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Motivating judicial supervised substance abusers to change

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Where would you like to be in one year?

Motivating Judicial Supervised Substance Abusers to Change



Lielach Shaul





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Motivating Judicial Supervised Substance Abusers to Change

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Where would you like to be in one year?
Motivating Judicial Supervised Substance Abusers to Change

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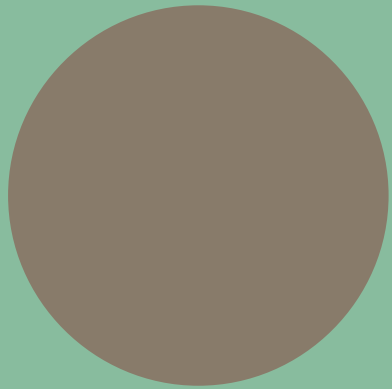
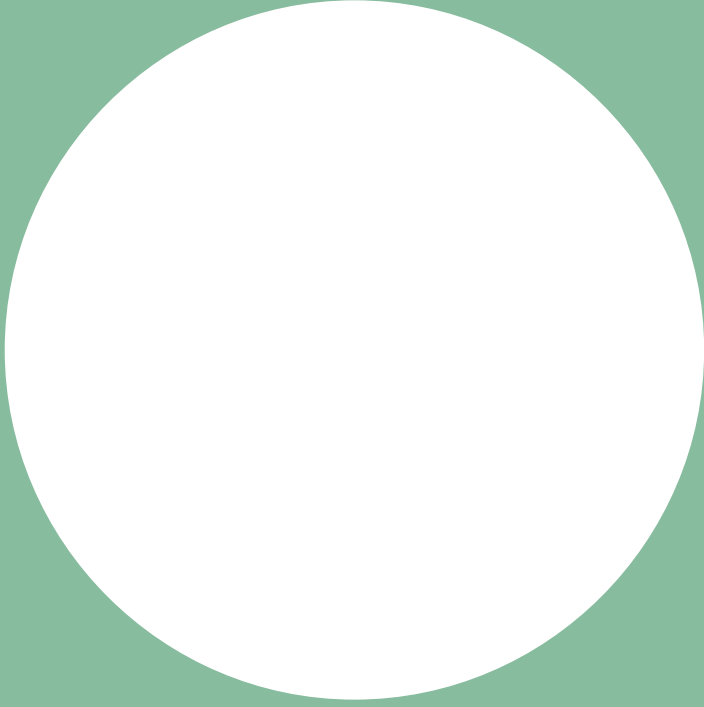
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CONTENTS

Chapter 1	General introduction and outline of this thesis	9
Chapter 2	The predictive value of impulsivity and risk-taking measures for substance use in substance-dependent offenders	23
Chapter 3	The role of motivation in prediction addiction treatment entry among offenders with substance use disorders under probation supervision	43
Chapter 4	The effectiveness of a brief motivation enhancing intervention on treatment initiation, treatment retention and substance-use: results from a multi-site cluster-randomized trial	55
Chapter 5	Brief motivation enhancing intervention to prevent criminal recidivism in substance-abusing offenders under supervision: a randomized trial	71
Chapter 6	General discussion	87
Appendix		101
	A. Probation supervision in the Netherlands	103
	B. Summary	105
	C. Samenvatting	109
	D. References	115
	E. Abbreviations	129
	F. Woorden van dank	131
	G. Portfolio and list of publications	133
	H. About the author	135



1

General introduction
and outline of the thesis

INTRODUCTION

I want to take you to a challenging place on the interface between justice and healthcare: the addiction probation service. You have probably never been arrested and this is probably your first visit to the probation rehabilitation. Therefore I want to introduce you to a group of people with problematic substance use and repetitive criminal behaviour who are under the supervision of the addiction probation service. As we walk down the corridors of the addiction rehabilitation, we meet John, a 30 years old, single, unemployed male who lives with his mother. He smokes 3 grams of cannabis a day and this is the 4th time he has been arrested for theft. He has been sentenced by the court to one year of probation supervision and obligated to addiction treatment for his cannabis use. John meets with his probation officer every two weeks and will soon start treatment for which he seems not to be intrinsically motivated. On our visit, we also get to meet other people who are under the supervision of the addiction probation service. They tell us similar stories of being arrested multiple times, prior treatment dropout, relapse in substance use and the long-standing relationship between their substance use and criminal behaviour. While we listen to their stories, the following questions occur to me: how are substance use and criminal behaviour related to each other and how can supervision contribute to preventing the influence of substance use on criminal behaviour?

THE RELATIONSHIP BETWEEN RECIDIVISM AND SUBSTANCE USE

Recidivism refers to the chance of repeating criminal behaviour (i.e., re-offending) and is an important element in judicial policy. Factors that promote recidivism are called criminogenic factors. Some criminogenic factors are static, such as age and gender. Other criminogenic factors are dynamic, such as substance use, and are of importance for intervention and policy. Problematic substance use and delinquency often co-occur and are interacting risk factors. They are associated with the occurrence, course and repetition of each other. Among other things, substance use seems to encourage recidivism. The prevalence of substance use disorders (SUDs) is four to nine times higher among offenders than in the general population (Fearn, Vaughn, Nelson, Salas-Wright, & Qian, 2016). SUDs increase the likelihood of continued criminal involvement; 69% of offenders with SUDs return to the criminal justice system (CJS) within 2.7 years of release from prison (Håkansson & Berglund, 2012). Substance users have a three to four times higher risk of offending than non-substance users, and the frequency of criminal behaviour increases with the severity of substance use (Bennett et al., 2008; Gottfredson, Kearly, & Bushway, 2008; White & Gorman, 2000). Studies have shown that substance abuse is a significant predictor of recidivism (Dowden & Brown, 2002; Håkansson & Berglund, 2012; Walter, Wiesback, Dittmann, Gaf, 2011), and that, without treatment, offenders with SUDs tend to repeat criminal behaviour (Harrison, 2001; Evans, Libo, & Hser, 2008). Furthermore, it has also been shown that recidivism by offenders with SUDs decreases as a result of addiction treatment, which has been shown to be mediated by a decrease in substance

use (Belenko, Hiller, & Hamilton, 2013; Löbmann & Verthein, 2014). Addiction treatment has been demonstrated to effectively reduce substance use and substance use related criminal behaviour in offenders (Belenko et al., 2013; Chandler, Fletcher, & Volkow, 2009; Harvey, Shakeshaft, Hetherington, Sannibale, & Mattick, 2007; Prendergast, Pearson, Podus, Hamilton, & Greenwell, 2013; Prendergast, Podus, Chang, & Urada, 2002). Despite these beneficial effects of addiction treatment, many offenders with SUDs do not participate in treatment at all or drop out of treatment early (Taxman, Perdoni, & Harrison, 2007; Evans, Libo, & Hser, 2009). An important barrier to treatment is offenders' low motivation for treatment (Chandler et al., 2009). In general, lower levels of motivation were observed for offenders compared to non-offenders (De Leon, Melnick, Thomas, Kressel, & Wexler, 2000; Melnick, De Leon, Thomas, Kressel, & Wexler, 2001), and for individuals legally mandated to treatment compared to individuals that participate in treatment voluntarily (Melnick, Hawke, & De Leon, 2014)

IMPULSE CONTROL AS AN ETIOLOGICAL FACTOR IN SUD AND CRIMINAL BEHAVIOUR

We hypothesize in this thesis that impulse control deficits may play a role in the relationship between recidivism and substance use. Impulse control deficits have been shown to be a risk factor of crime and recidivism (Åkerlund, Golsteyn, Grönqvist, & Lindahl, 2016; A. Carroll et al., 2006; Lee, Derefinko, Milich, Lynam, & DeWall, 2017; Mishra & Lalumière, 2017; Moffitt et al., 2011) and to contribute to the risk of problematic drug and alcohol use (De Wit, 2009; Perry & Carroll, 2008). Deficiencies in impulse control have been suggested to underlie the pathogenesis and pathophysiology of SUDs (Goldstein & Volkow, 2002; Verdejo-García, Lawrence, & Clark, 2008) and to negatively affect the ability to achieve and maintain abstinence during and following addiction treatment (Stevens et al., 2014). Therefore, the study of impulse control is essential in understanding patterns of substance use, criminal behaviour and prevention of SUD relapse and recidivism.

Impulse control is a multifaceted construct including broad domains of impulsive and risky decision-making, personality traits and response inhibition (MacKillop et al., 2016). Recently, in order to examine different facets of impulse control among offenders, studies started using computerized neurocognitive behavioural measures (Jones, Fearnley, Panagiotopoulos, & Kemp, 2015; Vedelago et al., 2019). For example, the delay-discounting task (DDT) is a computerized neurocognitive task used to measure delay discounting (Wittmann, Leland, & Paulus, 2007). Delay discounting is one of the aspects of impulsive decision-making (Bickel, Johnson, Koffarnus, MacKillop, & Murphy, 2014; Green & Myerson, 2004), meaning that the individual prefers immediate smaller rewards over distal larger rewards. A separate yet related aspect to impulsive decision-making is risk-taking, which refers to the tendency to seek novel and rewarding, but potentially harmful experiences (Dougherty et al., 2015). To assess risk-taking in decision-making, a computerized behavioural measure, the balloon analogue risk task (BART), was developed (Lejuez et al., 2002).

A recent systematic review by Vedelago and colleagues (2019), included 28 studies using computerized neurocognitive tasks to assess two domains of impulse control - response inhibition and impulsive decision-making. Ten studies examined impulsive decision-making, of which six studies used the DDT. Of those, five studies reported more discounting of delayed rewards (i.e. increased impulsiveness) among offenders compared to control groups. For example, in two studies, Cherek and colleagues (Cherek & Lane, 1999; Cherek, Moeller, Dougherty, & Rhoades, 1997) showed that violent parolees selected more often smaller-immediate rewards over larger delayed rewards than nonviolent parolees. In another study, offenders with SUDs were shown to exhibit higher rates of delay discounting relative to healthy non-offender controls (Jones, Hayhurst, & Millar, 2017). In addition, in a general sample, delay discounting was shown to be associated with self-reported engagement in antisocial behaviour in the past year and lifetime criminal outcome (i.e. ever arrested, charged, convicted, or detained for a crime) (Mishra & Lalumière, 2017). Moreover, a longitudinal study among college students provided evidence for a bi-directional relationship between crime and delay discounting (Lee et al., 2017). More discounting of delayed rewards was shown to predict future property crime and engagement in violent crime was shown to predict higher rates of delayed discounting one year later. Taken together, these findings demonstrate that offenders have a deficit in delay discounting and provide evidence for these deficits as an underlying factor in criminal behaviour. Given the link between delay discounting with both substance use and criminal behaviour, it seems especially important to assess the predictive value of delay discounting on substance use and criminal behaviour among offenders with SUDs.

Studies using the BART to assess the association between risk-taking and criminal behaviour showed that risk-taking behaviour is correlated with the self-reported number of times stealing in a general young adult population (Wallsten, Pleskac, & Lejuez, 2005; Wichary, Pachur, & Li, 2015). More recently the BART was also used in offenders by Wichary, Pachur and Li (2015) to assess the difference in risk-taking tendency between male and female prisoners and non-prisoners in China. Higher risk-taking behaviour (i.e., mean pumps excluding popped balloons) was observed in female prisoners relative to female non-prisoners. However, risk-taking did not differ between male prisoners and non-prisoners. Moreover, there is evidence for the predictive effect of risky decision-making in the BART on substance use (Fernie, Cole, Goudie, & Field, 2010; Hanson, Thayer, & Tapert, 2014). However, to our best knowledge, no prior study has assessed the predictive value of risk-taking on substance use and criminal outcome in offenders.

Another important domain of impulse control is a personality trait (MacKillop et al., 2016). Impulsive personality traits are generally assessed by self-report questionnaires, which measure tendencies such as non-planning, inattention, and sensation seeking, to name a few (Whiteside & Lynam, 2001). A questionnaire that contains measures of impulsivity and is theoretically related to impulsivity is the behavioural inhibition and behavioural approach system (BIS/BAS) scale. The BIS/BAS scale is a tool to assess self-reported reactivity to reward and punishment (Carver & White, 1994; Cooper, Gomez, & Aucote, 2007; Levinson, Rodebaugh, & Frye, 2011). It has been theorized that the underlying neuropsychological BIS and BAS systems facilitate avoidance-related

behaviour in the presence of potential punishment and approach-related behaviours in the presence of a potential reward, respectively (Carver & White, 1994). Previous evidence does show that substance use correlates positively with BAS levels and negatively with BIS levels (Franken & Muris, 2006; Pardo, Aguilar, Molinuevo, & Torrubia, 2007; Simons, Dvorak, & Batien, 2008). No prior study investigated BIS and BAS levels among offenders with SUDs. In this thesis, we investigated the predictive role of impulsive and risky decision-making and self-reported trait impulsivity (as measured with the DDT, BART and BIS/BAS scales, respectively) in offenders with SUDs who are under probation supervision.

PREDICTORS OF TREATMENT ENTRY AND RETENTION AMONG OFFENDERS

Research on treatment for offenders with SUDs who are under probation supervision is very limited. Available data on treatment for SUD in the CJS is mostly based on the prison population in the United States, as described in a review by Belenko and colleagues (2013). In addition, research on the assessments of predicting factors for treatment entry and retention in offenders with SUDs under probation supervision is also very scarce. However, the available evidence on predictors of addiction treatment entry supports the role of motivation in predicting treatment entry and retention by offenders.

In two studies, Evans, Li and Hser (2009; 2008) studied predictors of treatment entry and retention in offenders with SUD from different parts of California who were offered community-based addiction treatment instead of routine criminal justice process (i.e. detention). The authors wanted to know why some offenders did not opt for treatment (Evans et al., 2008) and why some who did opt for treatment, dropped out early (Evans et al., 2009). They found that offenders who did not opt for treatment were often younger, unemployed and had committed more severe crimes (Evans et al., 2008) and that severe psychiatric problems and more arrests in the year prior to treatment contributed to higher treatment dropout rates (Evans et al., 2009). In accordance with the before mentioned problem that many offenders do not enter treatment despite its beneficial effects, the authors found that offenders who started treatment had lower recidivism rates than those who did not enter treatment (Evans et al., 2008) and that offenders who dropped out of treatment had higher recidivism rates and relapsed in substance use more often compared to those who completed treatment (Evans et al., 2009). The findings also showed that the decision not to enter treatment and treatment dropout was related to lower rates of motivation for treatment (Evans et al., 2009, 2008). Offenders themselves also mentioned a lack of motivation as the main reason for not entering treatment or dropping out early. The offenders reported having no problem with substance use and believing that there is no need for treatment (Evans et al., 2009, 2008). Further evidence for the role of motivation comes from a review by Linn-Walton and Maschi, (2015) who evaluated the evidence on the relationship between insight (i.e. problem recognition) and motivation and the

impact of these psychological factors on treatment engagement, relapse, and recidivism among offenders. They observed lower levels of motivation among offenders compared to non-offenders. In addition, they found that levels of insight and motivation of offenders, as well as interventions that foster insight or motivation improve relapse and recidivism rates. All the 10 studies included in this review assessed motivation at the start of treatment and reported low baseline levels of recognition of problem severity and motivation for treatment among offenders.

All in all, knowledge is scarce on predictors of addiction treatment among offenders with SUDs under probation supervision. In addition, the available studies have only reported the predictive value of motivation among offenders at treatment entry, but there are no known reports on the predictive value of motivation at the start of the probation. To evaluate the importance of implementing interventions that foster motivation during probation supervision, it is important to assess motivation for addiction treatment at the start of probation supervision. Therefore, we examined predictors of addiction treatment entry among offenders with a SUD under probation supervision as well as the predictive value of treatment motivation at the start of the probation.

HOW TO MOTIVATE FOR CHANGE?

In answering the question of how supervision can contribute to preventing the influence of substance use on recidivism, we hypothesize that supervision can contribute by enhancing the motivation of offenders for treatment during supervision. A widely used technique for motivation enhancement is motivational interviewing (MI).

MI: definition, principles and skills

MI is developed by Miller and Rollnick in the early 1990s and is defined as “a collaborative, person-centred form of guiding to elicit and enhance motivation for change” (Miller & Rollnick, 2009, p 137). The intention of MI is to help people recognize their problems and to encourage and support them with behavioural change. Research from the field of addiction suggests that MI is particularly useful when working with individuals who are not aware of the consequences of their behaviour, show resistance and are ambivalent about changing their own behaviour (De Jonge, Merckx, & Schippers, 2012). In accordance with the collaborative nature of MI, the practitioner tries to enhance individuals’ intrinsic motivation by connecting behaviour change to their personal goals and values and to provoke *change talk* (Rollnick, Miller, & Butler, 2008). Change talk (initially referred to as “self-motivating statements”) involves overt statements by the individual demonstrating desire, perceived ability, need, readiness, reasons or commitment to change (Arkowitz & Miller, 2008; Miller & Rollnick, 2002).

At the basis of MI is the “spirit”: an attitude focused on collaboration, evoking a persons’ own motives for change and honours a client’s autonomy (Miller & Rollnick, 2005). There are four general principles behind MI: the first being *expression of empathy*. Reflective listening is an important

technique to express empathy and is used throughout the entire MI process (Miller & Rollnick, 2002). The second principle of MI involves *developing discrepancy* between current behaviour and the broader goals and values that are important to the person. In doing so, awareness of the importance of change is created by letting an individual explore the pros and cons of their current behaviour and of behaviour changes in light of their goals and values. *Rolling with resistance* to change, the third MI principle, involves avoiding discussion about the need for change and honouring a person's autonomy. For this, it is important that new perspectives are elicited from the individual itself, but not imposed. The fourth MI principle is *supporting self-efficacy*, that is, the belief of individuals in their capacity to carry out the changes they have chosen. Finally, the following four skills are used in MI to provoke change talk: asking open-ended questions, reflective listening, affirmations, and summarizing (Miller & Rollnick, 2002).

Miller and Rose (2009) developed an explanatory model for the process of MI. According to this model, change talk is predictive of behaviour change. Quite recently studies have been conducted on the MI process, including one review and two meta-analyses (Magill et al., 2018; Magill, Gaume, Apodaca, & Walthers, 2014; Romano & Peters, 2016). The most recent meta-analysis of 12 MI process studies by Magill and colleagues (2018) found no support for the assumption that therapists' empathy and MI spirit are related to outcome. However, there is sound evidence showing that the frequency of MI consistent skills used by practitioners is positively related to the frequency of client change talk and that a greater proportion of change talk, rather than sustained talk (i.e., statements against change), is related to risk behaviour reduction (Magill et al., 2018).

Evidence for the effectivity of MI in different SUD populations

Several meta-analyses showed MI to be effective in reducing alcohol and drug use disorders, and positively affect treatment engagement (DiClemente, Corno, Graydon, Wiprovnick, & Knoblach, 2017; Hettema et al., 2005; Lundahl & Burke, 2009; Lundahl, Kunz, Brownell, Tollefson, & Burke, 2010). Lundahl and Burke (2009) reviewed the research evidence for MI from four meta-analyses of MI for a wide range of substances (e.g., alcohol, marijuana, tobacco and other drugs) and behaviours (e.g., diet/exercise, treatment compliance, gambling). These meta-analyses reviewed 30 controlled trials of individual MI for a wide range of problem behaviours (Burke, Arkowitz, & Menchola, 2003), 72 studies of MI and MI/CBT (Hettema et al., 2005), 15 studies of MI that target excessive alcohol consumption (Vasilaki, Hosier, & Cox, 2006), and 119 studies of MI for multiple problems (Lundahl et al., 2010). The four meta-analyses overlapped considerably in terms of included articles. (Lundahl & Burke, 2009) found MI to be significantly more effective than no treatment and generally at least as effective as other treatments for a wide range of problems, such as substance use disorders, reduction of risky behaviours, and increase in treatment engagement.

Recently, (Diclemente et al., 2017) conducted a meta-analysis reviewing 34 review articles (including 6 Cochrane reviews) published between 2007 and 2017. The review articles included motivation enhancement interventions for various substances of abuse (alcohol, tobacco, drug, marijuana, cocaine, opioids, methamphetamines) and gambling. They found support for the use

of motivation enhancement interventions in reducing substance use (for alcohol, tobacco, and marijuana), with brief interventions being particularly efficient and helpful in reducing risk in these three commonly used substances. For the other substances, there was less evidence available: for cocaine and gambling, they found some support for effectiveness, but for opiates and methamphetamine there was still insufficient evidence available. They also found that overall MI is more effective than no treatment and at least as effective as other treatments (Diclemente et al., 2017).

There has been relatively little research on MI in the CJS and in probation supervision in particular. In the only systematic review to date, McMurrin (2009) examined the existing evidence for the effectiveness of MI in offenders. This review covered thirteen published studies including ten randomized control trials (RCTs) and six dissertation abstracts evaluating the use and effect of MI on substance abuse and offending behaviour. Studies addressing the effect of MI on problematic substance use in offenders show that MI contributed to several positive outcomes such as reduced substance use (Miles, Dutheil, Welsby, & Haider, 2007), less negative engagement in the addiction treatment program (Stein et al., 2006) and less dropout in court-mandated outpatient addiction treatment (Lincourt, Kuettel, & Bombardier, 2002). MI was shown to positively affect increased problem recognition and considerations to change substance use (Mendel & Hipkins, 2002; Vandenberg, 2003). MI contributed to improved confidence in resisting substance use in risky situations (Slavet, Stein, Klein, Colby, Barnett, & Monti, 2005), and decreased self-reported substance use problems (Harper & Hardy, 2000). Other studies addressed the effect of MI on criminal behaviour. Although MI contributed to more acceptance of the blame for violence in perpetrators of domestic violence, it did not lead to a reduction in violence (Kistenmacher & Weiss, 2008). Moreover, MI enhanced motivation to change substance use among perpetrators of domestic violence (Easton, Swan, & Sinha, 2000), but it did not improve treatment retention (Kennerly, 1999). The study focusing on general offending showed that an MI treatment program for prisoners reduced re-conviction and re-imprisonment rates 4 years after release from prison (Anstiss, 2005). The findings of the reviewed studies (McMurrin, 2009) are promising for MI being effective in offenders and it might lead to improved treatment retention for offenders with problematic substance use, and enhanced motivation to change. With regard to behavioural change, such as a reduction in substance use and reduced offending, the effects of MI are equivocal yet.

Additional evidence on the effect of MI comes from a randomized controlled trial by Walters and colleagues (2010) in which the effect of MI has been assessed as a probation supervision strategy on probation officer skill, on offender outcome, and the overall relationship between officer skill and offender outcome. The probation officers followed a two-day MI workshop, followed by a half-day booster training in the first month, and one or two monthly supervision meetings over six months in order to maintain MI skills. Officers improved their MI skills and these improvements maintained over six months. There were no differences in positive urinalysis and violations of probation conditions between offenders assigned to an officer trained in MI and offenders assigned to an untrained officer or supervision as usual (SAU). Furthermore, probation officer MI competency (assessed during role play) was unrelated to offender outcome (i.e., positive urinalysis and poor

probation outcome). The authors assessed only two gross indices of probation progress as outcome measures, leaving unanswered the question about the effect on other outcomes such as treatment engagement and readiness to change. Furthermore, as also mentioned by the authors, although MI was observed in the role-plays, this might not have been reflected in the actual probation interactions.

Many of the MI interventions applied in studies and practice would be better labelled as motivation enhancing interventions (MEIs) or adaptations of motivational interviewing (AMIs) (Burke, Arkowitz, & Menchola, 2003; Miller & Rollnick, 2012). These interventions focus on enhancing motivation and apply the MI spirit, skills and principles as well as other non-MI elements, such as personalized-feedback. Schippers, Baron, Campen and Koeter (2010) developed an MEI for the Dutch addiction probation service, called Step by Step (*Stap voor Stap*; SvS). This thesis evaluated the effectiveness of adding this brief, manual-based MEI to probation supervision.

