of the ABSQ which measures awareness of bodily sensations during anger. Recently, the SRM-AV and AWI were also developed to assess the level of moral awareness and the attitude toward women. These instruments can be applied for the evaluation of treatment programs for (sexually) violent forensic psychiatric inpatients, but may also be used for diagnostic purposes. The ABSQ has received positive responses from PMT therapists in the Netherlands and its validity in other (forensic) populations is being studied at this moment.

To conclude, the current thesis has also provided a first attempt to evaluate an evidence based treatment method which consisted of ART and PMT. There are indications that PMT as an add-on intervention to ART may result in improvements on behaviors related to the inhibitions of aggressive behavior, but not in actual improvements on aggressive behavior. Although the sample size of this study was too small to draw any definitive conclusions, these results were in accordance with the clinical observations of PMT therapists and staff members on the ward. Therefore, it is advised to provide the multi-modal treatment program for violent forensic inpatients, and that this treatment program should not only be evaluated by measures of aggression, but preferably by valid and reliable measures of prosocial behaviors.

CHAPTER SEVEN

Summary

Aim of this thesis

The first goal of the current research project was to get more insight in the determinants of reactive aggression, namely psychopathy, as measured with the Psychopathy Checklist-Revised (PCL-R), and implicit attitudes toward violence. Based on earlier research, there were indications that certain factors of the PLC-R are related to aggression, and that positive implicit attitudes toward violence may be related to aggression. The second goal of the current research project was to investigate the possible treatment effects of a multi-modal treatment program for violent forensic psychiatric inpatients, consisting of the extended Aggression Replacement Training (ART) and psychomotor therapy (PMT). PMT is an experience-based intervention that is often added to cognitive-behavioral treatment programs for aggressive forensic psychiatric inpatients. The main goal of PMT is to gain control over anger, in order to prevent impulsive aggressive behavior. Up till now, the treatment effects of PMT have not been systematically evaluated.

Chapter summaries

In Chapter 1, a general introduction to aggression and related terms was provided. A model was presented in which anger and implicit attitudes toward violence are seen as important antecedents of aggressive behavior: anger-related arousal has a detrimental effect on executive functions, hence resulting in impulsive aggression, while more positive implicit attitudes toward violence may increase the likelihood of impulsive violent behavior.

Chapter 2 focuses on the validation of the four-factor structure of the PCL-R in Dutch forensic psychiatric inpatients. An acceptable fit was found in a subsample of 269 forensic psychiatric inpatients with a personality disorder, in a subsample of 142 forensic psychiatric inpatients with a psychotic disorder, and in the combined sample. Results indicated that measurement invariance could be established between both subsamples of patients, which indicates that the PCL-R can be administered in both patient groups and that scores can be compared in a valid way. Interestingly, several items were found to have rather low threshold values, which points out that these items were quite often endorsed as being present in this population. Correlations with external measures showed that the lifestyle factor and the antisocial factor were both related to measures of aggression in inpatients with a personality disorder, whereas the results for the inpatients with a psychotic disorder were found to be less clear.

Altogether, the results of this study supported the validity of the four-factor structure of the PCL-R in forensic psychiatric inpatients.

The study in Chapter 3 examined the relation between implicit attitudes toward violence and aggressive behavior, socially adaptive behaviors, and psychopathy. Implicit attitudes toward violence were assessed in 100 forensic psychiatric inpatients with an Implicit Attitudes Test (IAT) and related to various self-report questionnaires, an observation scale, and the PCL-R. Results indicated that patients in general had negative implicit attitudes toward violence, and that these attitudes were related to the antisocial factor of the PCL-R, which is concerned with an antisocial behavior pattern. Interestingly, in this study, attitudes toward violence were found to be negatively associated with several socially adaptive behaviors, including coping techniques and the level of moral awareness. These results seemed to indicate that implicit attitudes toward violence are to some extent related to aggressive behavior, but that they mainly have an impact on behavior that is related to the inhibition of aggression.