A BRIEF, MANUAL-BASED MEI FOR OFFENDERS UNDER PROBATION

The MEI, SvS is a manualized MI-based pre-intervention and was developed specifically for offenders with problematic substance use who are under addiction probation supervision. SvS is designed as a brief probation supervision tool to enhance problem recognition and motivation to change among the offenders during probation supervision sessions in a non-moralizing and non-confronting way. SvS consists of a manual for the probation officer and an individual workbook for the offender containing simple exercises. It is applied in 4 to 6 individual supervision sessions of 15-20 minutes. This pre-intervention takes place at the beginning of the probation period in order to enhance motivation for follow-up treatment. The focus is on enhancing motivation for both addiction treatment and treatment for other crime-related behaviour, such as aggression regulation. Probation officers are trained to deliver the intervention during regular probation supervision sessions with the use of MI. The intervention targets five MI-based areas and addresses them in 7 steps: willingness to collaborate (step 1), problem recognition (steps 2 and 3), ambivalence to change (step 4), confidence in the ability to change (steps 5 and 6), and commitment (step 7).

In step one, the exercises focus on stimulating offender's willingness to collaborate. The paradox is discussed between compulsory supervision and the choices that the offender can make while under supervision. In the following steps two and three, the exercises focus on improving problem recognition. In step two an inventory is made by the offender of the current situation with regard to substance use, criminal behaviour, and experienced problems (e.g., financially, socially, mentally and physically). In step three the offender first draws a graphical biography of his substance use and criminal behaviour over the years and then evaluates the relationships between his substance use, criminal behaviour and experienced problems. In step four the exercises focus on ambivalence to change. The offender makes balanced scorecards of the pros and cons of both the current and the

imagined changes for both substance use and criminal behaviour patterns. The exercises in steps five and six focus on reinforcing the offender's confidence in the ability to change. In step five prior attempts to change are assessed. Accordingly, the offender evaluates which approach, support and personal characteristics were helpful for him. In step six the offender's beliefs about diverse forms of support are identified. Finally, the aim of the exercises in step seven is to strengthen the commitment to change among offenders who are motivated to change. Offenders who are motivated to change are asked to make concrete what the main reasons for change, resources and agreements are for them. Unmotivated offenders are asked what the consequences may be of not participating in (mandated) treatment to them.

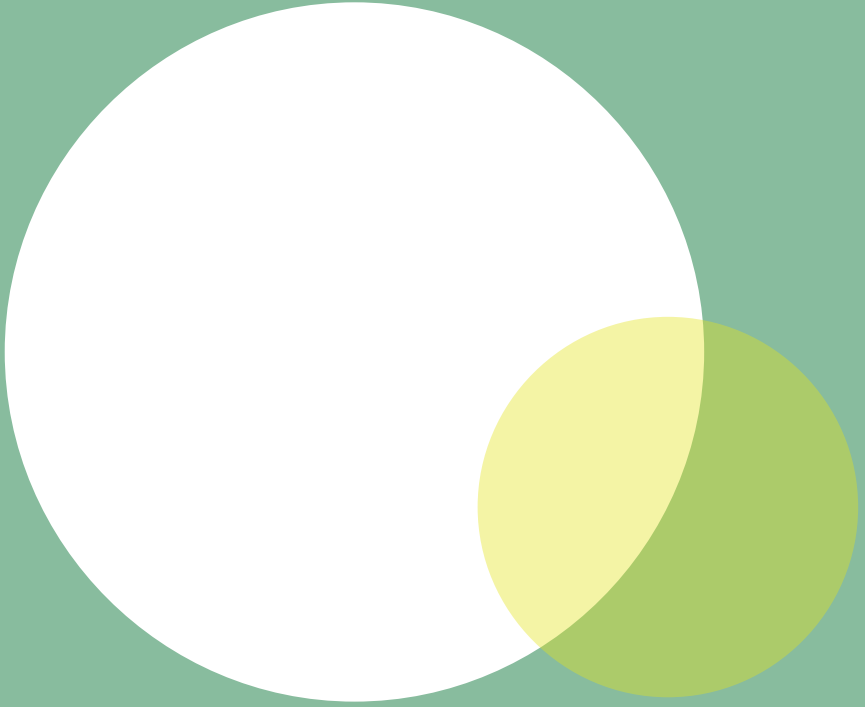
In this thesis, the effect of adding this MI-based manual intervention to supervision is assessed by comparing SAU plus MEI with SAU alone, which also includes the use of MI techniques. The research in this thesis is carried out in the context of the probation supervision of the Social Rehabilitation for Addicted Offenders (*Stichting Verslavingsreclassering GGz* or *SVG*) that is specialized in working with offenders with problematic substance use.

OUTLINE OF THIS THESIS

The above-mentioned lack in our knowledge with regard to (a) the predictive value of impulsivity and risk-taking in offenders with SUD (b) the predictive value of motivation at the start of probation supervision, and (c) the effectiveness of adding a brief MEI to probation supervision are divided into four research questions that are addressed in this thesis, through a cluster-randomized trial (CRT) in 220 substance-abusing offenders:

- I. What is the predictive utility of self-reported and behavioural impulsivity and risk-taking measures, and their interactions with substance use on 12-month follow-up substance use and recidivism in offenders with problematic substance use?
- II. What factors at the start of probation are associated with addiction treatment entry at 12-month follow-up, and to what extent is the motivation for treatment at the start of probation associated with addiction treatment entry at 12-month follow-up?
- III. Is SAU plus a brief manual-based MEI (SAU + MEI) more effective than SAU in (a) reducing time to treatment initiation (primary outcome) and (b) enhancing the proportion of treatment retention and (c) abstinence of primary substance in offenders with problematic substance use under probation supervision at 12-month follow-up?
- IV. Is SAU plus a brief manual-based MEI more effective than SAU in increasing time to re-offending and reducing the proportion of recidivism among substance-using, judicially supervised re-offenders; and is there a difference between offenders who completed the intervention versus those who did not complete the intervention (SAU or SAU + MEI) on these outcomes?

Chapter 2 presents the study that we conducted in order to address the first research question. We hypothesized that higher scores on self-reported and behavioural impulsivity measures would be associated with higher substance use and recidivism at follow-up. Research question II is addressed in **chapter 3**. To our knowledge, this is the first study that assessed treatment motivation at the start of probation supervision to examine how motivation is related to the prediction of addiction treatment entry within the first year of probation supervision. In chapters 4 and 5 we report on the effectiveness of MEI, the newly developed intervention to enhance motivation for treatment in substance abusing offenders under probation supervision. In **chapter 4** we tested our hypotheses that SAU + MEI would be more effective in reducing time to treatment initiation, enhancing treatment retention rate and abstinence of primary substance compared to SAU. Our hypothesis that compared to SAU, SAU + MEI would be more effective in increasing time to recidivism and recidivism rate is tested in **chapter 5**. Finally, in **chapter 6** we summarize and discuss our findings in the context of the literature and consider implications for future research and clinical practice.



2

The predictive value of impulsivity and risk-taking measures for substance use in substance-dependent offenders

Shaul^{*}, L., Rieser^{*}, N., Blankers, M., Schippers, G. M., & Goudriaan, A. E.

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ABSTRACT

Impulsivity and risk-taking are known to have an important impact on problematic substance use and criminal behaviour. This study examined the predictive value of baseline self-report and behavioural impulsivity and risk-taking measures [Delay Discounting Task (DDT), Balloon Analogue Risk Task (BART) and Behavioural Inhibition, Behavioural Activation Scale (BIS/BAS)] on 12-months follow-up substance use outcomes (e.g., use of alcohol, cannabis and other substances) and criminal recidivism (yes/no). Participants were 213 male offenders with a substance use disorder (SUD) under probation supervision. Bivariate regression analyses showed that BIS and BAS levels were associated (respectively) with the use of alcohol and cannabis. Multiple regression analysis showed that BIS was negatively associated with alcohol use at follow-up, whereas cannabis use at baseline and BAS predicted cannabis use at follow-up. At a trend level, interactions between delay discounting and risk-taking, and interactions between baseline cannabis use and BAS and BART predicted cannabis use at follow-up. Other substance use at follow-up was solely predicted by baseline other substance use. Overall, the findings provide marginal support for the predictive utility of impulsivity and risk-taking in accounting for variability in substance use among offenders with a SUD. This may be partly explained by the fact that only a limited number of psychological factors was assessed in this study. The studied population consists of a severe group, in which relapse into substance use or criminal behaviour likely is related to complex, interacting biopsychosocial factors, of which impulsivity measures play a relatively small part.

INTRODUCTION

This article examines the predictive utility of self-report and behavioural impulsivity and risk-taking measures on substance use in offenders with a substance use disorder (SUD). In SUDs, higher impulsivity has been linked to both the development of SUD and to a more severe course, such as evidenced by earlier treatment dropout and more frequent relapses in SUDs (Stevens et al., 2014). Central to many dual-process theories about SUDs are the higher impulsivity and diminished control functions, compared with a focus on more immediate rewards, and specifically, responsivity towards drug-related cues, as for example in the I-RISA (Impaired-Response Inhibition Salience Attribution) model by Goldstein and Volkow (Goldstein & Volkow, 2002; Verdejo-García & Bechara, 2009). This makes persons with SUDs who both experience a high reward responsivity to drug cues (e.g., by a higher cue reactivity, and a focus on more immediate rewards), in combination with less cognitive control—as for instance in higher impulsivity more vulnerable to relapse. A large number of studies corroborate that impulsivity and risk-taking are associated with a broad range of problematic behaviours such as SUDs or at-risk substance use (e.g., Bornoalova, Daughters, Hernandez, Richards, & Lejuez, 2005; De Wit, 2009; Dick et al., 2010; Moeller & Dougherty, 2002; Lejuez, Aklin, Jones, Richards, Strong, Kahler, & Read, 2003; MacKillop et al., 2011; Mathias et al., 2002; Perry & Carroll, 2008; Smith, Mattick, Jamadar, & Iredale, 2014; Verdejo-García, Lawrence, & Clark, 2008) and criminal behaviour (e.g., Gottfredson & Hirschi, 1990; Nofziger, 2009; Ribeaud & Eisner, 2006; White et al., 1994).

In addition, a strong and consistent association has been found between substance abuse and crime (e.g., Bennett et al., 2008; Haggård-Grann, Hallqvist, Långström, & Möller, 2006; Pihl & Peterson, 1995). Although impulsivity and risk-taking are associated with substance abuse and crime in general, these associations may differ across crime-types (e.g., violent, nonviolent; Cherek, Moeller, Schnapp, & Dougherty, 1997) and classes of substances (e.g., cocaine, heroin use; Bornoalova et al., 2005).

Impulsivity has been defined as “a predisposition toward rapid, unplanned reactions to internal or external stimuli without regard to the negative consequences of these reactions to the impulsive individual or to others” (Moeller, Barratt, Dougherty, Schmitz, & Swann, 2001, p.1784). It is a multifaceted construct whose facets can be assessed both by self-rated [e.g., Behavioural Inhibition, Behavioural Activation Scale (BIS/BAS)] and behavioural (neurocognitive) measures. Behavioural aspects of impulsivity are for instance delay discounting and risk-taking (Dougherty et al., 2015). The Delay Discounting Task (DDT) is a frequently used task that measures the preference for smaller immediate rewards over larger delayed rewards. The BIS/BAS scale is an instrument assessing reactivity to reward and punishment (Carver & White, 1994). Risk-taking behaviour, the “propensity to seek out novel, stimulating but potentially harmful experiences” (Dougherty et al., 2015, p.1502) can be estimated with the Balloon Analogue Risk Task (BART), a computer task in which the propensity of an increase in gains (by pumping a balloon) over a risk of loss of the total accrued amount (when the balloon explodes after a pump) is measured.

Behavioural risk-taking as measured with the BART, and similar risky decision-making tasks like the Cambridge Gamble Task—has been associated with substance use (Bornovalova et al., 2005; Hanson et al., 2014; Schneider et al., 2012; Wills, Vaccaro, & McNamara, 1994). In this study, we, therefore, hypothesize that higher risk-taking would lead to higher substance use, which was also shown by Fernie et al. (2010), who found that risk-taking predicted alcohol use in a group of 75 social drinkers. There are some indications that risk-taking in the BART is associated with alcohol use, but other studies indicate no differences. Ashenhurst, Jentsch and Ray (2011) reported that higher risk-taking propensity was associated with lower alcohol use disorder symptoms in a sample of 158 non-treatment seeking heavy alcohol drinkers. Moreover, Ashenhurst et al. (2011) proposed that risk-taking may be an influential factor at the initiation of alcohol use, but as use progresses, the relationship may turn in the opposite direction. Hanson et al. (2014) found a predictive effect of riskier choice in the BART and more frequent use of marijuana and other drug use in the past 18 months in a sample of 24 marijuana users and 34 non-users. Wichary et al. (2015) investigated risk-taking in male and female prisoners and non-prisoners. They reported an increased level of risk-taking in female prisoners compared to female non-prisoners, but no difference between male prisoners compared to male non-prisoners.

Delay discounting has also been associated with substance use, as indicated by two meta-analyses (Amlung, Vedelago, Acker, Balodis, & MacKillop, 2017). MacKillop et al. (2011) conducted a meta-analysis and reported a relation between substance use and delay discounting, but with a small magnitude of effect and high heterogeneity of effect size. They also presented a number of studies not showing a relationship for both alcohol and cannabis use. From the 64 studies analyzed, 27 studied substance use and 74% of the studies reported a higher delay discounting in the SUD samples compared to controls. In a more recent meta-analysis by Amlung et al. (2017), a small, but highly significant effect size was found for steeper delay discounting in SUD, and this relationship was stronger for studies focusing on the severity of substance use problems, compared to studies including quantity by frequency measures of substance use. Results from single studies do indicate that several factors may impact the relation between substance use and delay discounting, as for instance gender: in a study on delay discounting and alcohol use in 65 college students or graduated students, higher levels of delay discounting were associated with higher levels of drinking in female college students, but not in their male counterparts (Yankelevitz, Mitchell, & Zhang, 2012). Although the meta-analyses did not indicate differential effects for specific substances, Moallem and Ray (2012) reported a steeper delay discounting rate in heavy drinkers who smoked ($n = 213$), compared to heavy drinkers ($n = 107$) or smokers ($n = 67$) solely. When drinking in combination with smoking is viewed as more severe substance use, this finding converges with the conclusion of the meta-analysis by Amlung, that severity measures have a stronger relation to steeper delay discounting. Impulsivity in substance-using offenders was correlated with substance use in a sample of 80 drug court participants when measured using self-report, but not when impulsivity was measured with a DDT (Jones et al., 2015). In conclusion, both the meta-analyses indicate a link between substance use and delay discounting, whereas in some other individual studies or

in some subgroups—no relations were found. Thus, higher delay discounting in SUD samples is present, although the meta-analyses both indicate a small - but significant - magnitude of effect and high heterogeneity of effect size, indicating that the strength of the association of higher delay discounting in SUD samples differs across studies and may be stronger with more severe levels of substance use problems.

Regarding the relation between delay discounting and criminal activity, a smaller number of studies has been published. Åkerlund et al. (2016) analyzed the link between delay discounting at age 13 with their criminal behaviour up to age 31 in 6,749 males. Adolescents showing a higher delay discounting rate had a higher risk to be involved in criminal behaviour in the future. A study in 86 male offenders (prisoners and ex-prisoners) reported a significant group difference in delay discounting between non-offenders, prisoners and ex-prisoners; ex-prisoners showed a higher discounting rate compared to the other groups (Hanoch, Rolison, & Gummerum, 2013). Lastly, Piquero, Farrington and Jennings (2018) recently conducted a long-term analysis in a longitudinal sample of over 400 boys of the predictive effect of delay discounting (instead of a task, they asked one question each at age 18, 32 and 48) on criminal behaviour (number of convictions until age 56). Higher delay discounting was associated with more convictions.

Lee et al. (2017) found a bi-directional relation between delay discounting and property crime 1 and 2 years later in a study in 526 undergraduates. In another study among 63 male and female offenders, higher delay discounting rates were found in offenders compared to 70 non-offenders (Arantes, Berg, Lawlor, & Grace, 2013). In the only study that examined offenders with a SUD, discounting rates and substance use among 80 offenders with a SUD were higher compared to noncriminal students (Jones et al., 2015). In a very small study by Cherek, Moeller, Dougherty, et al. (1997), parolees who had a history of violent crime ($n = 9$) displayed higher discounting rates than parolees without such a history ($n = 21$). Lastly, higher levels of delay discounting predicted property crimes, but not violent crimes later on Nagin and Pogarsky (2004). Mixed findings were present in a study by White et al. (1994), who reported a predictive value of cognitive and behavioural impulsivity at age 10 in a sample of 400 boys for delinquency at age 12–13, but no differences between stable nondelinquents, other delinquents and stable-serious delinquents in delay discounting at age 10 and 12–13. Wilson and Daly (2006) also found no difference in the discounting rates of young offenders ($n = 91$) compared to high school students ($n = 284$). Summarizing, previous research found evidence for an association between DDT and delinquency, but the relation has not uniformly been demonstrated, and studies in combined populations of offenders with problematic substance use are virtually non-existent (Jones et al., 2015).

BIS/BAS levels in young adults have been linked to alcohol, cannabis and methamphetamine use (e.g., Pardo et al., 2007; Simons et al., 2008) (O'Connor and Colder, 2005). The BIS is associated with the avoidance of punishment, whereas the BAS is related to disinhibited behaviour (Gray, 1975). The BAS was positively correlated with alcohol and cannabis use, whereas the BIS revealed a negative relation to these two substances (Pardo et al., 2007; Simons et al., 2008). To our best knowledge, there exists no previous research about the association of BIS/BAS levels with criminal

recidivism and substance use in a criminal population. We hypothesize that higher BAS and lower BIS may promote substance use and criminal behaviour.

In sum, relatively few studies assessed the association of impulsivity and risk-taking with substance use or future criminal behaviour in offenders, using laboratory behavioural measures of impulsivity and risk-taking (e.g., Chen, Muggleton, Juan, Tzeng, & Hung, 2008; Cherek, Moeller, Dougherty, et al., 1997; Mathias et al., 2002; Munro et al., 2007). These laboratory behavioural measures are especially important for the assessment of offenders' impulsiveness and risk-taking, as they provide measures that are less susceptible to simulation than self-report measures. In addition, very few of these studies have focused on multiple aspects of impulsivity. As impulsivity is a multifaceted construct, it can be argued that being impulsive on several of these aspects—e.g., having a focus on steeper delay discounting and a higher risk-taking propensity may exacerbate the effects on potential future substance use and criminal behaviour more than only having a present reward orientation or high risk-taking. The purpose of our study is to examine the predictive utility of baseline self-reported and behavioural impulsivity and risk-taking measures, and interactions between impulsivity factors and baseline substance use and impulsivity measures on follow-up use of: (1) alcohol; (2) cannabis; (3) other substance use, and; (4) criminal behaviour in offenders with a SUD, using a self-rated measure of impulsivity (BIS/BAS) and behavioural measures of impulsivity (DDT) and risk-taking propensity (BART). We hypothesized that higher baseline scores on DDT, BAS and BART, and lower BIS scores would be associated with higher substance use (i.e., alcohol, cannabis and other substances) and higher criminal behaviour at follow-up.

MATERIALS AND METHODS

Study Design

A cluster-site, controlled trial (CRT) was conducted to examine the effectiveness of a brief motivation enhancing intervention for offenders with SUDs. The reported results were part of a larger study (see Shaul, Koeter, & Schippers, 2016 for additional information). Within the 220 offenders under probation supervision, participants followed either the motivation enhancing sessions or supervision as usual. The probation officer was set as the cluster variable and the participants were allocated to the two conditions by cluster randomization. This means, 73 probation officers of six probation offices were randomized to perform either supervision with the motivation increasing intervention (intervention condition) or supervision as usual (control condition). With the allocation to the probation officer, participants were also allocated to the supervision they will follow. To control for a potential bias of the motivation enhancing intervention, only data of offenders from the control condition were included for substance use outcome.

Recruitment and assessment procedures

The probation officers gave all the eligible offenders information about the study. The interested offenders were invited for the baseline assessment (T1). Baseline assessment took place in a private consulting room at the drug-probation office and consisted of a face-to-face interview and three computerized neurobehavioural tests. A 17-inch laptop computer with a computer mouse was used to run the three neurobehavioural test programs. Written informed consent for the offender's study participation was obtained prior to baseline assessment. The follow-up (T2) took place on average 14.4 months (SD = 3.76) after baseline (T1). Offenders were paid €15 at baseline and €20 at follow-up for participation. The CRT was approved by the Medical Research Ethics Committee of the Academic Medical Centre, University of Amsterdam. The trial is registered at the Dutch Trial Register, number NTR2420.

Participants

A total of 220 male parolees were included in the study, recruited from four addiction probation offices of five out of eleven District Courts in the Netherlands (for more information regarding the inclusion process see Shaul et al., 2016). For 27 months, beginning in May 2010 until August 2012, all offenders meeting inclusion criteria were invited to participate. Inclusion criteria were: (i) a sufficient command of the Dutch language to understand interview questions and questionnaires; (ii) male gender; (iii) at least one prior sentence; (iv) regular use of alcohol and/or illicit drugs, i.e., using at least 3 days a week of which for alcohol: consuming at least five or more glasses per day, and; (v) currently under court-order supervision executed by an addiction probation service in a noncustodial setting. Exclusion criteria were: (i) a history of neurological problems or severe psychiatric disorders like schizophrenia, psychotic disorder, or bipolar disorder; (ii) only convicted for driving under influence; and (iii) illegal stay in the Netherlands. Of the 220 participants at baseline, 217 completed the DDT, 212 completed the BART and 209 filled in the BIS/BAS. We had to exclude two participants; one due to the diagnosis of schizophrenia (exclusion criterion i) and one participant due to not using any substances regularly (inclusion criterion iv). Five additional participants completed the BART or DDT at follow-up instead of baseline and were therefore excluded from our further analysis, leading to a final sample of $n = 213$. Out of the included 213 parolees, 160 participants finished the full procedure. Previous findings in our group showed that the motivation enhancing intervention had no significant effect on criminal recidivism at follow-up (Shaul et al., 2016), and effects of this intervention on treatment entry and substance use are being reported in a separate article (Shaul et al., 2016). Since the earlier publication found no difference between the two conditions regarding criminality, we used the whole sample ($n = 213$) to predict criminal behaviour at follow-up. However, the effect of the motivation enhancing sessions on substance use at follow-up is still being analyzed, therefore, we used solely the participants in the no-intervention ($n = 106$) subgroup for the prediction of substance use at a 12-month follow-up.

Measures

A semi-structured interview based on the MATE-crimi (Schippers, Broekman, & Buckholz, 2011) was conducted both at baseline (T1) and 12 months follow-up (T2) assessment, including demographic questions and questions regarding lifetime, 12 months and 30 days information from offenders about their substance use, treatment history and criminal behaviour.

Substance use was measured both at T1 and T2 using the Measurements in the Addiction for Triage and Evaluation (MATE 2.1; Schippers et al., 2011; Schippers, Broekman, Buchholz, Koeter, & Van Den Brink, 2010). We distinguished between three classes of substances: alcohol, cannabis and other substances, and used different entities per class. For alcohol, we used the number of units of the last 30 days, for cannabis the number of grams, and for other substances the total number of days used in the last 30 days before T1 and T2. Because use was lower for other substances (cocaine, crack, other stimulants, ecstasy, heroin, other opiates and other substances), we added all these substances together and analyzed the effect of the aggregated use of other substances. As the measure of other substances variable included multiple substances it is possible that participants could show a sum of more than 30 days on T1 and T2 measures. This measure shows us how many days these substances were used.