Chapter 4 described the development and psychometric evaluation of the Anger Bodily Sensations Questionnaire (ABSQ), which is a self-report questionnaire for measuring bodily awareness during anger. The total sample consisted of 70 forensic psychiatric patients and 100 secondary vocational students. Results indicated that the ABSQ has satisfactory psychometric properties with good reliability and validity as established by significant correlations with measures of bodily awareness, social anxiety, anger, and aggression. On the basis of these results, it was concluded that the ABSQ can be readily applied in studies that evaluate body-oriented therapies.

In Chapter 5, a study was presented about the first results of PMT as an additive intervention to ART for violent forensic psychiatric inpatients. A total number of 37 forensic psychiatric inpatients were assigned to two conditions, namely ART+PMT and ART+Sports. Both groups showed limited improvement on the primary outcome measures of aggressive behavior, whereas the ART+PMT group exhibited more improvement on the secondary outcome measures, including bodily awareness during anger and coping behavior. Thus, PMT did not result in a decrease of aggressive behavior, whereas improvements were predominantly found on behavior related to the inhibition of aggressive behavior.

Finally, Chapter 6 concluded with a general discussion of the main findings of the studies described in this thesis, and an integration of the results. Implications for clinical practice and suggestions for future research were discussed. Furthermore, problems with the assessment of aggressive behaviors of forensic psychiatric inpatients and randomized controlled trials in forensic psychiatry were discussed.

CHAPTER EIGHT

Samenvatting

Doel van het onderzoeksproject

Het eerste doel van het huidige onderzoeksproject was om meer inzicht te krijgen in de determinanten van reactieve agressie, namelijk psychopathie, zoals gemeten met de Psychopathy Checklist-Revised (PCL-R), en impliciete ten opzichte van geweld werden onderzocht. Vanuit eerder onderzoek waren er indicaties dat bepaalde factoren van de PCL-R gerelateerd zijn aan agressie en dat positieve impliciete attitudes ten opzichte van geweld gerelateerd kunnen zijn aan agressie. Het tweede doel van het huidige onderzoeksproject was om te onderzoeken of een multimodaal behandelprogramma voor gewelddadige forensisch psychiatrisch patiënten, bestaande uit de verlengde agressiehanteringstherapie (AHT) and psychomotorische therapie (PMT) resulteert in een afname van agressief gedrag en een toename van prosociaal gedrag. PMT is een ervaringsgerichte behandelinterventie die vaak toegevoegd wordt aan cognitief-gedragstherapeutische behandelprogramma's voor agressieve forensisch psychiatrische patiënten. Het belangrijkste doel van PMT is om controle te krijgen over woede, om zo impulsief agressief gedrag te voorkomen. Tot dit moment zijn de behandeleffecten van PMT nog niet systematisch onderzocht.

Hoofdstuk samenvattingen

In hoofdstuk 1 werd een algemene introductie gegeven over agressie en daaraan gerelateerde termen. Een model werd gepresenteerd waarin woede en impliciete attitudes ten opzichte van geweld worden gezien als belangrijke voorspellers van agressief gedrag: woedegerelateerde spanning heeft een storend effect op de executieve functies wat resulteert in impulsieve agressie, terwijl positieve impliciete attitudes ten opzichte van geweld de kans op impulsief gewelddadig gedrag kunnen vergroten.

Hoofdstuk 2 richt zich op de validatie van de vier factoren structuur van de PCL-R in Nederlandse forensisch psychiatrische patiënten. Een acceptabele fit werd gevonden in 269 forensisch psychiatrische patiënten met een persoonlijkheidsstoornis, in 142 forensisch psychiatrische patiënten met een psychotische stoornis en in de gecombineerde sample. Resultaten gaven aan dat meetinvariantie kon worden bevestigd tussen beide subsamples wat suggereert dat de PCL-R kan worden afgenomen in beide patiëntgroepen en dat scores op een valide manier met elkaar kunnen worden vergeleken. Opvallend was dat meerdere items een lage treshhold waarde hadden, wat aangeeft dat deze items vaak als aanwezig werden gescoord in deze

onderzoeksgroep. Correlaties met externe maten toonden aan dat de levensstijl factor en de antisociaal factor beiden gerelateerd waren aan maten van agressie bij patiënten met een persoonlijkheidsstoornis, terwijl de resultaten bij patiënten met een psychotische stoornis minder duidelijk waren. Samengevat lijken de resultaten van deze studie de validiteit van het vier factoren model van de PCL-R in Nederlandse forensisch psychiatrische patiënten te ondersteunen.

De studie in hoofdstuk 3 onderzocht de relatie tussen impliciete attitudes ten opzichte van geweld en agressief gedrag, aangepast gedrag, en psychopathie. Impliciete attitudes ten opzichte van geweld waren gemeten bij 100 forensisch psychiatrische patiënten met behulp van een Impliciete Associatie Test (IAT) en gerelateerd aan verschillende zelfrapportage vragenlijsten, een observatieschaal, en scores op de PCL-R. Resultaten toonden aan dat patiënten over het algemeen negatieve impliciete attitudes ten opzichte van geweld hadden en dat deze attitudes gerelateerd waren aan de antisociale factor van de PCL-R die een antisociaal gedragspatroon beschrijft. Opvallend is dat in deze studie werd gevonden dat attitudes ten opzichte van geweld negatief waren gerelateerd aan meerder vormen van aangepast gedrag, waaronder coping technieken en de mate van moreel bewustzijn. Deze resultaten leken aan te geven dat impliciete attitudes ten opzichte van geweld tot een bepaalde hoogte gerelateerd zijn aan agressief gedrag, maar dat ze vooral invloed lijken te hebben op gedrag dat gerelateerd is aan de inhibitie van agressie.

Hoofdstuk 4 beschrijft de ontwikkeling en de psychometrische evaluatie van de Boosheid Lichamelijke Signalenlijst (BLS; Engelse titel: Anger Body Sensations Questionnaire of ABSQ), wat een zelfrapportage vragenlijst is om lichamelijk bewustzijn tijdens woede te meten. De totale steekproef bestond uit 70 forensisch psychiatrische patiënten en 100 studenten van het middelbaar beroepsonderwijs. Resultaten gaven aan dat de psychometrische eigenschappen van de BLS voldoende waren. Een goede betrouwbaarheid en een goede validiteit konden worden aangetoond aan de hand van significante correlaties met maten van lichamelijk bewustzijn, sociale angst, woede en agressie. Op basis van deze resultaten werd geconcludeerd dat de BLS kan worden toegepast in studies over de evaluatie van lichaamsgerichte therapieën.

In hoofdstuk 5 werd een studie gepresenteerd over de eerste resultaten van PMT als een aanvullende interventie op AHT voor gewelddadige forensisch psychiatrische patiënten. Een totaal van 37 forensisch psychiatrische patiënten waren toegewezen tot twee condities, namelijk AHT+PMT en AHT+Sport. Beide condities toonden beperkte vooruitgang op de primaire uitkomstmaten van agressie gedrag, terwijl de ART+PMT groep meer vooruitgang toonden op de secundaire uitkomstmaten, waaronder sociaal gedrag, lichamelijk bewustzijn tijdens woede, en

coping gedrag. PMT resulteerde niet in een afname van agressief gedrag, terwijl vooruitgang voornamelijk werd gevonden op gedrag dat gerelateerd is aan de inhibitie van agressief gedrag.

Hoofdstuk 6 sloot af met een algemene discussie over de belangrijkste bevindingen van de studies die beschreven worden in dit proefschrift en een integratie van de resultaten. Meerdere sterke punten en beperkingen van deze studies werden bediscussieerd, samen met implicaties voor de klinische praktijk en toekomstig onderzoek. Daarnaast werden problemen met het meten van agressief gedrag van forensisch psychiatrische patiënten en het uitvoeren van randomized controlled trials in de forensische psychiatrie bediscussieerd.