Delay Discounting Task (DDT)

A computerized version of the DDT by Wittmann et al. (2007) was used to assess impulsive-choice behaviour. This shorter functional magnetic resonance imaging (fMRI)-compatible version was included to limit the assessment time and in order to enable comparison to other SUD studies of the authors. The task consisted of six blocks, each containing eight trials on which participants made a choice between an immediate (lower) and a delayed (higher) hypothetical monetary reward. Delay in days (i.e., 5, 30, 180, 365, 1,095, 3,650) and delayed reward in euros (range 476–524 Euro) were equal for all trials of a given block, while the immediate reward value varied across trials within each block (range 0–476 Euro), in which the first two trials of one block were used to narrow down the delay equivalent depending on the responses made (see Wittmann et al., 2007 for exact adjustments). Block order varied and was randomized across participants. As proposed by Myerson, Green and Warusawitharana (2001), the area under the discounting curve (AUC) was used as a dependent measure; with lower AUC values denoting more discounting by delay (more impulsivity, or inversely, less self-control).

Data of 27 participants were considered non-systematic using the proposed algorithm developed by Johnson et al. (2010) to identify cases with indifference points that were not monotonically decreasing with delay. Specifically, a case was defined as non-systematic if: (i) two or more individual indifference points were greater than their preceding indifference point by a magnitude greater than 20% of the larger later reward; or (ii) the last indifference point was not less than the first indifference point by at least a magnitude equal to 10% of the larger later reward (Johnson et al., 2010). For participants with just one outlier point of indifference according to the former criteria

($N = 11$), the AUC was replaced by an adjusted AUC through linear interpolation of that point of indifference, leading to exclusion of 16 participants.

Balloon Analogue Risk Task (BART)

The BART (Lejuez et al., 2002) was used to assess risk-taking propensity. Due to time constraints, a version with 20 trials was chosen, as versions with 10–30 trials are a methodologically sound choice (Wallsten et al., 2005). As correlations for the total score are acceptable for the first 10 trials (~ 0.6) and good for trials 11–20 (~ 0.8) with little change for the 10 trials that follow (21–30: ~ 0.8 ; Dahne, Richards, Ernst, MacPherson, & Lejuez, 2013; Wallsten et al., 2005), we opted for a 20-trial BART version. This was also done for feasibility reasons (time restrictions). During each of the 20 trials, participants inflated a picture of a balloon by pressing a pump button on the screen with a laptop mouse. Each pump increased the risk of the balloon exploding (average breaking point being 64 pumps) and the potential earning (rising by 5 cents). In each trial the balloon's potential earning that was accumulated in a temporary bank could be assured by clicking a collect button on the screen, thus transferring the earning from that particular balloon into a permanent bank. If a balloon exploded before that, the potential earning in the temporary bank for that balloon was lost and a new trial began. Participants received no precise information about the probability of explosion and the task contained no practice trials (for additional task details see (Lejuez et al., 2002). The two outcome measures used were: (1) the total number of balloons that exploded during the task; and (2) the average number of pumps on trials where the balloon did not explode (i.e., adjusted average pumps).

Behavioural Inhibition, Behavioural Activation Scale (BIS/BAS Scale)

We used the BIS/BAS scale (Carver & White, 1994; Dutch version: Putman, Hermans, & Van Honk, 2004) to assess two general motivational systems underlying behaviour. The BIS assesses the affective response to punishment, regulates avoidance of punishment and is associated with suppressing behaviour and negative affect. The BAS assesses the affective response of upcoming rewards and is associated with the attainment of positively valued stimuli. The BAS scales are subdivided into three categories; BAS drive, BAS fun-seeking and BAS reward sensitivity.

Statistical analysis

Statistical analyses were performed using SPSS 24.0 statistical software package (SPSS Inc., Chicago, IL, USA). Prior to the analyses, we converted all scores to z-scores entered into the bivariate, multiple, moderated and binary logistic regressions, in order for variables to have a comparable impact. As suggested by Babyak (2004), we first conducted a bivariate linear regression with the potential predictors (DDT, BART, BIS/BAS) and the dependent variables (alcohol, cannabis and other substance use at follow-up) individually in order to minimize the number of predictors a priori and prevent over-fitting of our models. The impulsivity and risk-taking measures with a p -value < 0.10 were included in further analysis (Babyak, 2004). Second, we performed a multiple

regression to investigate whether the measures examined a priori predicted the use of alcohol, cannabis or other substances in the last 30 days before 12 months follow-up assessment (T2). We used the exclusion criteria listwise as proposed by Field (2009). To correct for the baseline use of the specific substance (alcohol, cannabis, and other substances), we entered the T1 substance use measures in the first block. The impulsivity measures were entered in the second block, also using the enter method to assess which measures would show the highest impact. This resulted in three different multiple regression models for the prediction of alcohol use, cannabis use, other substance use at follow-up (T2). The impulsivity and risk-taking measures (BIS/BAS, DDT and BART) were entered using the forward step (likelihood ratio) method as suggested by Field (2009). The cut-off p-value to enter was set at 0.05 and the one to remove was set at 0.10 (Hosmer & Lemeshow, 2000).

Furthermore, to assess the interaction effects of impulsivity measures on multiple regression, we conducted moderated regressions. To predict substance use (alcohol or cannabis) at follow-up, we first entered substance use (either alcohol or cannabis use) at baseline and the hypothesized impulsivity measures into the first block and the interaction effect of the substance use at baseline with impulsivity measures and interactions between the impulsivity measures into the second block.

We hypothesize that higher alcohol use at follow-up would be associated with a lower BIS, a lower delay discounting (present orientation) and their interactions (lower BIS in combination with lower delay discounting; lower delay discounting and higher BAS; lower BIS and higher BAS). We entered the measures as moderator, whereas alcohol use at baseline was set as the independent variable and alcohol use at follow-up as the dependent variable. In a second model predicting alcohol use at follow-up, we hypothesize that a lower BIS, a higher BART and interactions of the impulsivity measures (moderators) and of baseline alcohol use and impulsivity measures are associated with increased alcohol use. Analyzing the moderating effect of the impulsivity measures on cannabis use at follow-up - cannabis use at baseline as an independent variable - we expected a higher BAS and a higher delay discounting to be associated with higher cannabis use. Furthermore, higher values of combinations of impulsivity measures were expected to be linked to increased cannabis use at follow-up.

RESULTS

Although not all variables were perfectly normally distributed, no serious violations of normality such as platy kurtosis requiring transformations were observed (Stevens, 1996). The demographic information is displayed in **Table 1**.

Bivariate Analysis

When predicting alcohol use at follow-up in the bivariate analysis, only the BIS displayed a $p < 0.10$ and was therefore entered in the following multiple linear regression as the only predictor. The same occurred for the BAS, which predicted cannabis use at follow-up and was included in the

multiple regression for cannabis use. However, no impulsivity measure predicted the use of other substances with a $p < 0.10$ and no predictor was entered into the model. More detailed results of the bivariate analyses are shown in **Table 2**.

When predicting criminal recidivism for property crime, the BAS displayed a $p < 0.10$ and was therefore entered as the only impulsivity measure in the binary logistic regression analysis. No impulsivity measures showed a $p < 0.10$ when predicting criminal recidivism for violent crime or all types of crime. Detailed results of the bivariate analysis for criminal recidivism are reported in **Table 3**.

Table 1

Characteristics of offenders in the two groups.

	Samples	
	Substance use ($N = 106$)	Criminal recidivism ($N = 215$)
Age, mean (SD)	37.55 (10.67)	37.03 (10.90)
Years of education, mean (SD)	12.02 (2.28)	12.03 (2.31)
Cultural identity, % (n)		
Dutch	57.5 (61)	57.8 (122)
Surinam/Antillean	24.5 (26)	23.7 (50)
Other	17 (17)	18.5 (39)
Onset age criminal behaviour, mean (SD)	19.67 (9.63)	20.15 (9.90)
Onset age problematic substance use, mean (SD)	20.75 (7.96)	21.08 (8.68)
Substance use at baseline in the last 30 days, mean (SD)		
Alcohol (units)	70.82 (133.81)	96.65 (233.32)
Cannabis (grams)	21.90 (43.94)	28.65 (109.71)
Merged other substances (days) ^a	5.93 (13.87)	4.86 (13.06)
Substance use at follow-up in the last 30 days, mean (SD)		
Alcohol (units)	88.66 (184.87)	101.40 (261.23)
Cannabis (gram)	14.51 (20.97)	14.31 (29.38)
Merged other substances (days) ^a	4.83 (12.83)	5.34 (14.56)
Criminal recidivism at follow-up (yes), % (n)	59.4 (63)	56.9 (124)
BIS subscale (range: 7-28)	17.25 (3.7)	17.9 (3.8)
BAS subscale (score range: 16-52)	39.5 (6.68)	39.8 (6.72)
BART explosions (range: 0-14)	4.8 (2.8)	4.7 (2.8)
BART adjusted pumps (range: 1-64)	28.5 (13.3)	28.5 (13.4)
DDT AUC (range: .02-1.00)	0.37 (0.28)	0.36 (0.26)

Note. ^aIncluding heroin, other opiates, crack, cocaine, other stimulants, ecstasy and other substances.

Table 2

Results of bivariate linear regression analysis for predictors of substance use individually.

Predictors	β	R	R^2	F	p
Dependent variable: alcohol use at follow-up					
BIS	-0.232	0.232	0.054	4.136 (1, 73)	0.046*
BAS	0.138	0.138	0.019	1.415 (1, 73)	0.238
DDT ^a	-0.179	0.179	0.032	2.115 (1, 64)	0.151
BART ^b	0.112	0.112	0.012	0.936 (1, 74)	0.336
Dependent variable: cannabis use at follow-up					
BIS	-0.135	0.135	0.018	1.357 (1, 73)	0.248
BAS	0.367	0.367	0.134	11.335 (1, 73)	0.001*
DDT ^a	0.095	0.095	0.009	0.581 (1, 64)	0.449
BART ^b	0.036	0.036	0.001	0.096 (1, 74)	0.758
Dependent variable: other substance use at follow-up					
BIS	0.067	0.067	0.004	0.432 (1, 97)	0.513
BAS	0.003	0.003	0.000	0.001 (1, 97)	0.973
DDT ^a	0.084	0.084	0.007	0.625 (1, 87)	0.431
BART ^b	0.056	0.056	0.003	0.313 (1, 99)	0.577

Note:

^a Measured with the area under curve.^b Measured with the average adjusted pumps.* $p < 0.10$

Multiple linear regression predicting substance use in the last 30 days at follow-up

In the multiple regression analysis with alcohol use at follow-up as the dependent variable, the alcohol use at baseline was entered ($\beta = 0.211$, $p = 0.073$), the model was not significant; $F_{(1,71)} = 3.310$, $p = 0.073$, $R^2 = 0.211$, adjusted $R^2 = 0.045$. After including BIS (second block), the model showed a significant, albeit limited amount of explained variance; $F_{(2,70)} = 3.770$, $p = 0.028$, $R^2 = 0.312$, adjusted $R^2 = 0.097$, indicating a small goodness of fit according to Cohen, (1992). Alcohol use at baseline was marginally associated with alcohol use at follow-up ($\beta = 0.217$, $p = 0.060$), and the association with BIS was statistically significant ($\beta = -0.230$, $p = 0.047$).

In the first block of predicting cannabis use at follow-up, cannabis use at baseline entered the model with an R^2 of 0.424 (adjusted $R^2 = 0.179$), which indicated a small goodness of fit according to Cohen (1992). The model and the regression coefficient were significant; $F_{(1,73)} = 15.96$, $p < 0.001$, respectively $\beta = 0.424$, $p < 0.001$). Additionally, in the second block, we found a significant prediction of cannabis use at follow up by cannabis use at baseline and BAS; $F_{(2,72)} = 13.064$, $p < 0.001$. The R^2 for the overall model was 0.516 (adjusted $R^2 = 0.266$), which also indicated a medium goodness of fit according to Cohen (1992). Therefore, the two variables together explained more variance than cannabis use at baseline solely. Cannabis use at baseline ($\beta = 0.369$, $p = 0.001$) and BAS ($\beta = 0.300$, $p = 0.005$) were significant predictors in the model.

Table 3

Results of logistic regression analysis for predictors of criminal behaviour individually.

	B(SE)	95% CI for Odds Ratio			Nagelkerke R ²	p-value
		Lower	Odds Ratio	Upper		
Dependent variable: property crimes						
BIS	0.149 (0.152)	0.861	1.160	1.563	0.006	0.328
BAS	0.300 (0.161)	0.985	1.350	1.850	0.025	0.062*
DDT ^a	-0.018 (0.154)	0.726	0.982	1.329	0.000	0.908
BART ^b	0.084 (0.147)	0.815	1.088	1.451	0.002	0.568
Dependent variable: violent crimes						
BIS	0.072 (0.152)	0.798	1.075	1.449	0.002	0.634
BAS	0.245 (0.163)	0.929	1.278	1.758	0.016	0.131
DDT ^a	-0.204 (0.169)	0.585	1.137	0.816	0.011	0.229
BART ^b	0.014 (0.153)	0.751	1.014	1.368	0.000	0.929
Dependent variable: all crimes together						
BIS	0.064 (0.140)	0.810	1.066	1.403	0.001	0.647
BAS	0.099 (0.138)	0.842	1.104	1.448	0.003	0.475
DDT ^a	-0.196 (0.146)	0.617	0.822	1.095	0.012	0.180
BART ^b	0.158 (0.141)	0.888	1.171	1.543	0.008	0.263

Note:^a Measured with the area under curve.^b Measured with the average adjusted pumps.* $p < 0.10$

Moderated Regression Analyses

In the moderated regression analyses with alcohol use at follow up as the dependent variable - no predictors or interactions beyond the predictive value of the BIS (main effect of BIS ($\beta = -0.28$, $p = 0.04$), reached significance ($p < 0.05$) or a trend level ($p < 0.10$). The original model without the interactions, explained 18% of the variance ($R^2 = 0.18$, adjusted $R^2 = 0.11$); $F_{(5,61)} = 2.5$, $p = 0.04$. The moderated regression model did not reach a significant level ($p = 0.18$). In Figure 1, we report the interaction graphs between alcohol use and the measures BART, BIS and DDT.

The moderated regression analysis to predict cannabis use at follow up, indicated in the first block, as expected from the multiple linear regression analyses, a significant main effect of cannabis use at baseline ($\beta = 0.49$, $p = 0.001$) and BAS ($\beta = 0.25$, $p = 0.02$), but also of BIS ($\beta = -0.22$, $p = 0.046$). The moderated model also reached significance ($F_{(10,63)} = 5.14$, $p \leq 0.001$, $R^2 = 0.49$, adjusted $R^2 = 0.40$). With the interaction effects in the model, besides the main effects of cannabis use at baseline ($\beta = 0.32$, $p = 0.02$) and BAS ($\beta = 0.35$, $p \leq 0.002$), and a trend for BIS ($\beta = -0.20$, $p \leq 0.07$), significant interactions were present for baseline cannabis use*BAS ($\beta = 0.395$, $p = 0.013$), a trend for baseline cannabis use*BART ($\beta = -0.25$, $p = 0.09$), and a trend for BART*delay discounting ($\beta = -0.22$, $p = 0.046$). To have a better understanding of the tendencies or direction, we included Figure 2 reporting the interactions between cannabis use and BART, BAS and DDT and in Figure 3 the interaction between cannabis use, BART and DDT.

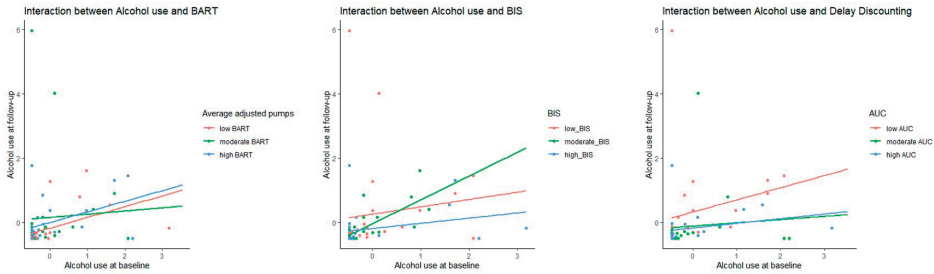


Figure 1

Scatterplot indicating the interaction between alcohol use and the measures Balloon Analogue Risk Task (BART, measured using average adjusted pumps), Behavioural Inhibition Scale (BIS) and Delay Discounting (measured using the area under curve, AUC). A higher measure on BART indicated a higher risk-taking because of more average adjusted pumps to a balloon. Whereas a lower AUC points to more discounting by delay, higher impulsivity and less self-control.

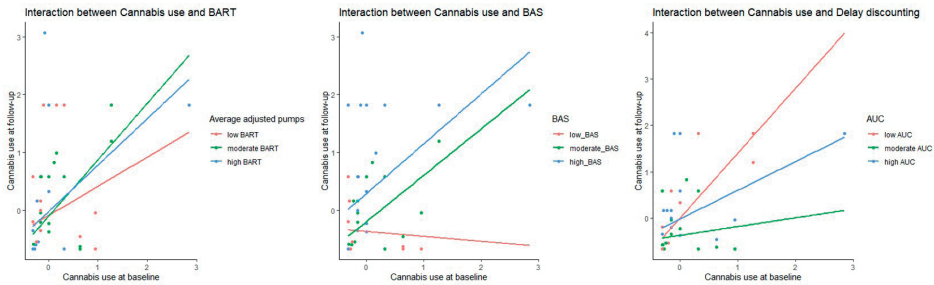


Figure 2

Scatterplot indicating the interaction between cannabis use and the measures BART (measured using average adjusted pumps), BIS and Delay Discounting (measured using the area under curve, AUC). A higher measure on BART indicated a higher risk-taking because of more average adjusted pumps to a balloon. Whereas a lower AUC points to more discounting by delay, higher impulsivity and less self-control.

To summarize, no significant interaction effects for the prediction of alcohol use at follow-up were present, but in cannabis use at follow-up, interaction effects were present. In patients with a higher BAS, an increased use at baseline was strongly associated with higher cannabis use at follow up. However, in patients with a lower BAS, the association was minor. For the BART, lower levels of cannabis use at baseline in combination with higher risky decision-making, predicted higher cannabis use at follow-up, whereas this relation was less strong in those with higher levels of cannabis use at baseline, although this only was a trend ($p = 0.09$). An interaction of both high BART and high delay discounting was predictive of more cannabis use at follow-up, although only at a trend level ($p = 0.07$).

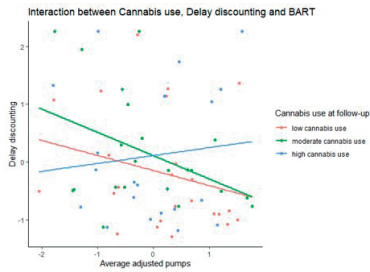


Figure 3 Scatterplot indicating the interaction between cannabis use and the measures BART (measured using average adjusted pumps) and Delay Discounting (measured using the area under curve, AUC).

DISCUSSION

We aimed to investigate the predictive value of impulsivity (DDT and BIS/BAS) and risk-taking (BART) measures for substance use and criminal recidivism at follow-up in a sample of substance-using criminals. Results showed that self-rated impulsivity measures (BIS/BAS) were associated with substance use at follow-up. Specifically, a higher BIS predicted lower alcohol use at follow-up, whereas a higher cannabis use at baseline and BAS predicted an increased cannabis use at follow-up. For cannabis use, baseline use interacted with impulsivity measures to predict cannabis use at follow-up, and a (trend level) interaction between delay discounting and risky decision-making (BART) predicted higher cannabis use at follow-up. Other substance use at follow-up was not predicted by BIS/BAS impulsivity measures or any of the behavioural impulsivity measures and was only associated with baseline other substance use. Our hypotheses were therefore partly confirmed.

When looking at other substances, only baseline use was associated with use at follow-up. This may be due to less frequent use of the other substances and a higher amount of non-users which resulted in a reduced power. The relationship between impulsivity, risk-taking and substance use might differ across substances in the other substance use class. For example, in a study in crack cocaine users, higher levels of risk-taking and impulsivity were present compared to those of heroin users (Bornovalova et al., 2005). Therefore, the combination of varying levels of impulsivity in the other substance use category may have had a reducing effect on power, although the analysis of the individual other substances was not an option, given their lower prevalence of use.

Previous research demonstrated that a higher BIS is associated with a more inhibited personality style (Hoppenbrouwers, Neumann, Lewis, & Johansson, 2015). Furthermore, higher BIS scores have been related to the avoidance of potentially dangerous environments (Campbell-Sills, Liverant, & Brown, 2004). Therefore, it seems plausible that increased inhibition, as evidenced in higher BIS scores are protecting for alcohol use as found in our study, which is also in line with previous findings in a study in undergraduates (Pardo et al., 2007). However, baseline alcohol use had no influence on alcohol use at follow-up, indicating that BIS had a stronger effect on future alcohol

use than the baseline use, which means that personality traits relating to impulsivity may be more important when predicting future alcohol use.

Scores on the BAS have been associated with higher attention to positively valued stimuli (Hoppenbrouwers et al., 2015), impulsive reward-seeking behaviour (Carver & White, 1994) and disinhibited behaviour (Gray, 1975). Therefore, a higher BAS could lead to higher anticipation of pleasure and reward-seeking behaviour, thus explaining the relation to increased cannabis use in our study in criminal offenders. This finding is in line with prior research (Pardo et al., 2007). Baseline cannabis use predicted follow-up use as well, and at a trend level, interactions between both higher risk-taking behaviour as measured in the BART and higher delay discounting, and higher cannabis use at baseline and higher BAS were also predictive of higher cannabis use at follow-up, indicating that combinations of higher impulsivity have an additive effect on predicting cannabis use at follow-up, while also interacting with baseline cannabis use. In the last case, the opposite effect of the main effect of baseline cannabis use was present, with higher BAS and higher BART values impacting cannabis use at follow-up more when baseline cannabis use was lower.

No direct associations between BART or DDT and alcohol, cannabis, or other substance use were present in our study. This could be related to the fact that in this severe sample, probably with a higher level of impulsivity compared to the general population, the influence of these factors is limited through a restriction of range. Swogger, Walsh, Lejuez and Kosson (2010) found no association between psychopathy and BART in male criminals and argued that caution is needed when generalizing results from non-criminal to criminal samples. They also suggested that the diagnostic benefit of the BART among inmates may be limited. To be able to detect differences between inmates and other samples, a BART version with higher rewards for risky behaviour may be superior (Bornovalova et al., 2009).

As already seen in the introduction, some inconsistent results were reported in the literature regarding the association between DDT and offending, respectively. Prior research with the DDT demonstrated positive findings, for example, an increased delay discounting in offenders compared to students (Arantes et al., 2013), predictive value for property and violent crime in undergraduates (Lee et al., 2017), increased delay discounting in a drug court sample compared to non-criminal university students (Jones et al., 2015) and delayed discounting measured in early lifetime (13 or 18, 32 and 48, respectively) as a predictive value for criminal convictions until the age of 31 or 56, respectively (Åkerlund et al., 2016; Piquero et al., 2018). However, negative findings are also present for instance in two studies where: no differences in delay discounting between delinquents and non-delinquents were found (White et al., 1994; Wilson & Daly, 2006). Property and violent criminality may be associated differently with delay discounting, as high levels of delay discounting have been associated with property crime, but not with violent crime, which was predicted by poor impulse control (Nagin & Pogarsky, 2004). Our results indicate no predictive value of DDT for criminal behaviour, which may be related to the male sample that we included, whereas other studies included both males and females. Since gender differences exist in the DDT (Yankelevitz et al., 2012), this may have had an influence. The DDT used in this study was a shorter version than usual

DDT tasks, which also may have led to a less optimal measurement of delay discounting, as also indicated by the exclusion of 16 participants due to non-systematic data on the DDT. Further, the statistical analyses differed; we wanted to predict criminal behaviour and substance use in parolees, whereas the prior studies calculated a comparison between offenders and students or predicted crime in students or in a healthy sample. Thirdly, most studies analyzed a longer time period than we used (e.g., 18 years, Åkerlund et al., 2016; 38 years, Piquero et al., 2018). Lastly, the DDT itself differed; for example, Piquero et al. (2018) asked the participants only one question in each survey year to assess delay discounting, whereas Arantes et al. (2013) used a DDT with amounts between \$500–\$4,000 with delays between 1–8 years. These are higher amounts and later hypothetical payout than in the version of the DDT that was used in this study (Wittmann et al., 2007).