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APPENDICES

Appendix A

Words used for the pleasant-unpleasant category and the peace-violence category

Pleasant words	**Unpleasant words**
beautiful	accident
good	cancer
happy	disaster
health	pollution
honest	poverty
joke	sickness
laugh	ugly
lucky	vomit
Peace words	**Violence words**
calm	attack
dove	hit
peace	hurt
quiet	kill
rest	murder
sleep	stab
tranquil	strangle
whisper	threaten

Appendix B

Anger Bodiliy Sensations Questionnaire (ABSQ)

Anger Bodily Sensations Questionnaire (ABSQ)

Dutch version: Boosheid Lichamelijke Signalenlijst (BLS)

A.J. Zwets, R.H.J. Hornsveld, F.W. Kraalmaat, T. Kanters, P. Muris, E. Langstraat, H.J.C. van Marle, 2014

Group: ….. Number: ……

Questionnaire

BODILY SIGNALS DURING ANGER

Everybody can become tense as the result of the behavior of someone else, such as during an argument. This questionnaire contains several statements about your bodily reactions when you become angry in such a situation. Each statement is followed by a 5-point scale ranging from 'Not at all' to 'Very much'. You have to answer to what degree you generally experience these bodily sensations during situations when you become angry with another person. You may only choose one answer for each statement. **It concerns situations in which you become tense as the result of the behavior of someone else.**

An example:

	Not at all	A little	Somewhat	Much	Very much
When I get tense because of somebody, my hands starts to tingle	O	O	O	x	O

If you think that this physical response corresponds to what you experience when you are tense, you may put a cross in the box on the right.

If you think that this physical response does not match what you experience when you are tense, then you put a cross in the box on the left.

	Not at all	A little	Somewhat	Much	Very much
1. When I get tense because of somebody I feel my heart starts beating faster	o	o	o	o	o
2. When I get tense because of somebody I notice that my hands are starting to sweat more	o	o	o	o	o
3. When I get tense because of somebody I notice that my body freezes	o	o	o	o	o
4. When I get tense because of somebody I get light-headed	o	o	o	o	o
5. When I get tense because of somebody I notice that my breathing becomes irregular	o	o	o	o	o
6. When I get tense because of somebody I notice that my body starts shaking	o	o	o	o	o
7. When I get tense because of somebody I notice that I get an adrenaline kick	o	o	o	o	o
8. When I get tense because of somebody I notice that my head feels warmer	o	o	o	o	o
9. When I get tense because of somebody I notice that I start breathing faster	o	o	o	o	o
10. When I get tense because of somebody I notice that I start to sweat more	o	o	o	o	o
11. When I get tense because of somebody I notice that my muscles become tensioned	o	o	o	o	o
12. When I get tense because of somebody I notice that my hands start shaking	o	o	o	o	o
13. When I get tense because of somebody I notice that my body becomes warmer	o	o	o	o	o
14. When I get tense because of somebody I notice that my heart starts beating harder	o	o	o	o	o
15. When I get tense because of somebody I notice that my jaw muscles become tensioned	o	o	o	o	o
16. When I get tense because of somebody I notice that I start breathing deeper	o	o	o	o	o
17. When I get tense because of somebody I notice that I get a dry mouth	o	o	o	o	o
18. When I get tense because of somebody I notice that I clench my fists	o	o	o	o	o

Appendix C

Boosheid Lichamelijke Signalenlijst (BLS)

Boosheid Lichamelijke Signalenlijst (BLS)
Anger Bodily Sensations Questionnaire (ABSQ)

A.J. Zwets, R.H.J. Hornsveld, F.W. Kraalmaat, T. Kanters, P. Muris, E. Langstraat, H.J.C. van Marle, 2014