Another factor that may be related to future substance use that has been discussed in this field is one's attitude towards the future. An optimistic attitude towards the future is linked to less risky behaviour, whereas a negative orientation towards the future correlates with higher substance use and more risk-taking (e.g., Apostolidis, Fieulaine, Simonin, & Rolland, 2006; Henson, James, Carey, Carey, & Maisto, 2006; Wills, Sandy, & Yaeger, 2001). Juveniles on probation who are more positive about their future were less involved in substance use and more likely to reject risky behaviours (Robbins & Bryan, 2004). The willingness to take risks can vary and be dependent on attitudes toward the future (Wilson & Daly, 2006). Participants in our sample recently left the prison and may show a more optimistic perspective for their future and may be keen to change their behaviour. Therefore, they may display less impulsive behaviour just after their stay in prison.

Wise and Koob (2014) discussed the development and maintenance of SUDs including positive (i.e., increase of behaviour with positive stimuli) and negative (i.e., increase of behaviour in order to remove or avoid a negative condition) reinforcement. When starting to use a substance, positive reinforcement, involving more impulsive behaviour, is essential. They hypothesize that after developing an addiction, negative reinforcement predominates, involving elements of compulsivity [defined as "actions inappropriate to the situation that persist, have no obvious relationship to the overall goal, and often result in undesirable consequences" (Wise & Koob, 2014, p.257)]. Therefore, impulsivity may have a larger impact at the beginning of an addiction, but for the maintenance of an addiction, other factors may become more influential. Still, we found effects of the BIS/BAS, of a combination of high delay discounting and high BART and of an interaction of BAS and BART with baseline cannabis use, on follow-up of cannabis use, indicating that combinations of higher levels of impulsivity and risk-taking can impact future substance (alcohol and cannabis use). These findings are consistent with addiction models that indicate a central role for impulsivity, other executive functions, and the underlying diminished functioning of the dorsolateral prefrontal cortex and anterior cingulate cortex (Goldstein & Volkow, 2002; Verdejo-García & Bechara, 2009). Thus, a combination of increased impulsivity, risk-taking and/or a preference for immediate rewards over delayed rewards, may exert its influence on future alcohol and cannabis, through changes in striatalfrontal brain circuitry, on top of the predictive effect that use at baseline has. Our sample consisted of parolees with a long history of criminal behaviour and it may be possible that impulsivity at this period may have a smaller impact,

than in younger or at-risk populations. This assumption may be supported by the findings in extremely violent prisoners, where Værøy, Western and Andersson, (2016) did not find an association between higher impulsivity (UPPS) and increased physical aggression (AQ-RSV). A further study found that premeditated aggression, which is defined as a planned action, predicted criminal recidivism, whereas impulsive aggression did not (Swogger, Walsh, Christie, Priddy, & Conner, 2015), also indicating that the role of impulsivity may be limited, at least for some forms of (aggressive) criminality.

Limitations

The sample consisted of male parolees and the effects are not generalizable to female offenders or offenders with comorbid mental illnesses. Additionally, the sample differed widely in the range of substance use. A few parolees had been using solely one substance, leading to a high portion of non-users in the “other substance” group (43.5%), limiting the power to detect differences for this specific analysis. Furthermore, the intervention or probationary service which all of these parolees followed, could have had a diminishing effect on impulsivity, meaning that the sessions may have reduced the influence of impulsivity on substance use. In this study, we could explain between 10% - 40% of the variance, which means that there are other predictors that we did not measure, such as other personality traits, acute substance intoxication during offence, childhood experiences, genetic predisposition, their neighbourhood and its criminogenic behaviour and/or relationships (Zimmerman, 2010). In this study, no counterbalancing was employed and thus, fatigue may have impacted the neurocognitive assessment, potentially impacting the power of predicting substance use at a later point. For the delay discounting, a quality check was done ensuring data integrity (see DDT), indicating that only in a small minority of cases, this was the case. Also, given the fact that the DDT and BART were not speed tasks, we think fatigue only may have impacted the data minimally. Another limitation may lie in a “restriction of range” effect: as our sample consisted of criminals with problematic substance use, this likely reflects a population in which impulsivity is higher than in the general population, and thus, impulsivity measures may have had more limited effects in our study. Lastly, the analyzed time at risk may have been too short. Further studies should assess a longer time period after prison.

CONCLUSION

Several impulsivity and risk-taking tasks had a predictive impact on alcohol and cannabis use at follow-up in male, substance-using parolees. Assessing behavioural inhibition, behavioural activation, impulsivity and risk-taking propensity in parolees seem to be a valuable addition in order to prevent substance use. Using these scores, parolees could be assigned to an intervention that focuses on reducing impulsivity and/or risk-taking behaviour. However, additional research is needed in order to improve the assessment of predicting criminal recidivism and substance use, taking into consideration other variables that may explain the complex roles of impulsivity and risk-taking in criminal behaviour and substance use.



3

The role of motivation in prediction addiction treatment entry among offenders with substance use disorders under probation supervision

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ABSTRACT

Many offenders with a substance use disorder (SUD) do not enter addiction treatment. The aim of this study was to examine predictors of addiction treatment entry and to get more insight into the predictive value of treatment motivation. A total of 83 male offenders with a SUD under probation supervision in the Netherlands were assessed at the start of probation supervision and 12-month follow-up. A total of 38 offenders (45.5%) entered addiction treatment in the follow-up period. Offenders with any mandated treatment ($p = .028$) and higher treatment motivation ($p = .005$) were more likely to enter treatment. Multiple logistic regression analysis showed that treatment motivation predicts addiction treatment entry in the first year of probation ($OR = 2.215, p < .01$). This emphasizes the relevance of treatment motivation for addiction treatment entry among offenders with a SUD. Pretreatment motivational interventions are therefore recommended for offenders with low motivation for treatment in probation settings.

INTRODUCTION

In this paper, the effect of treatment motivation on addiction treatment entry is evaluated among criminal offenders with a substance use disorder (SUD) under probation supervision in the Netherlands. SUD is between four and nine times more prevalent among offenders than in the general population (Fearn et al., 2016). Substance use and SUD increases the risk of criminal recidivism: the odds of offending are three to four times greater for substance users than non-substance users, and the frequency of criminal behaviour inclines with the level of substance use (Bennett et al., 2008; Gottfredson et al., 2008; White & Gorman, 2000). Treating offenders with SUD therefore provides an excellent opportunity to decrease substance use and at the same time reduce associated criminal behaviour. Addiction treatment has proven to be effective in reducing SUD as well as associated criminal behaviour (Belenko, Hiller, & Hamilton, 2013; Chandler, Fletcher, & Volkow, 2009; Harvey, Shakeshaft, Hetherington, Sannibale, & Mattick, 2007; Prendergast, Pearson, Podus, Hamilton, & Greenwell, 2013; Prendergast, Podus, Chang, & Urada, 2002).

There is a lack of research on addiction treatment for offenders under community supervision (i.e. probation), especially outside the US. A review by Belenko et al., (2013) on addiction treatment interventions used in the criminal justice system found that the majority of the studies focus on populations that are imprisoned in the United States (US), with addiction treatment interventions offered in prison. One meta-analysis of fifteen studies on European addiction treatment programs compared treatment outcomes for offenders in prisons or jails with treatment programs under community supervision (Koehler, Humphreys, Akoensi, Sánchez de Ribera, & Lösel, 2014). This meta-analysis found that both types of programs (i.e. prison/jail- and community-based) were almost equally effective in reducing substance use and crime.

Despite the well-established link between substance use and crime and the positive effects of addiction treatment, many offenders who meet the criteria of SUD do not enter addiction treatment (Taxman et al., 2007). There are several challenges that negatively affect addiction treatment entry by offenders with a SUD. One of the challenges is a lack of resources to provide addiction treatment within the criminal justice system (often education is provided without treatment). Another challenge is a lack of infrastructure to make addiction treatment services available through correctional agencies (Chandler et al., 2009; Farabee et al., 1999; Taxman et al., 2007). However, a key barrier to treatment is the offenders' lack of motivation for treatment (Chandler et al., 2009).

In general, lower levels of motivation have been identified for individuals with a SUD treated in the criminal justice system, compared to individuals with a SUD treated in community settings (De Leon, Melnick, Thomas, Kressel, & Wexler, 2000; Melnick, De Leon, Thomas, Kressel, & Wexler, 2001). Lower levels of motivation to quit substance use and lower readiness for treatment were also observed for individuals who were legally mandated to treatment (compared to voluntary admission) within both residential and community-based services (Melnick et al., 2014). Addiction treatment may have a smaller effect on those offenders who have not yet decided that substance use is a problem (pre-contemplators) or on those who have not decided what they want to do about

their substance use (contemplators). For those offenders treatment entry might be guided more by external factors - such as legally mandated admission - dictated at the point of arrest or sentence than by intrinsic personal motivation (Klag, O'Callaghan, & Creed, 2005; Wild, 2006).

Prior studies on the predictive value of motivation for treatment among offenders assessed motivation at treatment entry instead of at the start of probation supervision. However, to evaluate the importance of implementing motivation-enhancing interventions during probation supervision, it is important to assess motivation for addiction treatment at the start of probation instead of at treatment entry. In addition, more research on probation-based treatment from outside the US would increase the knowledge on the impact of contextual factors. For example, in the Netherlands, the obligation to undergo treatment may be imposed as a condition attached to a suspended sentence. In practice, a suspended sentence with this condition attached is generally not imposed without the consent of the sentenced person (Flore, Bosly, Honhon, & Maggio, 2012). Therefore, in contrast to findings in the US (Melnick et al., 2014), there may be a positive association between addiction treatment motivation and the legal mandate for treatment in the Netherlands.

The purpose of our study is to examine predictors of addiction treatment entry among offenders with a SUD under probation supervision. Secondary, we aim to get more insight into the predictive value of treatment motivation at the start of the probation. Using self-reported addiction treatment entry data, we address the following research questions: (a) What factors at the start of probation (T_1) are associated with addiction treatment entry at 12-month follow-up (T_2)?; and (b) To what extent is motivation for treatment at the start of probation (T_1) associated with addiction treatment entry at 12-month follow-up (T_2)? We hypothesize that compared to those who have entered addiction treatment at T_2 , those who have not entered treatment at T_2 will have a lower likelihood of mandated treatment and demonstrate a lower treatment motivation level at T_1 .

METHODS

Study design

The present study is part of a larger multi-site, cluster-randomized controlled trial (CRT) in which the effectiveness of a brief motivation enhancing intervention for offenders with SUDs was assessed (see Shaul, Koeter, & Schippers, 2016 for additional information). The participants in the CRT were 220 offenders with SUDs under probation supervision who received either supervision augmented with the intervention or supervision as usual. Offenders participating in the CRT were allocated to the study conditions by cluster randomization, with probation officer as the cluster variable. In total, 73 probation officers of six probation offices were randomized to one of the two conditions: supervision as usual (control condition) or supervision augmented with the motivational enhancement intervention (intervention condition). Offenders were allocated to a supervisor following the usual allocation procedure of the probation office. To control for a potential bias of the motivation

enhancing intervention, only the data of offenders from the control condition – that received supervision as usual and no intervention- was included in the present study.

Recruitment and Assessment Procedures

Between May 2010 and August 2012, offenders from six addiction probation offices in the Netherlands, were invited by their probation officer to participate in the CRT if they met the following criteria: (i) sufficient command of the Dutch language to understand interview questions and questionnaires; (ii) male; (iii) at least one prior sentence; (iv) regular use of alcohol and/or illicit drugs, i.e. using the substance at least three days a week, and additionally for alcohol use: consuming at least five or more glasses per day; (v) currently under court-order supervision executed by an addiction probation service in a noncustodial setting. Exclusion criteria were: (i) a history of neurological problems or severe psychiatric disorders like schizophrenia, psychotic disorder, or bipolar disorder; (ii) only convicted for driving under influence; (iii) illegal stay in the Netherlands.

Eligible offenders received a short introduction and a brochure about the study from their probation officer. Those who wished to participate in the study were scheduled for a baseline assessment. Of the eligible offenders approached for participation in the CRT, 220 offenders (42%) agreed to participate and completed a baseline assessment at T₁. Of the 220 offenders, 160 (73%) participated a second time and completed a follow-up assessment (T₂), on average 14.4 months (SD = 3.76) after baseline assessment. Of the participants that completed both assessments at T₁ and T₂, 83 offenders (52%) were allocated to the control condition and 77 offenders (48%) to the intervention condition of the CRT. Offenders were paid €15 at baseline and €20 at follow-up for participation. Written informed consent for the offender's study participation was obtained prior to baseline assessment. The CRT was approved by the Medical Research Ethics Committee of the Academic Medical Centre, University of Amsterdam.

Setting and participants

The foundation for Social Rehabilitation of Addicted Offenders (*Stichting Verslavingsreclassering GGZ or SVG*) is a non-profit national probation organization in the Netherlands that specializes in providing care and supervision to offenders with SUDs (Van Kalmthout & Tigges, 2008). Offenders are referred to the SVG by the judicial system as (part of) their sentence. All participants were under probation supervision of the SVG at T₁.

The current study included the 83 offenders that were allocated to the control condition of the CRT and that completed both T₁ and T₂ assessments. Participants were all male offenders, their mean age was 38 years (SD = 11, range 18-58) and 67% were born in the Netherlands. The highest educational achievement for the majority of the offenders (90%) was primary education or less, 85% was unemployed, and 60% had a permanent place to live in the past 30 days. The most common primary substances reported were alcohol (43%), cocaine (32%), marijuana (14%), heroin (6%), and methamphetamine (5%). The mean duration of primary substance use was 9 years (SD = 8.2). About 78% met the criteria for a SUD at T₁ assessment, 37% had completed prior

addiction treatment and for approximately 58% of the participants, mandatory addiction treatment was included in their verdict. The main types of crime in the verdict were violent crimes (44%), acquisitive crimes (41%), and drug crimes (15%). The mean number of arrests in the year prior to T_1 is 2.3 (SD = 2.5) and the mean probation period is 22.5 months (SD = 9.9).

Measures

Baseline assessment included a larger battery of instruments including a semi-structured baseline interview based on the MATE-Crimi (Schippers et al., 2011), containing 200 items regarding lifetime, 12 months, and 30-day information from offenders about their substance use, treatment history, criminal history, housing, education, and employment.

Treatment motivation was measured at baseline with the Dutch version of the Motivation for Treatment (MfT) scale, a 22-item questionnaire that assesses treatment motivation (De Weert-Van Oene, Schippers, De Jong, & Schrijvers, 2002). Each item is rated on a 5-point Likert scale, with response options ranging from 'strongly disagree' to 'strongly agree'. Higher scores on the scale indicate greater motivation.

Mandated addiction treatment was defined as the attached obligation to undergo an addiction treatment in the verdict. Mandated addiction treatment is a dichotomous variable derived from the digital database IRIS used by the addiction probation offices.

Treatment entry was defined at 12-month follow-up assessment (T_2) as entry into addiction treatment during the follow-up period (yes/no; self-reported by participants).

Statistical Analysis

Independent samples t-tests for continuous variables and a χ^2 tests or Fisher exact tests for categorical variables were used to compare demographic (e.g., age, education level, employment), substance-use (e.g., primary substance used, SUD, any mandated addiction treatment, history of completed addiction treatment), criminal behaviour (e.g., crime type, history of arrests, probation period) and treatment motivation variables at baseline assessment (T_1) for those that did and did not enter addiction treatment at 12-month follow-up assessment (T_2). Next, multiple logistic regression analysis was conducted in two steps. For Model 1, the treatment motivation variable was entered as a predictor, with follow-up duration as a confounder variable. In Model 2, the model 1 variables plus other baseline variables that were (nearly) significant ($p < 0.10$) between groups were entered. The (pseudo) explained variance of both models was assessed with the Nagelkerke R^2 measure. We compared the fit of the two models with the -2 log-likelihood tests to assess the relative importance of the motivation variable (Model 1 vs. Model 2) in predicting addiction treatment entry. All analyses were conducted using SPSS version 21.0 (SPSS Inc., Chicago, IL, USA). P-values < 0.05 were considered statistically significant.

RESULTS

Table 1 shows the baseline characteristics of offenders stratified by treatment entry. A total of 83 offenders were included in the analysis. The sample was divided into two groups according to self-reported addiction treatment entry at follow-up assessment (T_2). The mean follow-up duration was 14.4 months ($SD = 3.76$). Thirty-eight offenders (46%) entered treatment for their problematic substance use in the follow-up period and 45 offenders (54%) did not. Follow-up duration was longer for offenders that entered addiction treatment during follow-up period than for those that did not (15.4 months ($SD = 4.7$) versus 13.6 months ($SD = 2.5$), $t(81) = 2.217$, $p = 0.041$).

Treatment entry was positively associated with mandated addiction treatment in verdict ($X^2 = 5.024$, $p = 0.028$) and treatment motivation ($t(80) = 2.900$, $p = 0.005$). There was a positive trend towards an association between treatment entry and self-reported lifetime history of completed addiction treatments ($X^2 = 3.938$, $p = 0.065$). Demographic characteristics, substance-use, or criminal involvement were not associated to addiction-treatment entry at follow-up (T_2).

The multiple regression results are presented in Table 2. The main effects of Model 1 and Model 2 are shown. In Model 1, treatment motivation and follow-up duration were predictive factors of treatment entry. This model showed a significant, though limited amount of explained variance (LR $\chi^2 = 96.5$, $df = 2$, $p = 0.001$) with Nagelkerke $R^2 = 0.21$. The Hosmer and Lemeshow (2000) goodness-of-fit test statistic was not significant ($\chi^2 = 4.5$, $df = 8$, $p = 0.809$) indicating that the model fitted the data reasonably well. Offenders with higher levels of treatment motivation were two times as likely to enter addiction-treatment compared to those with lower levels of treatment motivation (OR = 2.21, CI = 1.29 – 3.80, $p = 0.004$) and the likelihood of addiction treatment entry was increased by longer time to follow-up assessment (OR = 1.19, CI = 1.02 – 1.38, $p = 0.031$). Model 2 also demonstrated that the likelihood of treatment entry was increased by treatment motivation and that the other predictors in the regression (i.e. prior completed treatment and treatment mandate) were not significantly associated with treatment entry in this model. With a Nagelkerke R^2 of 0.27, Model 2 accounted for 27% of the (pseudo) variance in treatment entry (LR $\chi^2 = 92.2$, $df = 4$, $p = 0.001$). Compared to Model 1, Model 2 showed no significant improvement in the amount of explained variance ($p = 0.116$).

DISCUSSION

The purpose of this study was to examine predictors of addiction treatment entry among offenders with a SUD under probation supervision and to get more insight into the predictive value of treatment motivation at the start of the probation. Congruent with our hypotheses, offenders who entered addiction treatment at 12-months follow-up (T_2) had higher levels of motivation at the start of probation (T_1) and were more often mandated to treatment than offenders who did not enter addiction treatment at T_2 . In addition, it appears that treatment is more appealing to offenders with

a lifetime history of addiction treatment since a trend was observed for history of addiction treatment having a positive effect on current addiction treatment entry. With regard to the predictive value of treatment motivation, our study shows that treatment motivation is the strongest predictor of subsequent addiction treatment entry among male offenders with a SUD.

Table 1

Characteristics of offenders, total sample and by addiction treatment entry status (entry versus no entry).

Variable, % (<i>n</i>) or <i>M</i> (SD)	Total (n=83)	Entry (n=38)	No Entry (n=45)	χ^2 , <i>t</i> ,	<i>p</i> -value
Demographics					
Age, <i>M</i> (SD)	37.9 (10.8)	36.6 (10.0)	39.0 (11.4)	0.986	0.327
Born in the Netherlands, % (<i>n</i>)	67.1 (53)	69.4 (25)	65.1 (28)	0.166	0.811
Primary education or less, % (<i>n</i>)	90.4 (75)	92.1 (35)	88.9 (40)	0.245	0.721
Unemployed, % (<i>n</i>)	85.4 (70)	86.5 (32)	84.4 (38)	0.068	1.000
Permanent place to live, % (<i>n</i>)	60.2 (50)	63.2 (24)	57.8 (26)	0.249	0.658
Substance Abuse and Treatment History					
Primary problematic substance, % (<i>n</i>)				2.669	0.636 ^a
Alcohol	42.5 (34)	40.5 (15)	44.2 (19)		
Cocaine	32.5 (26)	29.7 (11)	34.9 (15)		
Marijuana	13.8 (11)	18.9 (7)	9.3 (4)		
Heroin	6.3 (5)	8.1 (3)	4.7 (2)		
Methamphetamine, % (<i>n</i>)	5.0 (4)	2.7 (1)	7.0 (3)		
Primary substance use, <i>M</i> (SD) years	9.4 (8.2)	9.9 (8.0)	9.0 (8.5)	0.501	0.606 ^b
Problematic use at baseline ^c , % (<i>n</i>)	78.3 (65)	84.2 (32)	73.3 (33)	1.435	0.290
Prior completed addiction treatment, % (<i>n</i>)	37.0 (30)	48.6 (18)	27.3 (12)	3.938	0.065
Mandated addiction treatment, % (<i>n</i>)	57.8 (48)	71.1 (27)	46.7 (21)	5.024	0.028 [*]
Criminal involvement					
Type of crime				0.098	1.000
Violent, % (<i>n</i>)	54.2 (45)	55.3 (21)	53.3 (24)		
Property, % (<i>n</i>)	31.3 (26)	31.6 (12)	31.1 (14)		
Drug, % (<i>n</i>)	14.5 (12)	13.2 (5)	15.6 (7)		
No. of arrests, past 12 months, <i>M</i> (SD)	2.3 (2.5)	2.1 (2.1)	2.4 (2.9)	0.378	0.692 ^b
Probation period, <i>M</i> (SD) months	22.5 (9.9)	23.6 (10.5)	21.6 (9.4)	0.896	0.384 ^b
Treatment motivation, <i>M</i> (SD)	3.0 (1.0)	3.2 (1.0)	2.7 (0.9)	2.900	0.005 ^{**}
Follow-up duration, <i>M</i> (SD) months	14.4 (3.8)	15.4 (4.7)	13.6 (2.5)	1.173	0.041 ^{b*}

Note. MATE = Measurements in the Addiction for Triage and Evaluation; CIDI = Composite International Diagnostic Interview.

^a Fisher's Exact Test because expected cell counts <5.

^b Bootstrapped *p*-value of *t*-test to account for skewed distributions.

^c Substance abuse and dependence established with the MATE-Crimi questionnaire based on the CIDI 2.1 (Diagnostic and Statistical Manual of Mental Disorders-IV [DSM-IV] criteria).

p* < .05, *p* < .01

Table 2
Associations of Motivation, Mandate and Prior Treatment with Treatment Entry.

Model/step	Variables	OR	p-value	95% CI	-2 log-likelihood	R ²	p-value step
1					96.505	0.214	0.001**
	Follow-up duration	1.186	.031 [†]	[1.016 – 1.384]			
	Motivation	2.212	.004**	[1.288 – 3.799]			
	(Intercept)	0.007	.001**				
2					92.199	0.273	0.116
	Follow-up duration	1.198	.036 [†]	[1.012 – 1.418]			
	Motivation	1.870	.031 [†]	[1.059 – 3.301]			
	Mandate	2.039	.170	[0.737 – 5.638]			
	Prior treatment	2.291	.118	[0.810 – 6.480]			
	(Intercept)	0.005	.001**				

Note. OR = odds ratio; CI = confidence interval.

[†] $p < .05$, ** $p < .01$

Implications

Prior studies on the predictive value of motivation assessed motivation at the point of treatment entry to predict addiction treatment outcome (Linn-Walton & Maschi, 2015; Melnick et al., 2001; Olver, Stockdale, & Wormith, 2011). To the best of our knowledge, our study is the first to assess treatment motivation at the start of probation supervision to examine how motivation is related to the prediction of addiction treatment entry within the first year of probation supervision.

A recent UK study by Jones et al. (2017) concluded that the success of addiction treatment in offenders with or without a legal mandate to treatment is unlikely to be impaired by lower levels of motivation at the point of treatment entry. The authors hypothesized that the potential lower motivation among those with a legal mandate to treatment may now be recognized and addressed within the criminal justice system. Jones et al. argued that lower levels of motivation may, indeed, exist at the point of arrest, but that motivation may be elevated at the time of treatment entry. Our study adds to this that offenders with a higher level of motivation at the start of probation supervision are more inclined to enter addiction treatment. Addressing offenders' lack of motivation during probation supervision could thus be effective for both addiction treatment entry and success of treatment.

It remains to be tested whether the level of motivation at the start of probation is associated with offenders' perceived coercion to treatment instead of legal mandate. Offenders who perceive themselves as coerced may do so because they have been diverted from the criminal justice system into addiction treatment too early in their process of change (Klag et al., 2005; Wild, 2006). Moreover, levels of perceived coercion may reflect differences in judicial systems and the application of mandatory referrals between countries.

Jones et al. (2017) highlight that concerns around lower levels of motivation are better focused on those who *perceive* themselves as coerced rather than on those whose referral – on objective grounds - carries a level of legal condition. Perceived coercion and motivation were shown to be different, but correlated constructs. Prendergast, Greenwell, Farabee and Hser (2009) found that offenders who expressed a high level of perceived coercion tended to score lower on motivation, while those who felt that they were under low coercion (i.e., felt a sense of choice and autonomy) to enter treatment tended to score high on motivation. Future studies on offenders' treatment motivation and on predictors of addiction treatment entry should include measures of perceived coercion.

In probation settings where addiction treatment is encouraged, the results of the current study suggest that motivational interventions designed to enhance offenders' motivation for addiction treatment may increase the likelihood of addiction treatment entry. This corroborates findings from previous research into motivational pre-treatment programs for offenders that showed that it is beneficial to address lack of motivation prior to offender treatment programs for behaviour change (Anstiss, Polaschek, & Wilson, 2011; Marshall & Moulden, 2006).

Future studies on factors promoting treatment entry during probation should take treatment motivation into account by assessing it at the start of probation because motivation may fluctuate and higher motivation has been related to better addiction treatment outcomes (Taxman, Walters, Sloas, Lerch, & Rodriguez, 2015). Empirical knowledge of internal and external factors that promote and/or restrict treatment motivation among offenders with SUDs can facilitate the development of more effective motivational intervention strategies.

Limitations

The current study has several limitations. First, we only evaluated male repeat offenders and thus, our findings may not generalize to female or first offenders. Second, the small sample size of the treatment entry status groups may have limited our power and thus our ability to identify whether other offender characteristics relate to addiction treatment entry as well. Third, in recent studies, perceived coercion has been related to treatment motivation (Jones, Hayhurst, & Millar, 2017; Opsal, Kristensen, Vederhus, & Clausen, 2016) and perceived coercion may therefore also be predictive of treatment entry. We did not measure perceived coercion, and thus, our study does not provide information on how perceived coercion may have interacted with treatment motivation in our sample of repeat offenders. Fourth, except for the official records obtained on mandated addiction treatment, participant data are based on self-report. However, the instruments and procedures used in this study have been validated (Schippers et al., 2010), and blinding of professionals to the responses of participants was warranted, as the researchers were not affiliated with the Dutch probation organization, SVG.

CONCLUSIONS

In probation settings where addiction treatment is encouraged lies an opportunity to enhance addiction treatment entry for offenders with a SUD. This study shows that treatment motivation predicts addiction treatment entry among repeated male offenders with a SUD under probation supervision. This study, therefore, emphasizes the importance of treatment motivation and implementation of motivation enhancing interventions in probation settings to enhance addiction treatment entry by offenders with a SUD.



4

The effectiveness of a brief motivation enhancing intervention on treatment initiation, treatment retention and substance-use: results from a multi-site cluster-randomized trial

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ABSTRACT

The aim of this study was to test the effectiveness of a brief motivational enhancing intervention (MEI) as an add-on to supervision-as-usual (SAU) in reducing time to treatment initiation in offenders with substance use disorders (SUDs) under probation supervision. We also tested the effectiveness of enhancing treatment retention and abstinence of primary substance rates. The study was designed as a multi-site, cluster-randomized trial (CRT) in six addiction probation offices. We randomized 73 probation officers (37 to intervention, 36 to control) and followed 220 substance-abusing repeat offenders during their supervision (111 intervention, 109 control). Individualized SAU was compared with supervision with MEI. We report time to treatment initiation, treatment retention rate during the 12 months follow-up, and primary substance abstinence rate in the 30 days before follow-up. Results show that time to treatment initiation ($\chi^2(1) = 1.817, p = .178$), and the proportion of treatment retention (OR = 1.980, $p = .213$) and primary substance abstinence (OR = 0.945, $p = .886$) did not significantly differ between offenders that received SAU plus MEI and those that received SAU at 12 months follow-up. Our findings provide no evidence that supervision plus a brief manual-based MEI is more effective than SAU.

INTRODUCTION

About 60% of Dutch offenders under probation supervision have substance use problems (Menger, Bosker, & Heij, 2012; Van Kalmthout & Tigges, 2008). Studies have shown that without treatment, substance-involved offenders tend to repeat behaviour that has led to their criminal status (Harrison, 2001). Substance use is therefore an important issue for the probation service. One way to increase treatment participation rates and thereby reduce substance use problems among offenders may be to incorporate motivational interviewing (MI) in the probation service (De Jonge et al., 2012; Walters, Clark, Gingerich, & Meltzer, 2007). Although the MI-principles are generally embedded in the Dutch probation programs (Van Kalmthout & Tigges, 2008), so far the effectiveness of MI has been limited due to a lack of MI skills in officers who report the need for additional MI training and a manual to support the use of MI during supervision (De Jonge, 2005). To provide a more structured MI pre-intervention and implement additional MI training, for the current study a brief manual-based Motivation Enhancement Intervention (MEI) was implemented among the Dutch addiction probation officers.

MI is a communication style defined as a “collaborative, person-centered form of guiding to elicit and strengthen motivation for change” (Miller & Rollnick, 2009, p 137). MI is based on four central principles: amplifying the dissonance between current behaviour and personal values and goals, rolling with resistance to change, expressing empathy, and supporting self-efficacy (Miller & Rollnick, 2012). MEIs, also known as adaptations of MI, incorporate the MI-principles and are focused on implementing the four key MI-processes of engaging, focusing, evoking, and planning (Miller & Rollnick, 2012).

Research has provided robust support for the effectiveness of adaptations of MI at reducing substance use and increasing treatment readiness in substance users (Carroll et al., 2006; Hettema et al., 2005; Lundahl & Burke, 2009; Lundahl et al., 2010). MI has been widely validated as a stand-alone intervention, a prelude to more intensive interventions, or combined with other elements, such as personalized feedback (Burke et al., 2003; Hettema et al., 2005; Rubak, Sandbæk, Lauritzen, & Christensen, 2005; Vasilaki et al., 2006). However, most of this research has been conducted in non-offender-populations.

The evidence base for the effectiveness of MI for offender populations is limited. A review by McMurran (2009) provides preliminary evidence that MI can improve motivation and treatment retention among offenders although the authors conclude that the evidence for impact on behaviour is mixed. In a recent randomized controlled trial, Lerch, Walters, Tang, and Taxman (2017) compared the effectiveness of an add-on in-person MI intervention, a motivational computer-intervention (called MAPIT) or only supervision as usual (SAU). The authors found that compared to SAU, a motivational computer-intervention, but not in-person MI, improved treatment initiation at 2 and 6-month follow-up. They found no difference in substance use between the interventions. Given this limited evidence, the current study reports on a multi-site cluster randomized trial (CRT) comparing the effectiveness of the brief manual-based MEI versus SAU on treatment initiation,

treatment retention and abstinence of primary substance among substance involved offenders under the supervision of the Dutch addiction probation service. Previously, Shaul et al., (2016) tested the effectiveness of this MEI as an add-on to SAU on criminal recidivism and found that the proportion of re-offending and time to re-offending was not significantly different between offenders that received SAU plus MEI and those that received only SAU.

The aims of the current study were to test the effectiveness of the MEI as an add-on to SAU in (1) reducing time to treatment initiation (primary outcome measure); enhancing proportion of (2) treatment retention; and (3) abstinence of primary substance in offenders with SUDs under probation supervision. We hypothesized that SAU plus MEI would be more effective in reducing time to addiction treatment initiation and enhancing the proportion of treatment retention and abstinence of primary substance compared to SAU. Specifically, we hypothesized that offenders who received SAU plus MEI would have a shorter time to first addiction treatment contact (initiation) and a higher rate of treatment retention during the 12 months follow-up, and a higher rate of primary substance abstinence in the past 30 days before follow-up compared to those who received SAU.

METHODS

Setting

The study was conducted in six court districts: Amsterdam, Almere, Rotterdam, Dordrecht, Breda and 's-Hertogenbosch. The judiciary authorities can impose probation supervision as a conditional sanction. Similarly, the obligation to undergo treatment or to participate in certain behavioural interventions can be imposed as a condition attached to the sentence. Treatment is often, but not always, part of the conditions of the sentence. Offenders are typically referred by the court for supervision to a regional addiction probation office (closest to the address of the offender) when their criminal behaviour is related to problematic substance use. Addiction probation centres are specialized in working with offenders with SUDs. To bridge the gap between justice and health care these addiction probation offices are embedded in health care institutes. Supervision includes both guidance and surveillance. The probation officer checks if the offender complies with the conditions under which he is under supervision. The probation officer has a dual task: to encourage and motivate the offender to adhere to the conditions imposed (guidance), as well as to check the compliance with those conditions and to identify (imminent) violations. Referral to treatment is an important part of the probation officer's work. The probation officer and offender have regular face-to-face contacts at the probation office. The frequency varies depending on the estimated risk of criminal recidivism between one to four times per month.

Design and randomization

This study is a multi-site, CRT using a parallel-group design to assess the effectiveness of adding a manual-based MEI to SAU. The allocation of the intervention was at the cluster level, with

probation officer as a cluster variable. Probation officers from six addiction probation centres in the Netherlands were randomized per office (i.e., site) to one of the two conditions: SAU (control condition) and SAU augmented with the manual-based MEI (intervention condition). Offenders referred to probation supervision at the participating probation centres were assigned to a probation officer following the usual allocation procedure of the probation centre. Participating offenders allocated to a probation officer in the MEI group received SAU plus MEI, whereas offenders allocated to a probation officer in the SAU group received only SAU. Data were collected from participating offenders (SAU + MEI and SAU) at baseline (T1), i.e. at the start of supervision, and at 12-month follow-up (T2). The study has been reviewed and approved by the ethics committee of the Academic Medical Centre of the University of Amsterdam, Amsterdam, the Netherlands and was registered at trialregister.nl (NTR2420).

The trial was powered to detect a 20% difference in primary outcome: treatment initiation and retention. With an estimated 10% response in SAU and 30% response in the MEI, a power of 0.90, a α level of 0.05 (two-sided), and an estimated design effect of 1.75, we needed 240 participants. To take the effect of cluster randomization on sample size into account in the power calculation we adjusted for the intra-cluster correlation (ICC) by multiplying the required sample size by the estimated design effect. The estimated design effect = $1 + (m - 1) * ICC$, with m being the estimated average number of participants in each cluster (Donner, 1992). In our case, the estimated design effect of 1.75 was calculated as follows $1 + (4-1) * 0.25$.

Participants

Participants were offenders referred to an addiction probation office by the judicial system as (part of) their sentence. Six large urban addiction probation centres that are embedded in four main regional mental health care institutes in the Netherlands participated in the CRT.

Upon the start of probation supervision, offenders supervised at the participating addiction probation centre were screened for eligibility by their probation officer. Offenders were included if they were male, were convicted at least twice (including the current offence), were regular substance users (i.e. using the substance at least three days a week, and additionally for alcohol: consuming at least five or more glasses per day of use for at least three days a week), and were currently under a court order supervision executed by addiction probation service in a noncustodial setting. Furthermore, offenders were required to have a sufficient command of the Dutch language to understand interview questions and to complete written self-report questionnaires. Offenders were excluded if they were convicted for driving under influence (DUI) only, had a history of neurological problems or severe psychiatric disorders, or were illegal immigrants. The sub-population of offenders that are only convicted for DUI were excluded because they generally are obliged to participate in an educational intervention that is not part of probation supervision in The Netherlands. Because the main outcomes of this study are entering treatment and treatment retention, people illegally staying in the Netherlands were excluded since this limits treatment opportunities.

Assessment procedure

Recruitment took place from May 2010 through August 2012, with follow-up through August 2013. Inclusion and exclusion criteria were checked for all offenders by their probation officer. In addition, the coordinator of each location and a researcher went through the screenings of new candidates for supervision in a weekly consultation during the inclusion period. All offenders who fulfilled the criteria were informed about the study and invited to participate by their probation officer who then informed the research staff whether an offender was interested in participating in the study (yes/no). Research staff was allowed to contact those offenders who consented to be contacted by the research staff. Research staff planned a T1 assessment with offenders who agreed to participate and obtained written informed consent when they met with the offender for a T1. After providing informed consent, participating offenders completed a 90–120 min face-to-face T1 assessment, conducted at the probation office. After T1, participants continued their probation supervision with or without the manual-based MEI depending on the condition to which their probation officer was randomly allocated. Probation officers randomly assigned to the MEI condition started applying the manual-based intervention after T1. Research staff contacted the probation officer in the MEI condition six weeks after T1 to monitor their progress using a questionnaire. In the event that the intervention was not yet fully completed, another appointment was planned around the expected ending of the intervention.

T2 assessment consisted of a face-to-face interview that lasted between 60 and 90 min and took place 12 months after T1. T1 and T2 assessments were conducted by five persons: the principal investigator and senior researcher, and three research assistants: one psychologist and two criminologists. All participants received a financial compensation of €15 for T1 and €20 for T2 assessment.

Outcome measures

The primary outcome measure was treatment initiation. Secondary outcome measures were treatment retention and abstinence of the primary substance. We created dichotomous outcomes to indicate whether treatment initiation, treatment retention and abstinence of primary substance occurred and reported time to treatment initiation. We assessed registered treatment initiation and treatment retention via addiction treatment records of the addiction care institutes that fell under the same health care organizations as the participating probation offices. Treatment initiation (yes/no) was scored positively when a participant started a new substance use treatment (i.e. individual-sessions, in-patient, detoxification, intensive outpatient, medication) during the 12-month follow-up period. Time to treatment initiation was defined as the number of days between the date of entry into the study (T1 assessment) and the date of the first registered treatment contact. For censored cases, this date was set at 365 days (12 months). Treatment retention (yes/no) was scored positively when a participant engaged in a minimum of 90 days of substance use treatment during the 12-month follow-up period.

The secondary outcome measure self-reported abstinence of primary substance in the past 30 days (yes/no) was assessed at T2 using the Measurement of Addiction for Triage and Evaluation,

(MATE; Schippers et al., 2011). In accordance with the MATE guidelines, the primary substance of use was defined as the substance that causes the most problems according to the offender and assessor. In the case of several substances causing the same number of problems, the primary substance was determined according to the following sequence: cocaine, opiate, alcohol, other substances or sedative, cannabis.

Socio-demographic and health care use measures

Demographic characteristics included age, employment (yes/no), primary education or less (yes/no), and whether the offender had a permanent place to live (yes/no). Substance use measures were assessed with the Measures in the Addiction for Triage and Evaluation (MATE 2.1, Schippers et al., 2011; Schippers et al., 2010). Substance use measures included primary problem substance (i.e. alcohol, stimulating drugs, cannabis, opiates and other drugs), and problematic use (i.e. score on the dependence and abuse criteria scale of the MATE-Crimi, Schippers et al., 2011). Offenders were asked about their substance use in the last 30 days before T1 and their lifetime substance use in years. We also examined motivation for treatment using the Dutch version of the Motivation for Treatment scale (De Weert-Van Oene et al., 2002), lifetime prior addiction treatment (yes/no), and whether the offender had a court-ordered requirement for substance abuse treatment (yes/no). Finally, we examined; type of crime for under probation (i.e. property, violence, drugs, or other crime), the probation period, number of registered arrests in the past year before T1, and whether the offender has been detained for the past 12 months (yes/no).

Intervention

The manual-based brief MEI, called ‘Step by Step’ (Stap voor Stap, SvS) (Stichting Verslavingsreclassering GGZ, 2019), is an adaptation of MI in that it is based on the MI techniques and delivered through an MI approach. The SvS-module consists of a manual for the probation officer and an individual workbook for the offender that contains simple exercises. It is delivered individually over 4–6 probation supervision sessions of 15–20 min by a probation officer who is trained in delivering the module through an MI approach. The intervention takes place at the beginning of the probation period (after T1 assessment) and is integrated into the regular supervision meetings.

The MEI aimed to increase the offenders’ motivation to address their problematic substance use and criminal behaviour during probation supervision. The SvS-module comprises 5 target areas that are addressed in 7 steps: willingness to collaborate (step 1), problem recognition (steps 2 and 3), ambivalence to change (step 4), confidence in the ability to change (steps 5 and 6), and commitment (step 7).

The offender’s willingness to collaborate is addressed in the first step, in which a discussion is held about the paradox between compulsory supervision and the choices that the offender can make while under supervision. Problem recognition is addressed in step two and three. Step two involves taking stock of the current situation with regard to substance use, criminal behaviour, and other problems that the offender experiences (e.g. financially, socially, mentally, and physically). In step three offenders are guided in drawing up a graphical biography of their substance use and

criminal acts over the years, including behaviour patterns, as well as their experiences with quitting and reducing substance use and criminal acts. Ambivalence to change is addressed in step four, in which offenders make up a balanced scorecard of the advantages and disadvantages of the current and the imagined changed lifestyle, regarding substance use as well as criminal behaviour patterns. Confidence in the ability to change is addressed in step five and six, which focus respectively on assessing and re-enforcing the offender's attempts to change, and identifying the offender's beliefs about diverse forms of support and possibilities suitable for him. Finally, in step seven the emphasis is on reinforcing commitment language.

MI training

Probation officers of both supervision conditions (SAU and SAU + MEI) received an eight-hour small group MI-training (4 to a maximum of 12 officers) provided by MINT-trained professionals. The MI-training consisted of a brief overview of MI, videos and a discussion of core MI skills and 'MI spirit', and skill-building practice. All probation officers (of both control and intervention condition) were trained in MI to level out differences in general MI skills between the groups and to be able to test specifically the effect of the implementation of the manual-based MEI. In addition, only probation officers allocated to the intervention condition received training in working with the SvS-manual, which included studying the manual and participating in an 8-hour training session (provided by MINT-trained professionals). This SvS-training was followed up with 4-hour booster training sessions after 4 and 8 weeks. All probation officers in the MEI condition participated in the SvS-training sessions. Probation officers of both supervision conditions were explained that it is important that they adhere to the condition in which they are randomized. In addition, the team leaders from each office were informed that it was important to ensure that there is no contamination between conditions and asked to supervise this. Research staff had regular contact with the team leaders to inquire about possible obstacles and needs or more working books for officers in the intervention condition. In order to increase treatment fidelity, probation officers in the MEI condition were contacted by the research staff and asked about their progress in working with the manual. Probation officers allocated to the control group received no training in working with the manual-based MEI, SvS-module.

Statistical analyses

Analyses were performed according to the intention-to-treat principle. All statistical analyses were performed using SPSS Version 25.0 (SPSS Inc., Chicago, IL, USA). All reported P-values are two-sided and $P < .05$ was chosen as the threshold for statistical significance.

The effect of the intervention on time to treatment initiation was analyzed using a Kaplan-Meier survival analysis with the supervision-group allocation as an independent variable. For censored cases, the time to treatment initiation was set at 365 days (12 months). The intervention effect on the proportion of treatment retention (yes/no) and primary substance abstinence (yes/no) was examined using separate logistic regression analyses with group allocation as a fixed effect. Propensity scores were included in the analyses to adjust for the covariates related to outcome

variables. Besides the propensity score time to treatment initiation was included as a covariate in the regression models, and a T1 measure of abstinence rate was included as a covariate in the regression analysis on the effect of the intervention on abstinence rate.

A table will be presented showing T1 characteristics for each group (MEI and SAU). Independent-samples t-tests were used to examine group differences for continuous T1 variables and a χ^2 test for categorical T1 variables. For continuous variables with an asymmetrical distribution, the median and interquartile range will be presented.

RESULTS

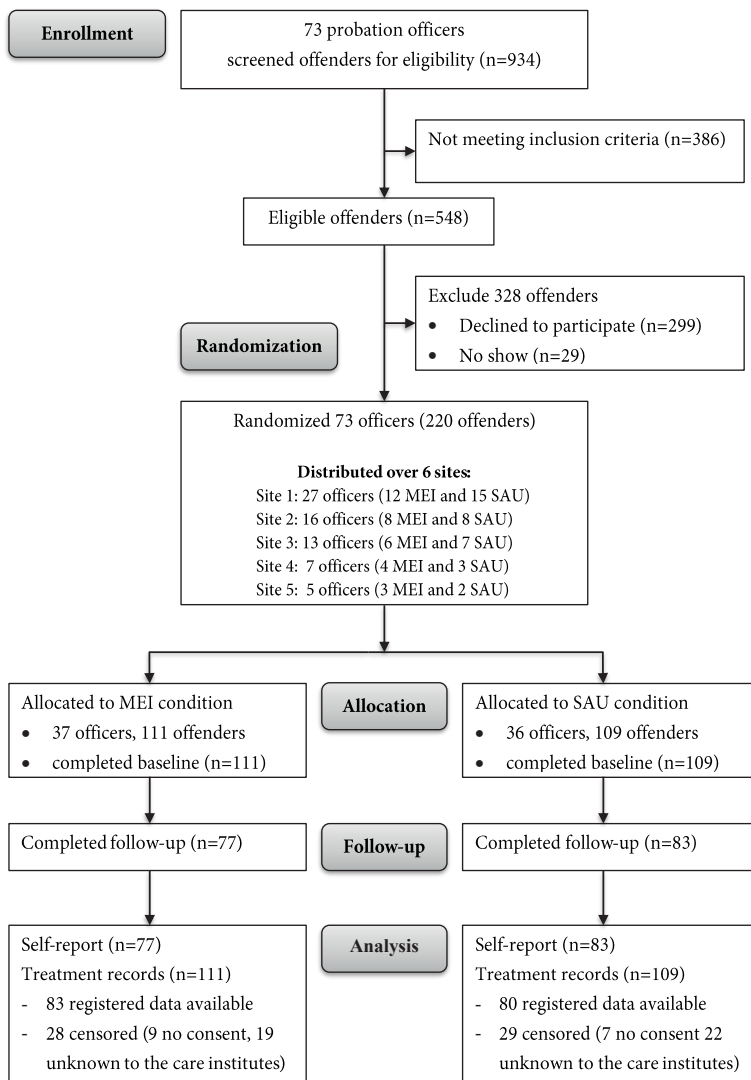
Study flow

Fig. 1 shows the study flow diagram. A total of 73 probation officers participated in the study (MEI = 37, SAU = 36). Between May 2010 and August 2012 the participating officers screened 934 offenders and found 548 eligible. Of these, 328 (60%) either declined or did not complete the T1 assessment. The total offender sample recruited was 220 (MEI = 111, SAU = 109). Registered T2 data on treatment initiation and treatment retention was available for 204 offenders (92.7%, MEI, n = 102 and SAU, n = 102). Registered T2 data was missing for 16 offenders (MEI, n = 9 and SAU, n = 7) since they did not consent to request their treatment information at the involved addiction-care institutions. These missings were considered censored cases. Self-reported T2 data on substance use was available from 160 offenders (73%, MEI, n = 77 and SAU, n = 83) who completed the T2 assessment. Offenders lost to T2 assessment tended to be younger ($t(218) = 2.197, p = .029$) and were more often employed ($\chi^2(1) = 4.587, p = .043$).