Groep: ….. Nummer: ……

Meting: na indicatiestelling/voor behandeling/na behandeling/bij follow-up

Vragenlijst

LICHAMELIJKE SIGNALEN BIJ BOOSHEID

Iedereen raakt weleens gespannen door het gedrag van een ander, zoals bijvoorbeeld tijdens een ruzie. In deze vragenlijst staan enkele uitspraken die gaan over wat u aan uw lichaam voelt wanneer u **tijdens** dat soort situaties boos wordt. Achter elke uitspraak staat een vijfpunt-schaal die loopt van 'Niet' tot 'Heel erg'. Het is de bedoeling dat u op deze schaal aangeeft in welke mate u OVER HET ALGEMEEN deze lichamelijke reacties ervaart **tijdens** situaties waarin u boos wordt door een ander. U zet achter elke uitspraak slechts één kruisje. **Het gaat om situaties waarin u gespannen raakt omdat een ander u boos maakt.**

Een voorbeeld:

	Niet	Een beetje	Nogal	Erg	Heel erg
Als ik door iemand gespannen raak gaan mijn handen tintelen	O	O	O	x	O

Als u vindt dat deze lichamelijke reactie overeenkomt met hetgeen u ervaart wanneer u gespannen bent, zet dan een kruisje in het meest rechtse hokje.

Als u vindt dat deze lichamelijke reactie helemaal niet overeenkomt met hetgeen u ervaart wanneer u gespannen bent, dan zet u een kruisje in het meest linkse hokje.

	Niet	Een beetje	Nogal	Erg	Heel erg
1. Als ik door iemand gespannen raak voel ik **mijn hart sneller kloppen**	O	O	O	O	O
2. Als ik door iemand gespannen raak merk ik dat **mijn handen meer gaan zweten**	O	O	O	O	O
3. Als ik door iemand gespannen raak merk ik dat **ik het gevoel krijg dat ik verstijf**	O	O	O	O	O
4. Als ik door iemand gespannen raak merk ik dat **ik licht in mijn hoofd word**	O	O	O	O	O
5. Als ik door iemand gespannen raak merk ik dat **mijn ademhaling onregelmatig wordt**	O	O	O	O	O
6. Als ik door iemand gespannen raak merk ik dat **mijn lichaam gaat beven**	O	O	O	O	O
7. Als ik door iemand gespannen raak voel ik **een adrenalinestoot door mijn lijf gaan**	O	O	O	O	O
8. Als ik door iemand gespannen raak merk ik dat **mijn hoofd warmer wordt dan normaal**	O	O	O	O	O
9. Als ik door iemand gespannen raak merk ik dat **ik sneller ga ademen**	O	O	O	O	O
10. Als ik door iemand gespannen raak merk ik dat **ik meer ga zweten**	O	O	O	O	O
11. Als ik door iemand gespannen raak voel ik dat **mijn spieren zich aanspannen**	O	O	O	O	O
12. Als ik door iemand gespannen raak merk ik dat **mijn handen gaan trillen**	O	O	O	O	O
13. Als ik door iemand gespannen raak merk ik dat **mijn lichaam warmer wordt dan normaal**	O	O	O	O	O
14. Als ik door iemand gespannen raak merk ik dat **mijn hart harder gaat kloppen**	O	O	O	O	O
15. Als ik door iemand gespannen raak merk ik dat **ik mijn kaakspieren aanspan**	O	O	O	O	O
16. Als ik door iemand gespannen raak merk ik dat **ik dieper ga ademen**	O	O	O	O	O
17. Als ik door iemand gespannen raak merk ik dat **ik een droge mond krijg**	O	O	O	O	O
18. Als ik door iemand gespannen raak merk ik dat **ik mijn vuisten ga ballen**	O	O	O	O	O