Participants characteristics

T1 characteristics were generally well balanced across the study supervision conditions (see Table 1). Notably, 70.3% of the participants randomized to MEI had a court-ordered requirement to attend substance abuse treatment, compared to 54.1% of the participants in the SAU condition ($\chi^2(1) = 6.099, p = .014$). There was one notable difference between sites, namely that there was no equal distribution over the sites on whether or not someone was born in the Netherlands ($\chi^2(5) = 30.881, p < .0001$). The percentage of offenders born in the Netherlands per site were: Amsterdam 50.5%, Almere 63.6%, Rotterdam 72.0% Dordrecht 75.0%, Breda 89.8% and 's Hertogenbosch 94.1%. Based on these T1 differences between MEI and SAU, we included the following T1 measures as covariates in the propensity score estimation: substance abuse and dependence (total score established with the MATE-Crimi questionnaire based on the CIDI 2.1; DSM-IV criteria), type of primary substance used, substance abuse treatment court order (yes/no), site (1–6) and motivation for treatment. The motivation for treatment at the start of supervision (T1) was added as a covariate, as a recent study by Shaul, Blankers, Koeter, Schippers, and Goudriaan, (2019) showed it to be predictive of self-reported treatment participation.

Figure 1
Study flow diagram.



Treatment integrity

There was a trend towards a higher number of supervision contacts in the MEI than in the SAU condition (MEI 18 sessions versus SAU 15 sessions; $t(188)=1.802, p=.073$). There was no significant difference in duration of supervision between the MEI and SAU condition (median supervision period was for both 23 months, see Table 1). On average, participants in the MEI sample completed 4.8 ($SD = 2.7$) of the seven steps.

Table 1
Characteristics by supervision condition at T1.

	MEI (n=111)	SAU (n=109)	X ² or <i>t</i>	p-value
Demographic characteristics				
Age, Median (IQR) years	37 (18-68)	38 (18-58)	.322	.748 ^a
Born in the Netherlands, % (n)	65.5 (72)	68.8 (75)	.279	.667
Primary education or less, % (n)	83.5 (91)	92.6 (100)	4.266	.058
Unemployed, % (n)	74.1 (80)	80.6 (87)	1.293	.330
Permanent place to live, % (n)	55.9 (62)	64.2 (70)	1.603	.218
Substance use				
Primary problematic substance, % (n)			.657	.897
Alcohol	41.7 (45)	36.4 (39)		
Stimulating drugs	37.0 (40)	39.3 (42)		
Cannabis	13.9 (15)	15.9 (17)		
Opiates and other drugs	7.4 (8)	8.4 (9)		
Problematic use ^b , % (n)	82.7% (91)	78.9% (86)	.518	.472
Primary substance use, M (SD) years	8.1 (8.90)	9.7 (8.64)	-1.322	.188
Mandated addiction treatment, % (n)	70.3 (78)	54.1 (59)	6.099	.014 [*]
Motivation for treatment ^c , M (SD)	3.1 (0.82)	3.0 (0.94)	1.154	.250
Currently in addiction treatment, % (n)	32.4 (36)	33.9 (37)	.057	.886
Prior addiction treatment, % (n)	56.0 (61)	52.3 (58)	.305	.591
Prior completed addiction treatment, % (n)	31.8 (35)	35.5 (38)	.332	.569
Criminal behaviour				
Type of crime for under probation			.588	.766
Property, % (n)	30.6 (34)	33.9 (37)		
Violence, % (n)	52.3 (58)	52.3 (57)		
Drugs and other, % (n)	17.1 (19)	13.8 (15)		
Probation period, Median (IQR) months	23 (1-50)	23 (2-49)	1.186	.237 ^a
Registered arrest, past 12 months, M(SD) ^d	2.3 (2.13)	2.3 (2.4)	-.015	.988
Detained past 12 months, % (n)	66.7 (74)	55.0 (60)	3.119	.097

MEI = motivation enhancing intervention; SAU = supervision-as-usual

^a Bootstrapped *p*-value of *t*-test to account for skewed distributions.

^b Substance abuse and dependence established with the MATE-Crimi questionnaire based on the CIDI 2.1 (DSM-IV criteria).

^c Motivation for treatment established with the Motivation for Treatment scale.

^d Number of arrests in the past 12 months at risk, i.e., corrected for days in detention or clinic.

^{*} *p* < .05

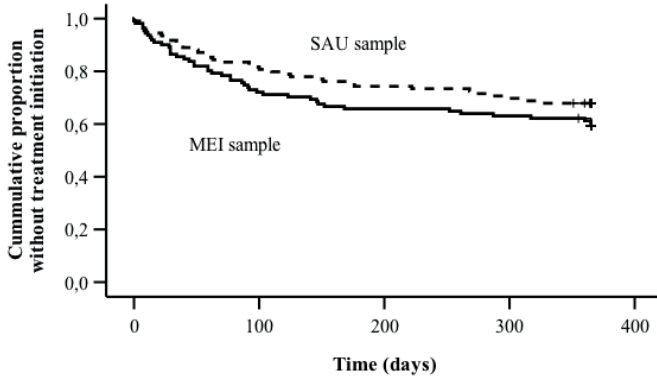
Treatment initiation

Fig. 2 shows for offenders in the MEI and SAU condition the Kaplan-Meier survival curve on treatment initiation. No effect of the intervention on time to treatment initiation was found. The mean time to treatment initiation was 257 days (95% CI = 230–285) for the MEI sample versus 283 days (95% CI = 258–308) for the SAU sample; the intergroup difference assessed by the log-rank method

was not statistically significant ($\chi^2(1) = 1.817, p = .178$). For the 80 offenders who initiated treatment during the 12-months follow-up period, the average time to treatment initiation was 104 days.

Figure 2

Cumulative proportion without treatment initiation for MEI and SAU.



MEI = motivation enhancing intervention; SAU = supervision-as-usual.

Treatment retention and abstinence rate

Table 2 shows the results of the logistic regression analyses on the proportion of treatment retention and abstinence of primary substance. There were no significant intervention effects for treatment retention (OR=1.980, 95% CI=0.676–5.803, $p=.213$) and primary substance abstinence rate (OR = 0.945, 95% CI = 0.438–2.041, $p = .886$). During the 12-month follow-up period, 46.8% of the 111 offenders from the MEI condition and 47.7% of the 109 offenders from the SAU condition remained for at least 90 days in substance abuse treatment. Of the offenders who completed the T2 assessment 12 months after T1, 36.8% of the 77 offenders in the MEI condition and 28.0% of the 83 offenders in the SAU condition reported at T2 abstinence of their primary problematic substance in the past 30 days.

Table 2

	MEI, % (n)	SAU, % (n)	β (SE_{β})	OR (95% CI)	p
Treatment retention ^a	46.8 (52/111)	47.7 (52/109)	.683 (.549)	1.980 (.676, 5.803)	.213
Abstinence ^b	36.8 (28/76)	28.0 (23/82)	-.056 (.393)	.945 (.438, 2.041)	.886

Logistic regression models prediction of 12-month treatment retention (yes/no) and primary substance abstinence (yes/no). MEI = motivation enhancing intervention; SAU = supervision as usual

^a. Propensity score was calculated based on the following T1 variables: age, employment (yes/no), education level (primary education or less), site (1-6), self-reported total score on substance abuse and dependence questionnaire, substance abuse treatment court order (yes/no), and motivation for treatment. Besides the propensity score, time to treatment initiation was included as a covariate in the regression analysis.

^b. Propensity score was calculated based on the following T1 variables: substance abuse and dependence (total score established with the MATE-Crimi questionnaire based on the CIDI 2.1; DSM-IV criteria), type of primary substance used, substance abuse treatment court order (yes/no), site (1-6). Besides the propensity score, time to treatment initiation and a T1 measure of abstinence were included as covariates in the regression analysis.

DISCUSSION

In this CRT we tested the effectiveness of adding a brief, manual-based MEI to SAU versus SAU only among offenders with problematic substance use under the supervision of the Dutch Addiction Probation Service. Our hypotheses were that, compared to SAU, SAU plus MEI would be more effective in (1) reducing time to treatment initiation, enhancing the proportion of (2) treatment retention, (3) and abstinence of primary substance at T2. None of these hypotheses was supported by our data. The Kaplan-Meier survival analysis revealed no statistically significant difference in time to treatment initiation between SAU plus MEI and SAU alone. Finally, the logistic regression analyses showed no difference in the proportion of treatment retention and self-reported primary substance abstinence at T2 between the SAU plus MEI and SAU.

A possible explanation for the lack of influence of the intervention on the outcomes might be that the provided training was insufficient for probation officers (both SAU + MEI and SAU) to reach the beginning proficiency level of MI, that is, the level of proficiency where MI can influence clients behaviour (Gaume, Gmel, Faouzi, & Daepfen, 2009; Miller, Yahne, Moyers, Martinez, & Pirritano, 2004; Moyers, Martin, Manuel, Hendrickson, & Miller, 2005). Unfortunately, we did not measure the MI proficiency of the probation officers participating in our study, however recent literature suggests that more than a basic 1–2 day workshop training is necessary to achieve a beginning MI proficiency level. A recent study that explicitly examined if a comparable amount of training as in our study was effective in disseminating MI skills found no improvement in MI skills after training between trained and untrained experienced clinicians working with dual diagnosis patients (see Kikkert, Goudriaan, de Waal, Peen, & Dekker, 2018). Moreover, Forsberg, et al. (2011a; 2011b) demonstrated that prison staff that received on-going MI training, but not staff that received workshop-only MI training, had increased MI skills compared to staff that did not receive training. However, none of the prison staff (workshop-only and on-going MI training) reached beginning proficiency level in MI (Forsberg et al., 2011a; 2011b) and no difference was found on T2 substance use, abstinence, illegal activity or working days between the trained and untrained (Forsberg et al., 2011a). Although MI is ostensibly simple and although some studies indicate that MI skills can be acquired in a workshop training of just a few days (Madson, Loignon, & Lane, 2009), a growing amount of studies have also demonstrated that on-going learning support is necessary for the acquisition and retention of MI skills (Forsberg, Forsberg, Lindqvist, & Helgason, 2010; Fu et al., 2015; Kikkert et al., 2018; Miller et al., 2004; Mitcheson, Bhavsar, & McCambridge, 2009). Forsberg et al. (2010) stated that a successful implementation of MI in a naturalistic setting may take up to 2 years of continuous training based on feedback and coaching in order to reach the beginning proficiency level of MI.

Recent findings show a computer-based motivational intervention, but not in-person MI, to be effective in enhancing treatment initiation compared to SAU among probationers (Lerch et al., 2017). This suggests that although it is not easy to acquire MI skills, computer-based interventions may be particularly suitable for probation where the staff has limited training in behavioural treat-

ment (Bonta et al., 2011; Chadwick, Dewolf, & Serin, 2015) and there are relatively few treatment resources available (Taxman, Perdoni, & Caudy, 2013). At the time of writing, the Dutch Addiction Probation Service (Stichting Verslavingsreclassering GGZ, 2019) transformed the SvS intervention into a smartphone application, enabling offenders under probation supervision to complete the program through this application independently or together with their probation officer.

Another possible explanation for our findings might be that training was sufficient to improve the level of MI proficiency of the probation officers but that the contrast between the intervention and control conditions was too small. As we trained all probation officers (SAU + MEI and SAU) in general MI skills, the general use of MI by SAU probation officers (control condition) may have led to a smaller contrast between the intervention and control conditions. The lack of an intervention effect could also be attributable to the fact that the intervention was manualized, which has been found to be associated with a weaker effect of MI compared to non-manualized MI (Hetteema et al., 2005; Lundahl et al., 2010). Although the provided training in applying the intervention was aimed at preventing this, too rigid adherence to the manual by MEI probation officers (intervention condition) may have worked against keeping to the MI principles.

The degree of motivation that offenders had at T1 may also be related to the lack of an intervention effect. About 33% of the offenders (32% SAU + MEI and 34% SAU) were in addiction treatment at T1 suggesting that a considerable portion of participants was already motivated for change. However, it has been suggested that applying MI to a motivated individual may stifle the desire to change (Miller & Rollnick, 2002). Possibly, the addition of MEI to SAU may have increased the motivation of some participants, but decreased motivation of those who were already motivated; which may have evened out the effectiveness of supervision with MEI in comparison with SAU with regard to treatment retention. Related, the lack of intervention effect could also be attributable to the large portion of the offenders mandated to addiction treatment in the SAU plus MEI condition (70.3%). Given that treatment is generally not imposed without the consent of the offender in the Netherlands (Flore et al., 2012), possibly there is a positive association between motivation for addiction treatment and legal mandate for treatment. Adding MEI to SAU may have limited the motivation for treatment of those offenders mandated to treatment and may as such have diminished the potential for an add-on effect of MEI plus SAU compared to SAU.

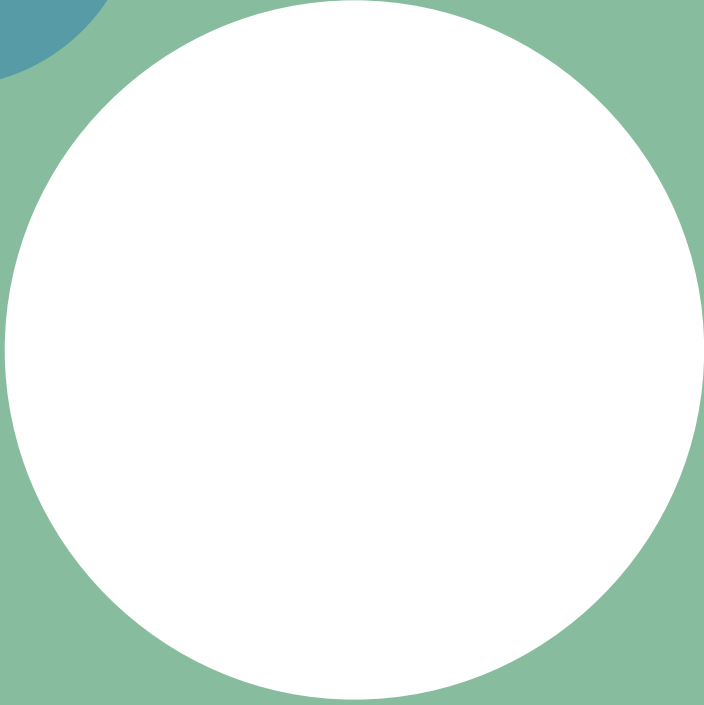
Limitations

Our study has several limitations. We were unable to collect information about eligible offenders who refused to participate in the study. Thus, we do not know whether there is a difference between offenders who participated in the study and those who refused participation. Further, we were unable to examine whether the implementation of MEI was successful, as we did not measure probation officers' proficiency in MI and in applying MEI in an MI style. Future studies should audiotape or videotape MI sessions to determine treatment fidelity. This is especially important when MI is offered by probation officers, given their dual role of both surveillance of compliance to conditions imposed by the judiciary authorities, as well as acting as a change agent (Clark, Walters,

Gingerich, & Meltzer, 2006). The inherent pitfalls of this dual-role (e.g., the tendency to move to one side; to become too harsh or too friendly) can pose a challenge to remain MI consistent while navigating this dual-role. Moreover, we have no treatment records of addiction care institutes other than those that fell under the same health care organizations as the participating probation offices. Participating offenders may thus have received treatment elsewhere or attended AA meetings or sought self-help in another way such as support from their general practitioners. The absence of an intervention effect could have been influenced by barriers to obtaining treatment services such as waitlists or experienced delays in commencing treatment. Unfortunately, data on these sorts of barriers were not available in our study. However, the study sites were specialized addiction probation offices that have close links to mental health care institutes, which probably limits barriers to treatment such as waitlists. If there was a waitlist that impacted time to treatment initiation, this is expected to have been balanced between groups, due to the randomized design of the study, and therefore its impact on our between groups comparisons is expected to be limited. In future studies, it is, however, important to also consider situational barriers to obtaining treatment, such as waitlists. Furthermore, differences in the acquisition of MI skills of probation officers could relate to the degree of motivation to learn MI and readiness to change practice (Barwick, Bennett, Johnson, McGowan, & Moore, 2012; Schumacher, Madson, & Nilsen, 2014). We had no data on the experience of probation officers or offenders with the intervention. Future studies could be improved by including independent measures of how working with the intervention is experienced by officer and offender when implementing MI. Our findings are not generalizable for offenders who are only convicted for driving under the influence (DUI) as they were excluded from the current study (since they are generally obliged to participate in an education group on substance use and traffic instead of being referred to probation supervision or addiction treatment in the Netherlands).

CONCLUSION

The results of this study provided no evidence for the effectiveness of a manual-based brief, individual MEI as an add-on to SAU in reducing time to treatment initiation, enhancing the proportion of treatment retention or abstinence of primary substance among offenders under probation supervision. Our findings raise the question of whether the two days of training received by MEI probation officers in our study was sufficient and whether a more intensive or longer training is needed in order to improve MI skills. In addition, the contrast between supervision as usual and the added intervention may not have been strong enough in order to have differential effects on the outcome measures. Above all, our results emphasize the importance of including instruments to assess MI proficiency both at T1 and after MI training, when implementing MI-based interventions in a naturalistic setting.



5

Brief motivation enhancing intervention to prevent criminal recidivism in substance-abusing offenders under supervision: a randomized trial

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ABSTRACT

The goal of this study was to assess the effect of a brief motivation enhancing intervention (MEI) on criminal recidivism. This was a multisite, cluster-randomized clinical trial in six addiction probation offices. We randomized 73 probation officers (37 to intervention, 36 to control) and followed 220 substance-abusing repeat offenders that were allocated to them (111 intervention, 109 control). We report three measures of recidivism rate (self-report, police records, combination of either of the two) and time to re-offending (police records) during a 12-month follow-up period. The proportion of re-offending and time to re-offending was not significantly different between offenders that received supervision plus intervention and those that received supervision-as-usual (no intervention). Our findings provide no evidence that supervision plus a brief motivation enhancing intervention is more effective than supervision-as-usual.

INTRODUCTION

The main aim of correctional rehabilitation programs is to reduce recidivism. Empirical evidence shows that three principles are necessary for effective correctional rehabilitation, namely, the Risk-Needs-Responsivity (RNR) principles (Andrews & Bonta, 2010; MacKenzie, 2006). The risk principle pertains to the question of 'who' to target for programs and posits that moderate- to high-risk offenders should be targeted. The needs principle pertains to the question of 'what' to target and posits that programs should address offenders' "criminogenic" needs, that is, the offenders' needs (such as substance use) that are associated with the likelihood of recidivism. The responsivity principle pertains to the question of 'how' to target offenders, and posits that programs need to be delivered in a manner that matches the offenders' (individual) learning styles and needs. A key precept of the responsivity principle is motivation (Day & Howells, 2007), a factor identified to be important in offender program engagement and, in turn, program outcomes (Ginsburg, Mann, Rotgers, & Weekes, 2002; Harper & Hardy, 2000; McMurrin, 2002).

A lack of motivation to change behaviour is often prevalent among offenders (McMurrin, 2002; Polaschek, Anstiss, & Wilson, 2010; Wong & Gordon, 2006). In the short term, the legal system can impose behaviour change by sanctions or external control on offenders, also known as extrinsic motivators. However, once the sanctions are lifted or the time period of active control is expired, offenders have to sustain any changes in behaviour without the assistance of such extrinsic motivators. For some offenders, the criminal justice event becomes a learning opportunity that facilitates the intentional behaviour change process. However, the level of recidivism in the criminal justice system indicates that consequences are not always effective teaching tools. The goal of criminal justice interventions is long-term protection of the public from crime as well as rehabilitation or sustained behaviour change on the part of the offender. Sustained behaviour change, even after sanctions have ended, seems to require a focus on the intentional process of change, also known as intrinsic motivation.

A potentially promising approach to facilitate the intentional change process involves the use of motivational interviewing techniques. Motivational interviewing (MI) is a client-centred method that focuses on enhancing an individual's motivation to engage in a particular behaviour, and his or her level of self-efficacy or confidence in the ability to engage in that behaviour (Miller & Rollnick, 2002). MI was developed by Miller and Rollnick (2002, 2013), originally as a method for motivating substance abusers to change, and has been shown to be effective in the field of substance abuse (Burke et al., 2003; Dunn, Deroo, & Rivara, 2001; Hettema et al., 2005; Rubak et al., 2005; Vasilaki et al., 2006). Given the high rate of substance use among offenders, it seems promising to apply this method to this population (Brookoff, O'Brien, Cook, Thompson, & Williams, 1997; Singleton, Farrell, & Meltzer, 2003). Among Dutch probationers, 55% have been identified as problematic drug users and 26% as problematic alcohol users. Furthermore, for judicial criminals, drug use (20%) and alcohol use (29%) played a part in delinquent behaviour (Van Kalmthout & Tigges, 2008).

Hence, MI could play a crucial role in the evidence-based treatment of offenders with problematic substance use.

In the years since MI was initially introduced (Miller & Rollnick, 1991), developers have incorporated its principles into interventions for a wide range of problem behaviours. Often referred to as motivation-enhancing interventions (MEIs), these methods are explicitly geared to implement the MI processes of engaging, focusing, evoking, and planning (Miller & Rollnick, 2013). Because motivation-enhancing approaches extend beyond simple information provision by targeting underlying attitudinal and motivational processes, they are particularly well-suited for court-mandated individuals who tend to enter intervention programs with high resistance and low motivation for change (Dill & Wells-Parker, 2006; Nochajski & Stasiewicz, 2006).

Past research has focused mostly on identifying risk factors and criminogenic needs. According to Andrews and Bonta's (2006) theory of criminal behaviour change, responsivity is necessary but not sufficient to reduce the risk of re-offending. Seen as a component of responsivity, a strong motivation to avoid re-offending is not viewed as likely to change directly dynamic criminogenic risk factors. However, a recent study by Anstiss et al. (2011) demonstrated that a brief offending-focused MI intervention reduced the risk of recidivism in male prisoners with a variety of offences and criminal histories.

The MI principles are generally adhered to in Dutch offender rehabilitation programs, but the training is limited (Van Kalmthout & Tigges, 2008). Thus, a large portion of the burden of preventing recidivism falls on the criminal justice system through the use of sanctions and monitoring. A significant challenge for criminal justice interventions is how to create conditions whereby the offender perceives control mechanisms as aids to self-change rather than obstacles to overcome. Many researchers advocate active participation by offenders in their rehabilitation process (Taxman, 2014). It is assumed that if offenders are stakeholders in their process of change, they will assume a greater level of accountability. A protocolized approach that involves awareness of the intentional change process could provide probation officers with a tool for creating an opportunity for offenders to be involved in their rehabilitation and long-term behaviour change process (DiClemente, 2013). We developed a protocolized motivation enhancing intervention (MEI) that provides a method of working with re-offenders with problematic substance use. In criminological research, the effectiveness of motivation enhancing interventions in reducing recidivism rate is a crucial but still relatively underexplored area (McMurran, 2009).

The present study uses an intention to treat analysis to examine the effect of a protocolized MEI on recidivism rate and time to re-offending among substance-using judicially supervised re-offenders. In addition, we conducted a per-protocol analysis, excluding participants who did not complete the intervention. We hypothesized that the MEI sample (supervision plus intervention) would show significantly less re-offending and delayed time to re-offending compared to those in the supervision-as-usual (SAU) sample.

METHODS

Design

We used a multi-site, two groups randomized controlled trial. Data were collected from offenders at baseline (on entry into the study supervision condition) and 12 months follow-up. This article focuses on recidivism at 12 months post-entry into the study.

Randomization and allocation to supervision condition

Participating offenders were allocated to one of two supervision conditions by cluster randomization with the probation officer as the cluster variable. That is, probation officers were randomized to either supervision-as-usual (SAU) or the protocolized motivation enhancing intervention (MEI). Offenders were allocated to a probation officer following the usual procedure of the probation office, resulting in an MEI offender sample or an SAU offender sample, depending on which group the probation officer belonged to. A cluster-randomized design was used because it avoided interference with daily practice in which offender and probation officers are matched, and evoked less resistance in offenders and probation officers than individual randomization, thus maximizing participation and intervention integrity.

In total, 73 probation officers were randomized (37 to MEI and 36 to SAU). Officers were distributed as follows over six probation offices: 27 officers (12 MEI and 15 SAU), 16 officers (8 MEI and 8 SAU), 13 officers (6 MEI and 7 SAU), 7 officers (4 MEI and 3 SAU), 5 officers (3 MEI and 2 SAU), and 5 officers (4 MEI and 1 SAU).

Setting and participants

The Social Rehabilitation of Addicted Offenders (*Stichting Verslavingsreclassering* GGZ or SVG) is a private non-profit national probation organization in the Netherlands that targets a specific group of offenders whose offences are supposedly related to their substance use. Offenders are referred to the SVG by the judicial system as (part of) their sentence. Eleven branch offices of the SVG deal with probation work and their primary aim is to reduce recidivism (van Kalmthout & Tigges, 2008). Six of the eleven branch offices participated in the study.

Offenders supervised at the participating SVG branch offices were screened by their probation officer for eligibility using a 10-item checklist. Inclusion criteria were: (i) sufficient command of the Dutch language to understand interview questions and questionnaires; (ii) male; (iii) at least two sentences; (iv) regular use of alcohol and/or illicit drugs, i.e. using the substance at least three days a week, and additionally for alcohol: consuming at least five or more glasses per day; (v) currently under court-order supervision executed by a branch office of the SVG in a noncustodial setting. Exclusion criteria were: (i) a history of neurological problems or severe psychiatric disorders such as schizophrenia, psychotic disorder, or bipolar disorder; (ii) only convicted for driving under influence; (iii) illegal stay in the Netherlands. Eligible offenders were invited by their probation officer to participate in the study. Offenders who agreed to participate were contacted by a researcher

for an appointment, usually at a probation office. Offenders were included in the study when they completed the baseline assessment.

Procedure

Five persons conducted the baseline and follow-up interviews: the principal and the second investigator, and three research assistants: a psychologist, and two criminologists (with graduate degrees). The baseline assessment, which lasted between 90-120 minutes, began with obtaining written informed consent. In addition, contact information was collected to be able to trace participants for follow-up assessment. Participating offenders received financial compensation at the end of the assessment (€15). Probation officers randomly assigned to the MEI condition started the motivation enhancing intervention after the baseline assessment. Research staff contacted the probation officers in the MEI condition to monitor their progress using a 5-item standardized questionnaire. Twelve months after the baseline interview a follow-up interview with the participating offenders was conducted that lasted approximately 60-90 minutes. For this interview, they received monetary compensation (€20). Ethical approval for this study was provided by the Medical Research Ethics Committee of the Academic Medical Centre, University of Amsterdam.

Intervention

The protocolized motivation enhancing intervention, called 'Step by Step' (*Stap voor Stap*, SvS), was developed for re-offenders with problematic substance use who are under probation supervision. The SvS module consists of a manual for the probation officer and an attractively-designed and illustrated individual workbook for the offender that contains simple exercises for making a personal sketch of his situation. It is delivered individually to re-offenders with problematic substance use in 4-6 sessions of 15-20 minutes by probation officers who were trained in delivering the intervention applying a motivational interviewing style of approach.

The overall goal of the SvS module was to enhance offenders' willingness to address their problematic substance use and criminal behaviour. The SvS module comprises seven steps that focus on the offender's willingness to collaborate (step 1), problem recognition (steps 2 and 3), ambivalence to change (step 4), confidence in the ability to change (steps 5 and 6), and commitment (step 7).

Each step has a number of main elements. The first step involves a discussion of the paradox between mandatory supervision and the choices that an offender can make while under supervision. Step two involves making an inventory of the current situation regarding substance use, criminal behaviour, and problems experienced by the offender (e.g., financial, social, mental, physical). In step three a substance use biography is drawn up: participants are guided in depicting their habits of using drugs and engaging in criminal acts over the years in a graph. This includes not only behaviour patterns, but also their experiences with stopping and reducing substance use and criminal acts. This helps them to observe their roles (enhancing self-esteem), and those of others in the case of (temporary) success. Step four involves making a balanced score chart of the pro's and con's of the current lifestyle, and an imagined changed lifestyle, pertaining to both substance use and criminal

behaviour patterns. Step five involves assessing and reinforcing the offender's attempts to change. Step six involves identifying the offender's beliefs about various forms of support and opportunities appropriate for him. Step seven involves reinforcing commitment language.

MI training

An eight-hour small group training provided by MINT-trained professionals was given to probation officers in both conditions. It consisted of a brief overview of MI, videos and a discussion of core MI skills and "MI spirit," and skill-building practice. Both groups of probation officers were trained in motivational interviewing to level out differences in general MI skills between the two groups and to be able to test specifically the effect of the implementation of the motivation enhancing intervention. Probation officers randomized to the MEI condition were further given an eight-hour small group start-up training in working with the exercises in the protocol and in handling the booklets. This training of the MEI group was refreshed after four and eight weeks with a four-hour booster training session. All probation officers in the MEI condition attended the training.

Measures

Recidivism data

Recidivism was operationalized as any new offence during the 12 months post-entry into the study (i.e. after the offender completed the baseline-assessment). We distinguished between three recidivism outcomes: self-reported recidivism, registered recidivism, a combination of self-reported and registered recidivism. Moreover, we measured the time to re-offending. Self-reported recidivism was obtained by several questions in the follow-up interview. Registered recidivism was operationalized as any new entry in the national police identification service system due to a criminal offence. Combined recidivism was operationalized as a combination of either reported or registered involvement in criminal activity. Time to re-offending was based on registered recidivism by the police and defined as the number of days between the date of entry into the study (baseline assessment) and the first re-offence date. For censored cases, this date was set at 365 days (12 months).

Data Analysis

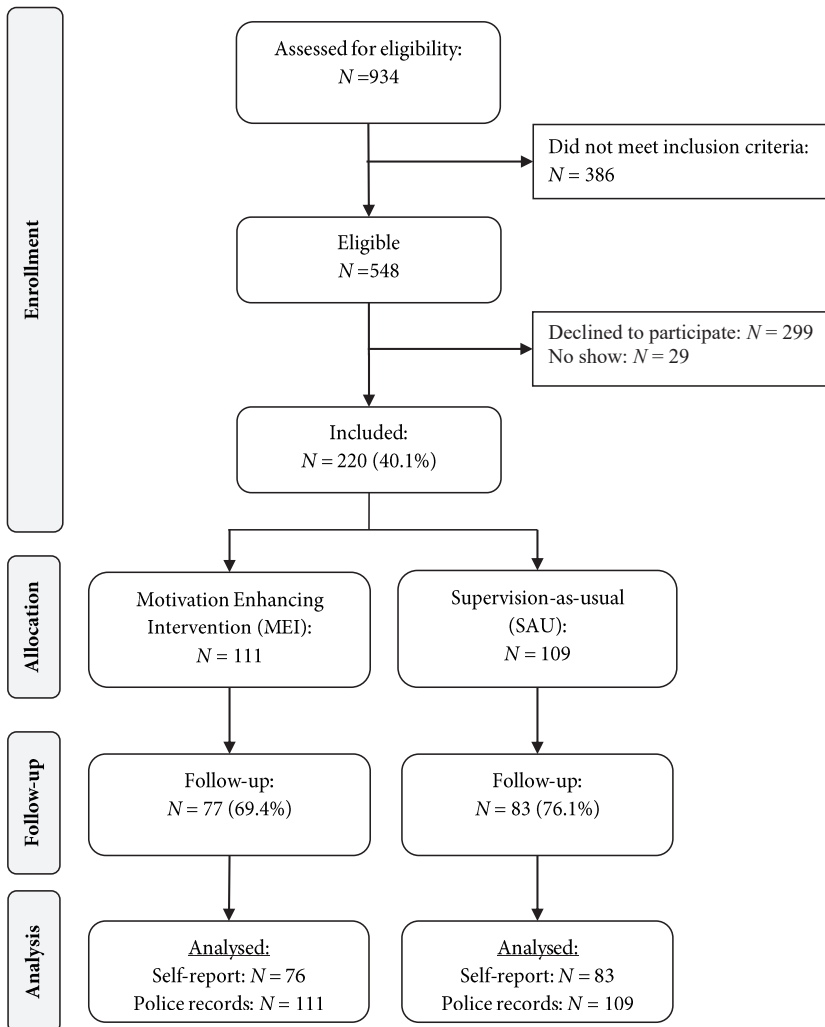
Differences in baseline demographic characteristics, substance use, and criminal behaviour variables between probationers in the MEI group and the SAU group were assessed with independent-samples *t*-tests for continuous variables and χ^2 tests for categorical variables. Logistic regressions and survival analyses were used to examine the effect of the MEI on recidivism outcomes (dichotomous data and survival time data). In addition, post-hoc per-protocol analyses were performed, including only offenders in the control group and offenders who completed all seven steps of the MEI. All analyses were conducted using SPSS Version 21 (SPSS Inc., Chicago, IL, USA). Significance was defined as $p < .05$.

RESULTS

Recruitment and follow-up

Recruitment for the study took place from May 2010 to August 2012. Follow-up assessments were completed in July 2013. Given the feasibility issues related to recruiting and follow-up of this hard-to-reach population, we chose to terminate data collection with a final sample of 220 offenders. Figure 1 presents the recruitment and flow chart of offenders throughout the study.

Figure 1
Flow chart.



Overall, 934 offenders were assessed for eligibility by their probation officer. Of the 548 offenders eligible for the study, 220 (40.1%) were included: 111 allocated to the MEI sample and 109 to the SAU sample. The overall retrieval rate for follow-up assessment was good, 73% ($N = 160$) of the participants completed both baseline and follow-up assessments, consisting of 77/111 (69.4%) for MEI, and 83/109 (76.1%) for SAU. Participants who completed follow-up were similar to those lost to follow-up regarding baseline demographic variables (age, ethnicity, education), substance use, and criminal behaviour.

Baseline characteristics

There were no significant differences between the MEI and SAU sample in demographic characteristics, substance use, or criminal behaviour at baseline (Table 1). Baseline characteristics of the 48 offenders in the MEI sample who did not complete the protocolized intervention were also similar to those of offenders who completed the intervention ($n = 50$).

Integrity check

The adherence in providing the intervention was observed: on average the intervention group completed 4.8 ($SD = 2.7$) steps out of seven. The frequency of supervision contacts with offenders was equal in both MEI and SAU condition (MEI 18 sessions vs. SAU 15 sessions; $t(188) = 1.802$, $p = .073$), but differed between the 23 MEI completers and the offenders in the SAU condition ($t(142) = 4.0$, $p < .001$).

Effects of the intervention

As part of the intent-to-treat (ITT) analysis data were available on registered criminal activity (police reports) for all 220 offenders who entered the study. With respect to self-reported criminal activity, 60 offenders were lost to follow-up (34 from MEI leading to a retrieval sample of 77, and 26 from SAU leading to a retrieval sample of 83).

Table 2 presents the effectiveness of the MEI on the three recidivism measures: self-reported recidivism, registered recidivism, and combined recidivism. The ITT analysis revealed no significant differences in self-reported recidivism (MEI: 51.3% vs. SAU: 49.4%), nor in registered recidivism (MEI: 41.4% vs. SAU: 45.0%), nor in combined recidivism (MEI: 56.8% vs. SAU: 57.8%).

Figure 2 shows the Kaplan-Meier survival curve for the MEI and SAU samples for time to re-offending based on registered recidivism. We found no effect of the MEI on time to re-offending (MEI: 307 days vs. SAU: 295 days; $\chi^2(1) = 0.008$, $p = .928$).

For the per-protocol (PP) analysis data were available on intervention completion for 98 offenders (50 completers vs. 48 non-completers) from the MEI sample of 111 (88.3%). For 13 (11.7%) participants data were missing on the number of steps completed. With regard to self-reported recidivism 24.0% (12/50) of the offenders that completed the MEI were lost to follow-up. Among the completers, 47.4% (18/38) and 49.4% (41/83) of the MEI and SAU offenders, respectively, reported that they reoffended in the 12 month follow-up period (Table 3). No significant differences

Table 1

Baseline demographic characteristics, substance use and criminal behaviour variables stratified by supervision condition.

Variable (% (n) or M(SD))	MEI (n=111)	SAU (n=109)	X ² or t	p-value
Demographic characteristics				
Mean age (years)	37.1 (11.31)	37.5 (10.66)	-.322	.748
Native, % (n)	65.5 (72)	68.8 (75)	.279	.667
Primary education or less, % (n)	83.5 (91)	92.6 (100)	4.266	.058
Unemployed, % (n)	74.1 (80)	80.6 (87)	1.293	.330
Substance use				
Any prior drug/alcohol treatment, lifetime	56.0 (61)	52.3 (58)	.305	.591
Primary substance used			.657	.897
Alcohol, % (n)	41.7 (45)	36.4 (39)		
Stimulating drugs, % (n)	37.0 (40)	39.3 (42)		
Cannabis, % (n)	13.9 (15)	15.9 (17)		
Opiates and other drugs, % (n)	7.4 (8)	8.4 (9)		
Problematic use at baseline*			.529	.925
No dependence or abuse, % (n)	17.3 (19)	21.1 (23)		
Dependence, % (n)	2.7 (3)	2.8 (3)		
Abuse, % (n)	24.5 (27)	22.9 (25)		
Dependence and abuse, % (n)	55.5 (61)	53.2 (58)		
Criminal behaviour				
Type of crime for under probation			.588	.766
Property, % (n)	30.6 (34)	33.9 (37)		
Violence, % (n)	52.3 (58)	52.3 (57)		
Drugs and other, % (n)	17.1 (19)	13.8 (15)		
Registered crimes in the year at risk prior to arrest, M(SD)	2.2 (2.63)	2.7 (4.4)	-.864	.389
Self-reported crimes in the year at risk prior to arrest, M(SD)	73.8 (189.37)	88.8 (163.22)	-.566	.572
Detained in the year prior to arrest, % (n)	39.6 (44)	37.6 (41)	.095	.783
Days detained in the year prior to arrest, M(SD)	75.5 (69.36)	91.4 (81.04)	-.969	.335
Current criminal thinking, at baseline, M(SD)	27.5 (8.70)	26.5 (9.42)	.794	.428
Historical criminal thinking, at baseline, M(SD)	27.5 (8.71)	26.5 (9.41)	.795	.428

Abbreviations: MEI: motivation enhancing intervention; SAU: supervision-as-usual.

* Substance abuse and dependence established with the MATE-Crimi questionnaire based on the CIDI 2.1 (DSM-IV criteria).

were found between MEI completers and SAU on registered recidivism (MEI completers: 38.0% vs. SAU: 45.0%) or combined recidivism (MEI completers: 56.0% vs. SAU: 57.8%).

Figure 3 shows the Kaplan-Meier survival curve based on registered recidivism for offenders who completed the intervention (MEI completers) and SAU. No effect of intervention on time to re-offending was found (MEI completers: 328 days vs. SAU: 295 days; $\chi^2(1) = 0.450, p = .502$).

Table 2
Relation between MEI and re-offending (yes/no)^a.

	Recidivism		β	SE_{β}	OR	<i>p</i>	95% CI
	MEI, % (<i>n</i>)	SAU, % (<i>n</i>)					
Self-report ^b	51.3 (39/77)	49.4 (41/83)	.135	.320	1.145	.673	.611 - 2.144
Police data	41.4 (46/111)	45.0 (49/109)	-.120	.275	.887	.663	.517 - 1.520
Combined ^c	56.8 (63/111)	57.8 (63/109)	.018	.275	1.019	.947	.594 - 1.748

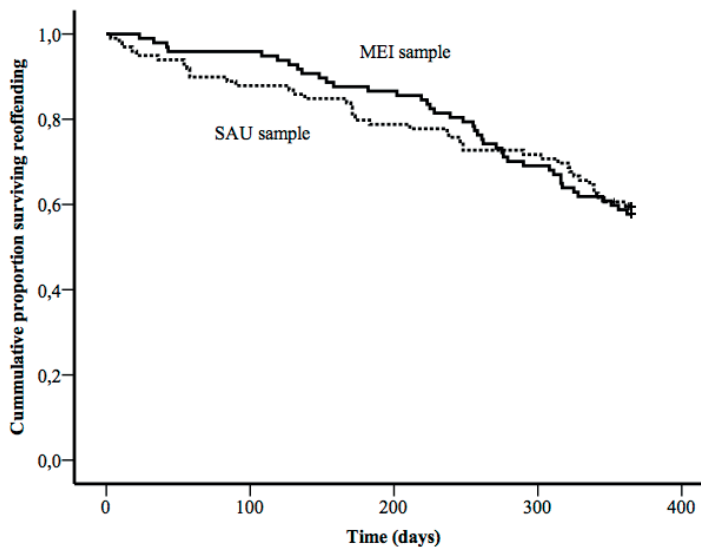
Abbreviations: MEI: motivation enhancing intervention sample; SAU: supervision-as-usual sample.

^a Logistic regression analysis with re-offending (yes/no) as dependent and MEI (yes/no) as independent variables and propensity score as a covariate to correct for criminal history. Propensity score was calculated based on the following four baseline variables: days detained in the year prior to arrest, registered arrests in the year at risk prior to arrest, self-reported arrests in the year at risk prior to arrest, type of crime for under probation.

^b Missing follow-up self-report data for 60 offenders.

^c Self-reported and/or police registered re-offending during the follow-up period.

Figure 2
Cumulative proportion surviving re-offending for MEI and SAU.



DISCUSSION

We assessed the effectiveness of a protocolized individual MEI in reducing recidivism among substance-abusing offenders under probation supervision. Both the intent-to-treat and per-protocol analyses revealed no statistically significant difference in recidivism between the MEI and SAU groups regarding self-reported, registered, or combined recidivism. Further, survival analysis showed no difference in time to re-offending between the MEI and SAU offenders.

Table 3
Relation between completed MEI and re-offending (yes/no)^a.

	Recidivism						
	MEI completers, % (n)	SAU, % (n)	β	SE_{β}	OR	<i>p</i>	95% CI
Self-report ^b	47.4 (18/38)	49.4 (41/83)	-.034	.399	.967	.932	.442 - 2.113
Police data	38.0 (19/50)	45.0 (49/109)	-.204	.357	.816	.568	.405 - 1.641
Combined ^c	56.0 (28/50)	57.8 (63/109)	.015	.351	1.015	.967	.510 - 2.019

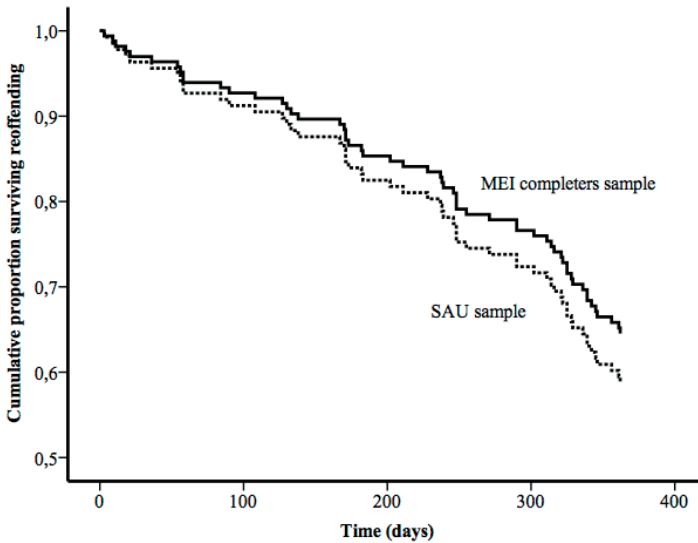
Abbreviations: MEI_{completers}: motivation enhancing intervention sample that completed all seven steps of the intervention; SAU: supervision-as-usual sample.

^a. Logistic regression analysis with re-offending (yes/no) as dependent and MEI (yes/no) as independent variables and propensity score as a covariate to correct for criminal history. Propensity score was calculated based on the following four baseline variables: days detained in the year prior to arrest, registered arrests in the year at risk prior to arrest, self-reported arrests in the year at risk prior to arrest, type of crime for under probation.

^b. Missing follow-up self-report data for 60 offenders.

^c. Self-reported and/or police registered re-offending during the follow-up period.

Figure 3
Cumulative proportion surviving re-offending for MEI completers and SAU.



Abbreviations: MEI: motivation enhancing intervention; SAU: supervision-as-usual.

Our findings provided no support for a difference in recidivism between supervision-as-usual and supervision plus a protocolized motivation enhancing intervention in substance-abusing repeat offenders. There are several possible explanations for these findings. One explanation is that, in line with the theory of criminal behaviour change (Andrews & Bonta, 2006), offenders’ motivation to engage in change is a necessary but not sufficient factor to commence in actual change. However, a recent New Zealand study by Anstiss et al. (2011) showed positive effects of a brief,

individual MI intervention in reducing the risk of recidivism. In this study prisoners who took part in an MI intervention, had a significantly lower chance of re-offending than their treatment-as-usual counterparts, who did not receive an intervention. In our study probation officers of both the protocolized motivation enhancing intervention and supervision-as-usual were trained in MI skills. Hence, our findings do not rule out the possibility that this was sufficient to have an effect on criminal behaviour change in both supervision conditions.

In the Netherlands, all probation officers dealing with offenders with problematic substance use are trained in MI skills (Van Kalmthout & Tigges, 2008). In addition, we trained all probation officers (control and intervention) in general MI skills to assess the effectiveness of the specific protocolized motivation enhancing intervention delivered with MI. Hence, compared to other studies, the general use of MI by SAU probation officers in the control condition may have led to a smaller contrast between the intervention and control conditions. Previous research provided evidence for the effectiveness of MI and its adaptations to increase motivation to change in offenders (Anstiss et al., 2011; Austin, Williams, & Kilgour, 2011). An alternative explanation for our findings may therefore be that both supervisions, with a specific protocolized motivation enhancing intervention and SAU with MI as a general method of approach, have an effect on recidivism.

Another possible explanation for our findings concerns integrity, in particular probation officers' competence. As we did not monitor the abilities and skills of probation officers to carry out the intervention, we do not know how competent they were herein. An eight-hour training might not be enough. For some participants we had information on adherence, that is, if they went through all the steps of the intervention as intended. We found, however, no difference between SAU and completers of the MEI. Still, we cannot rule out that a limitation in the competence of carrying out the intervention was underlying the results.

Overall, results suggest important recommendations for future research on the effect of a protocolized motivation enhancing intervention for reducing re-offending in probation-supervised substance-abusing offenders. Our findings emphasize the importance of monitoring integrity in training and implementation of protocolized motivational interventions. It is particularly essential to consider probation officers' experience with the protocol. More experienced probation officers, that is, by training or practice in working with the protocol, might be more skilled at applying MI skills within a protocolized approach. A protocolized approach might be particularly suitable for probation officers who know the tricks of the trade of working with MI. In studying the effectiveness of a protocolized motivational approach future research should account for implementation issues, such as probation officers' experience.

CONCLUSION

The results of this study provided no evidence for the effectiveness of a protocolized, brief, individual motivation enhancing intervention in reducing re-offending and in delaying the time to

re-offending among substance-using offenders under probation supervision. Our findings suggest that there is no difference in the effect on recidivism rate between supervision including a protocolized motivation enhancing intervention or supervision-as-usual that includes general use of motivational interviewing among substance-abusing repeat offenders.



6

General Discussion



INTRODUCTION

The main aim of this thesis was to compare the effectiveness of supervision plus a brief manual-based motivation enhancing intervention (MEI) with that of supervision as usual (SAU) in convicted persons with problematic substance use. In two parallel studies, we explored the predictive role of motivation for treatment entry, and of behavioural measures of impulse control in substance use and criminal behaviour. In this section, we summarize the main findings. Subsequently, we discuss some of the major issues that were evaluated in this dissertation and propose directions for future research. We then continue with discussing the methodological considerations. The general discussion ends with recommendations for implementing motivational interviewing (MI) in the criminal justice system and conclusions.