Appendix D

Psychomotor Therapy for violent forensic psychiatric inpatients

Sessions	Description and goals
1-6	Improving the awareness of bodily sensations. Patients are instructed to focus on their sensory perceptions in order to recognize possible changes within the body. During these exercises the patients can be at rest (e.g., focusing on breathing), but physical changes are also often provoked using physical exercises. During the homework assignments, patients are instructed to report a situation in which they focused exclusively on their sensory perceptions. Furthermore, learning to focus on bodily sensations is practiced repeatedly during the whole treatment program.
7-11	Practicing coping techniques, including (1) breathing exercises, (2) Jacobson's progressive muscle relaxation technique (1934, 1938), (3) reassuring thoughts, and the (4) time-out procedure. Every technique coping is practiced during the session, but also as homework assignment on the ward. All coping techniques are repeatedly practiced during the whole treatment program and during session 11, all techniques are practiced again in one single session.
12-13	Exercises that evoke an impulsive reaction to explore how a patient tends to respond during elevated levels of arousal (in a safe and structured treatment environment).
14-16	The personal triggers of frustration are explored for every individual patient. These triggers are first verbally explored and skills to cope with these situations are subsequently practiced during exercises (e.g., role-playing).
17	Exercises to provide insight in impulsive reflexes which are associated with aggression.
18-19	Patients practice communication skills during elevated levels of physiological arousal.
20-25	The aggression profile of each individual patient, which includes triggers which can lead to high levels of anger, possible reaction tendencies during anger, and protective skills which can help to decrease the level of anger. These protective skills are also practiced during these sessions.

Appendix E

Aggression Replacement Training for violent forensic psychiatric inpatients

Sessions	Description and goals
1-5	*Anger control.* Participants learn to recognize and manage feelings of irritation and anger more adequately. For that purpose, five aspects of problem situations are analyzed, namely (1) event, (2) thoughts, (3) feelings, (4) behavior, and (5) consequences
6-10	*Social Skills Training.* The focus is on the improvement of prosocial skills. Five skills are selected by the patients from a list of twelve skills. For each exercise, the patients receive a hand-out with possible targets ('What do you want to achieve?') and criteria ('Where do you pay attention to?').
11-15	*Moral Reasoning Training.* Patients take note of the prevailing norms and values and learn how to solve moral problematic situations.
16-20	*Prosocial thinking.* Knowing how to convert cognitions which may lead to antisocial behavior into cognitions which may lead to prosocial behavior. Five distorted cognitions are discussed, namely putting you in another's place, self-centeredness, minimizing, assuming the worst, and blaming others.
21-25	*Character formation.* Learning to focus on the short-term and long-term consequences of prosocial and antisocial behaviors. This is done on the basis of five themes, namely accountability, subservience, respect, cooperation, and honesty.
26-30	*Prosocial network.* Learning how to engage in prosocial contacts and how to hold off or to end antisocial contacts. Five problem situations are practiced, namely making acquaintance, making an appointment, intensifying a contact, informing others about your offense, and responding on a rejection.
31-35	*Attitude towards women.* Male patients learn how to behave towards women. Participants practice five problem situations, namely showing your need to intimacy, responding on a rejection, responding on approaches, intensifying the relation, and dealing with relational problems.

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CURRICULUM VITAE

Almar Justin Zwets was born on the 16th of May 1982 in Rotterdam, the Netherlands. In 2003, he attended the Erasmus University Rotterdam to study psychology. During his study, he worked at FPC De Kijvelanden as a research assistant until he received his MSc degree in 2008 on a study about treatment progression in a forensic psychiatric clinic. From that moment, he started to work as a part-time researcher and a part-time psychologist at FPC De Kijvelanden. In 2009, the possibilities to perform a PhD project were discussed within FPC De Kijvelanden and the Erasmus University Rotterdam. This resulted in a part-time PhD project about determinants of reactive aggression and implications for treatment, which started in 2010.

As a psychologist, Almar was mainly involved in group treatment of aggressive forensic psychiatric inpatients and the coordination of Aggression Replacement Training in the clinic. He completed several trainings, including the cognitive behavior therapy basic and advanced course in 2013. Besides doing clinical work, he gave several international workshops on Aggression Replacement Training. In 2015, he started to follow the healthcare psychology postdoc education (GZ opleiding) at FPC De Kijvelanden.

As a PhD candidate, Almar gave multiple presentations a year on international conferences, and was also a yearly guest lecturer on the Erasmus University Rotterdam and several other universities. Since July 2015, he is a member of the editorial board of the Journal of Forensic Psychiatry and Psychology.

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