SUMMARY OF MAIN FINDINGS

Impulse control

In chapter 2, the results of the study into the role of impulse control measures in substance use and recidivism of re-offenders with a SUD were reported. Logistic regression analysis showed that self-rated trait impulsivity measures (BIS/BAS) were associated with substance use at follow-up. Specifically, higher behavioural inhibition (i.e., lower impulsivity) scores on the BIS at baseline predicted lower alcohol use at 12-month follow-up and explained 18% of the variance. Moreover, a combination of higher BAS and cannabis use at baseline were the strongest predictors of increased cannabis use at follow-up. For cannabis use, baseline use interacted with impulse control measures to predict cannabis use at follow-up, and a (trend-level) interaction between delay-discounting and risky decision-making (BART) predicted higher cannabis use at follow-up. The use of other substances at follow-up was not predicted by BIS/BAS or any other impulse control measure and was only associated with baseline other substance use. Our results indicated no predictive value of impulsivity measures for criminal behaviour. However, at trend level, a positive association was observed between baseline BAS and property crime at follow-up.

Motivation as a predictor of treatment entry

In chapter 3, we examined two research questions. First, what factors at the start of probation are associated with addiction treatment entry at 12-month follow-up? Second, to what extent is treatment motivation at the start of probation related to the prediction of addiction treatment entry at 12-month follow-up? In accordance with our hypotheses, offenders who entered addiction treatment at 12-month follow-up had higher levels of motivation at the start of probation and were more often mandated to treatment than offenders who did not enter addiction treatment at follow-up. In addition, addiction treatment appeared to be more appealing to offenders with a history of addiction treatment, where a positive association was observed at trend level between

self-reported treatment entry and lifetime history of addiction treatment. We found no association between treatment entry and demographic characteristics, substance use, or criminal involvement. Regarding the predictive value of treatment motivation, the results of the multiple regressions showed that offenders with higher levels of treatment motivation were twice as likely to start addiction treatment compared with those with lower levels of treatment motivation, and that treatment motivation was the strongest predictor of subsequent addiction treatment entry.

Effectiveness of MEI

In chapters 4 and 5 we reported the key findings of our cluster randomized trial (CRT). The primary aim of the CRT was to investigate whether the addition of a brief, manual-based motivation enhancing intervention (MEI) to supervision as usual (SAU) would result in less time to addiction treatment initiation. Secondary, we aimed to examine whether adding MEI to SAU would result in larger improvements on the following secondary outcomes: proportion of treatment retention, primary substance abstinence, time to re-arrest, and proportion of re-arrest.

In chapter 4 we report on the effect of adding MEI to SAU on time to treatment initiation (primary outcome), and on the proportion of treatment retention and primary substance abstinence. Results demonstrate that 80 offenders (80/163; 49%) initiated treatment during the 12-month follow-up period with an average time to initiation of 104 days. There were no significant group differences in time to treatment initiation. No significant intervention effects were found for treatment retention and primary substance abstinence rate.

In chapter 5 the effect of adding MEI to SAU on recidivism rate and time to re-offending was examined. In addition, we investigated if there was a difference between offenders who completed the intervention versus those who did not complete the intervention on these two outcomes. There were no significant group differences in recidivism between MEI (completers) and SAU in self-reported, registered or combined recidivism. No significant differences in time to re-offending were found between the SAU plus MEI (completers) and SAU.

GENERAL DISCUSSION AND DIRECTIONS FOR FUTURE RESEARCH

From MI-based intervention studies to MI process studies

When setting up the study of this thesis, research had provided robust support for the effectiveness of MI at reducing substance use and increasing treatment readiness in substance users (Carroll et al., 2006; Hettema et al., 2005; Lundahl & Burke, 2009; Lundahl et al., 2010). However, the evidence base for the effectiveness of MI in offender populations was limited. A review by McMurran (2009) provided preliminary evidence that MI could improve motivation and treatment retention among offenders, although the authors concluded that the impact on behaviour was mixed. Given the high co-morbidity of addiction, the resistance to change among offenders, and the lack of other interventions to motivate behavioural change, MI was soon also applied in the forensic field. In this

sense, practice was ahead of scientific knowledge on the use of MI in offenders. This was also the case in the addiction probation service where the CRT described in this thesis took place: probation officers were already trained in working with MI. We tried to increase the effectiveness of MI with offenders under probation by coming up with a new add-on manual-based MEI for offenders with SUDs who were under probation supervision; however, we found no difference between SAU plus MEI and only SAU. As discussed in chapter 4 and 5 the lack of differences in behavioural outcomes between the two supervision conditions can have various explanations. However, above all the results primarily seem to raise three questions: First, what are the working mechanisms of MI? Second, what is needed for a successful implementation of MI? Third, what offender and context factors are predictive of MI outcome? Unfortunately, the studies that were conducted in this thesis could not answer these questions. Our proposition is that these are major research questions for future studies into MI in general and specifically with offenders with a SUD.

Working mechanisms of MI

The importance of more future research on the working mechanisms of MI is endorsed by the National Institutes of Health (NIH) who quite recently started calling for research not just on *if* interventions work, but also on *how* specific mechanisms affect behaviour change (NIH Common Fund, 2016). In addition, the rapid dissemination of research in the MI field requires more evidence-based knowledge on what process variables make MI work or not. Like in this thesis, most prior research investigated the effectiveness of MI by studying MI-based interventions for various physical and mental health domains (Lundahl & Burke, 2009; Lundahl et al., 2010). Fortunately, to understand how MI is clinically beneficial, there has also been an increase in MI process studies in the last decades that investigated what happens in the MI sessions and how the interactions in the sessions affect outcome (Magill et al., 2018). From the recent, first meta-analyses on MI process studies, we now know that counsellor's MI consistency is associated with a larger proportion of client's change talk, and a larger proportion of change talk is associated with risk behaviour reduction (Magill et al., 2018, 2014). However, as also pointed out by the authors, the effect sizes are small, suggesting that more must be happening in the MI sessions than has been investigated and specified in the theoretical model of MI to date. The authors also indicate that more research is needed on relational aspects. In this specific study, no evidence was found for the relational hypothesis according to which counsellors empathy and MI spirit is associated with client behaviour change (Magill et al., 2018). However, a recent study among offenders under probation did show that counsellors MI consistent relational skills were important predictors of treatment initiation among offenders with SUDs who are under probation supervision (Spohr, Taxman, Rodriguez, & Walters, 2016). This suggests that counsellor relational skills such as empathy and MI spirit may be important for developing rapport with offenders under probation supervision. Thus, more knowledge is still needed on the process by which MI exerts its effects (Burke et al., 2003; Magill et al., 2018), and specifically in offenders under probation supervision.

Successful implementation of MI

A possible explanation for the lack of MEI effect in the study described in this thesis (chapter 4 and 5) is that the contrast between the control and intervention condition was too small as we trained offenders in both conditions to level out differences in general MI skills between the conditions and to be able to test specifically the effect of the implementation of the manual-based MEI. Our findings thus underscore that an important feature of the success of MI is how the therapeutic process, rather than the content of the intervention, enhances clients' motivation for change. In that sense, a successful implementation of MI is for an important part dependent on the MI skillset of the provider. Training is a key medium through which providers can acquire skills, and thus constitutes an important step in the process of implementing MI. In 2009, Madson and colleagues systematically reviewed the MI training literature and found that, like in the study described in this thesis, most MI training relied on workshop formats, and insufficiently incorporated post-workshop performance feedback and coaching to acquire and maintain MI competency (Madson et al., 2009). However, as noted in that same year by Miller and Rose (2009), most providers need more than a workshop of a few days to acquire the complex MI skillset. This is also endorsed by more recent evidence on MI training, particularly regarding the value of extended training, including the need for on-going individual feedback and coaching to ensure adequate skill development and consistent proficiency (Barwick et al., 2012; De Roten, Zimmermann, Ortega, & Despland, 2013; Madson, Villarosa-Hurlocker, Schumacher, Williams, & Gauthier, 2019; Schwalbe, Oh, & Zweben, 2014; Söderlund, Madson, Rubak, & Nilsen, 2011). Research on MI training in criminal justice settings is still scarce. However, the available evidence suggests that a successful implementation of MI in criminal justice settings may take up to 2 years of training, including on-going feedback and coaching to achieve beginning proficiency level of MI (Forsberg, Ernst, Sundqvist, & Farbring, 2011; Forsberg, Ernst, & Farbring, 2011; Forsberg, Forsberg, Lindqvist, & Helgason, 2010). As such it may be quite time-consuming and impractical to train (all) probation officers to conduct MI themselves. Future research will have to determine which implementation strategy used to train probation officers is compatible with the existing probation practice and setting. A possible alternative strategy of MI implementation in the probation supervision context to consider is to provide probation officers with the ability to order (via electronic health record) an expert MI consultation. Probation officers might find ordering a MI consultation a simple, minimally burdensome process and compatible with how they use other specialized services. However, it requires offenders to join an MI intervention delivered by an unfamiliar professional. In that case, the use of telephone MI consultation as an alternative to face-to-face MI in offenders may create better privacy and thus facilitate access to this hard-to-reach group of offenders. A recent first review on the effectiveness of alternatives modes (beyond face-to-face individual format) of MI on preventing and treating SUDs and associated risk behaviours found tentative support for the effectiveness of telephone MI in treating SUDs (Jiang, Wu, & Gao, 2017). Future research on MI training implementation strategies in the criminal justice settings, such as probation, is needed and will likely improve the quality of MI training implementation in these contexts, and subsequently MI effects.

Offender and context characteristics as predictors of MI outcome

Future MI process studies should also bear in mind that the MI process model that is currently used possibly not invariably fits all clinical contexts. Therefore, we state that more research is needed into the profile of the people who may optimally benefit from MI. If we can predict who responds well to MI, we can offer more targeted interventions. Thus, apart from *how* MI contributes to a positive outcome, other important questions for future research to ask are: for *whom* and *when* is MI effective? Specifically, future research should consider whether the predictive role of client utterances (change vs. sustain talk) varies by population or other clinical factors. For example, it is unknown how MI contributes to behavioural outcomes in offenders with SUD. Like in this thesis, prior research on MI with offenders investigated the relationship between counsellors' fidelity with MI and offender outcomes such as treatment initiation, substance use and offending (McMurrin, 2009; Spohr et al., 2016). Therefore, in the future, it is important to also assess offender utterances, to account for both counsellor and offender variables. In addition, measures of alliance and resistance are also potential process offender-variables to consider in future research which are not yet included in the MI model (Crits-Christoph et al., 2009; Magill et al., 2018, 2014). Moreover, our finding that motivation measured at the start of probation is an important predictor of treatment initiation (chapter 3) also seems to indicate the importance of including measures of resistance and perceived coercion especially in MI process studies with offenders. Since treatment is generally not imposed without the consent of the offender in the Netherlands (Flore et al., 2012), it is possible that the offender variables such as resistance and perceived coercion have an important role in predicting treatment initiation. For this, we argue for MI process research in offenders in which technical, relational and offender-level factors are combined.

Promoting treatment among offenders under probation supervision

Although we found no difference between the effectiveness of SAU plus MEI and SAU (chapter 4 and 5), we argue, based on our finding that motivation plays an important role in predicting treatment initiation (chapter 3), that the use of motivational interviewing is advised in offenders with SUDs. This is also in line with available previous research that supports the role of motivation in predicting treatment entry and retention by offenders (Evans et al., 2009, 2008; Linn-Walton & Maschi, 2015). As discussed above, future MI process studies will have to show how, when and for which offenders under probation it is effective to use MI, and these findings could guide MI implementation. We found no difference in effectiveness between working with or without the manual at the start of probation supervision. Given the context of coercion, it is conceivable that making the protocol available as a means for the offender to use, for example in the form of a no-obligation application that he can use himself, would increase its effectiveness. This is in line with recent findings that showed computer-based motivational intervention (i.e., a web-based application, consisting of two, 45-minute modules that offenders complete themselves on a tablet), but not in-person MI (i.e., two 45-minute sessions in which offender complete a feedback report together with a counsellor trained in MI), to be effective in enhancing treatment initiation compared to SAU

among probationers (Lerch et al., 2017). At the time of writing, the Dutch Addiction Probation Service (Stichting Verslavingsreclassering GGZ, 2019) transformed the SvS intervention into a smartphone application, enabling offenders under probation supervision to complete the program through this application independently or together with their probation officer.

Towards behaviour change in offenders

In studying behavioural change, it is important to also have knowledge of underlying mechanisms contributing to that behaviour. Therefore, we have studied (neuro)psychological factors related to impulsivity and reward and punishment sensitivity. We found sensitivity to punishment and to rewards (i.e. BIS and BAS) to be related to respectively cannabis and alcohol use in offenders (chapter 2). Such knowledge can be a starting point for further research within supervision into which positive or negative reinforcements can be used to stimulate offenders to change their alcohol or cannabis use. In addition, it is important to reduce personal and interpersonal rewarding factors for substance use and to enhance alternatives to substance use. With regard to criminal recidivism, it seems that other factors than sensitivity to punishment or rewards, impulsive decision-making or risk-taking as measured with the BIS/BAS, DDT and BART in our study (chapter 2) are important in explaining crime. This may include criminogenic risk factors such as an established criminal history, an antisocial personality pattern, antisocial cognitions and pro-criminal associates (Andrews & Bonta, 2017; Andrews, Bonta, & Wormith, 2006; Mulder, Brand, Bullens, & Van Marle, 2011). Other neurocognitive functions that could be relevant are self-control and emotion regulation skills (Aharoni et al., 2014; Malouf et al., 2014), factors that have not been included in our study. For instance, Mulder and colleagues (2011) assessed risk factors that predict recidivism in a sample of 728 juvenile offenders. They found that past criminal behaviour, conduct disorder, poor parenting skills, criminal behaviour in the family, a history of physical and emotional abuse, and involvement with criminal peers are risk factors for recidivism. The presence of pro-criminal associates in the lives of offenders is an important risk factor, not least because the social network of offenders is often small and mostly comprised of professionals (e.g., treatment providers, probation officers) and friends and family members who engage in risky behaviour (Skeem, Loudon, Manchak, Vidal, & Haddad, 2009). In addition, there is growing interest and evidence that neuroscience may add to the forensic field by *neuroprediction*: research on the predictive utility of neuroimaging studies on recidivism (Aharoni et al., 2013; Kiehl et al., 2018; Nadelhoffer & Sinnott-Armstrong, 2012; Van Dongen & Franken, 2019).

In the pursuit of behavioural change in re-offenders, it is thus important to keep in mind that re-offenders often have close associations with criminal others and are relatively isolated from pro-social, immediate social protection against crime. Therefore, strengthening the association with pro-social others and increasing engagement in other alternative rewarding activities, thereby increasing life satisfaction, could possibly help reduce recidivism. For example, deploying experts by experience or social-network-coaches in parallel with supervision or treatment could contribute to enhancing the pro-social support for quitting or remaining abstinent from substance use and

criminality (for a recent study with regard to network-coaches, see Swinkels, Van der Pol, Popma, Ter Harmse, & Dekker, 2020). Involving the system of the offender in treatment and probation supervision may have high relevance as well: A positive, supportive social network can promote the wellbeing and functioning of offenders and reduce the risk of re-offending. In addition, offering MI training to experts by experience could also contribute to enhancing the motivation of offenders to change their behaviour.

METHODOLOGICAL CONSIDERATIONS

Cluster randomized controlled trial

For evaluating the effectiveness of adding MEI to SAU (chapter 4 and 5), a cluster randomized controlled trial (CRT) was performed. In addition, the analysis was based on the intention-to-treat paradigm and it was a pragmatic trial, thereby improving the ecological validity of the study results. Furthermore, we included a 12-month follow-up period and measures on the judicial, clinical, and personal level. Finally, we used a combination of self-report and registry-based clinical and police data.

However, as stated before, an important limitation of the design of the CRT (chapter 4 and 5) is that no data on MI fidelity was collected. Although we did measure how many steps of the MEI the officer and offender went through in their supervision contacts, the possibilities to examine whether the MEI was more effective for those with higher adherence to the intervention are limited. Consequently, no formal evaluation could be performed regarding the extent to which probation officers adhered to the MEI module, their proficiency in MI or whether they applied the MEI in an MI style. Therefore, based on the evidence obtained, we cannot yet draw definitive conclusions regarding the extent to which the lack of effect of MEI on treatment initiation, treatment retention, abstinence and recidivism was due to a theoretical problem (i.e. was the intervention based on inadequate theory?) or a pragmatic one (i.e., was the intervention not adequately implemented?). In future studies, more attention should therefore be paid to the incorporation of treatment integrity measures.

Timing of MEI

It has been suggested that applying MI to a motivated individual may stifle the desire to change (Miller & Rollnick, 2002). As such, the optimal timing of MEI may depend on the offender's motivational- and treatment readiness state. As mentioned in chapter 4, about 33% of the offenders (32% SAU + MEI and 34% SAU) were in addiction treatment at baseline assessment, suggesting that a considerable portion of participants was already motivated for change. Moreover, a large proportion of the offenders was mandated to addiction treatment in the SAU plus MEI condition (70.3%). Given that treatment is generally not imposed without the consent of the offender in the Netherlands (Flore et al., 2012), there may be a positive association between motivation for ad-

diction treatment and legal mandate for treatment. Adding MEI to SAU may thus have limited the motivation for treatment of those offenders already in treatment and of those mandated to treatment. Therefore, it is advised for future research to consider treatment status and other factors related to motivation for treatment, such as association with a mandate, when timing an MI intervention. In practice, it would be beneficial to tailor the timing and application of the intervention to the needs of the offender, for example by making it available but not mandatory. For example, the Dutch Addiction Probation Service (Stichting Verslavingsreclassering GGZ, 2019) transformed the MEI intervention into a smartphone application, enabling offenders under probation supervision to complete the program through this application independently or together with their probation officer.

Time to treatment initiation

As also mentioned in chapter 4, time to treatment initiation could have been influenced by barriers to obtain treatment services such as waitlists or experienced delays in commencing treatment. Unfortunately, data on such barriers were not available for our study. However, the study sites were specialized addiction probation offices that have close links with mental health care institutes, if there was a waitlist that impacted time to treatment initiation, this is expected to have been balanced between groups, due to the randomized design of the study, and therefore its impact on our between groups comparisons is expected to be limited. On the other hand, waitlists or experienced delays can also have a negative effect on motivation for treatment and subsequently MI effects such as time to treatment entry. In future studies, it is, therefore, important to also consider situational barriers to obtaining treatment, such as waitlists.

Definition of substance use and recidivism

We operationalized substance abstinence and recidivism as dichotomous measures. Substance abstinence was defined as the abstinence of primary substance in the past 30 days (yes/no) assessed at follow-up (chapter 4) and recidivism was defined as the occurrence or absence of criminal behaviour in the 12-month follow-up period (chapter 5). It is possible that our null-findings between the SAU plus MEI and SAU resulted from our choice to use these definitions as the main outcome measures. It is possible that offenders reduced the number and severity of their substance use and offences, and that by defining the main outcome measures as the absence of criminal behaviour and abstinence of primary substance use in the 12 months follow-up, we may have selected too stringent outcome measures. However, we found no significant difference between the two conditions in mean number of arrests in the past 12 months (MEI, $M (SD) = 1.1 (1.98)$ and SAU, $M (SD) = 1.1 (2.14)$, $t (215) = -0.095$, $p = .924$) and percentage of problem use (MEI, $M = 58.4\%$ and SAU, 53.0% , $X^2 (1) = 0.477$, $p = .490$) at follow-up nor at baseline (mean number of arrests: MEI, $M (SD) = 2.3 (2.13)$ and SAU, $M (SD) = 2.3 (2.40)$, $t (215) = -0.015$, $p = .988$; percentage of problem use: MEI, $M = 82.7\%$ and SAU, 78.9% , $X^2 (1) = 0.518$, $p = .472$), suggesting that it is highly unlikely that there was a difference at 12 months follow-up in number and severity of substance use and offences. However,

in future research (with longer follow-up periods) a continuous measure of change in substance use and offending could be more appropriate. After all, changes in substance use and offending, as well as in other criminogenic and protective factors are also relevant results for probation supervision (Andrews & Bonta, 2017; McNeil, 2006; Menger, Bosker, & Heij, 2012).

Generalizability of study findings

The generalizability of the study presented in this thesis is discussed in the light of the study population, the use of MI in supervision-as-usual, and the Dutch criminal justice context in which the present studies were conducted.

Study population

The sample in this thesis comprised male re-offenders with a SUD who were under probation supervision of the Social Rehabilitation for Addicted Offenders (*Stichting Verslavingsreclassering GGZ* or SVG) which is specialized in working with offenders with problematic substance use. However, the sample in our study is not necessarily representative of the general population of offenders with a SUD. We did not include first offenders, female offenders, or offenders who were only convicted for driving under influence (DUI). Thus, the findings in this thesis may only apply to male re-offenders with a SUD and not to female offenders, first offenders, and offenders convicted for DUI.

MI use in supervision-as-usual

SAU included the use of MI by trained probation officers working in specialized addiction probation offices for offenders with SUDs. Furthermore, probation officers (of both supervision conditions) were trained in MI to level out differences in general MI skills between the conditions and to be able to specifically test the effect of the implementation of the manual-based MEI. However, this may have reduced the contrast between the intervention and control condition, and it is, therefore, possible that MEI may show more differential effects when implemented in a probation setting where officers are not trained in MI.

Cross-national generalizability

The studies in this thesis were all conducted in the Netherlands. The generalizability of our findings to other countries may be limited since the Netherlands has unique legislation for addicted offenders and a specialized addiction probation service that probably affected the results in this thesis. As described elsewhere in the Discussion, in the Netherlands addiction treatment is generally not imposed if the offender is considered to be unmotivated for treatment (Flore et al., 2012). Consequently, the role of treatment motivation in predicting treatment entry may differ from that in other countries where treatment is imposed without the consent of the offender and external pressure and motivation are more separate from each other. Thus, in other countries, there may be a higher contrast between the role of mandated treatment and motivation for treatment. In addition, as also explained in the appendix of this thesis, the Dutch addiction probation service

(i.e., the SVG) is specialized in supervising offenders with a SUD. To bridge the gap between justice and health care the SVG offices are embedded in addiction care institutes. In other countries, there may be a bigger gap between justice and health care. Thus, in other countries, time to treatment entry and actual treatment entry may be more affected by other situational factors than in the Netherlands.

PRACTICAL IMPLICATIONS

Based on the findings of this thesis, it is difficult to provide implications for judicial treatment of offenders with a substance use disorder. However, following our argument for more MI-process studies and considering the challenging dual role of probation officers, we find it important to mention the following about implementing MI in the criminal justice system.

MI inconsistent skills such as confrontations, warnings, or unsolicited advising are harmful in the context of MI due to their positive relationship to sustain talk, and a subsequent relationship between sustain talk and poor outcome at follow up (Magill et al., 2018, 2014; Romano & Peters, 2016). Therefore, in MI implementation, training, and supervision in the criminal justice system, it is important to identify, intervene upon, and eliminate officer's behaviours that are inconsistent with MI principles. Given the challenge of the dual role of probation officers of both guidance and surveillance, and the fact that it is not easy to reach a beginners level of MI proficiency, training to reach a beginners level of MI and continuous supervision of MI skills is advised.

Given the dual role of probation officers, an additional specialized MI programme parallel to probation supervision is recommended. This could include the deployment of computer-based MI interventions guided by patient experts trained in MI, or offered as a part of an expert MI consultation. Recent findings show that a computer-based MI intervention that offenders can complete themselves is effective in enhancing treatment initiation compared to SAU among probationers (Lerch et al., 2017). The advantage of offering MI as a specialized service parallel to supervision would be that it provides offenders with a space or relation where they can speak openly and honestly about their substance use and criminal behaviour without this having consequences such as within the supervisory contact with the probation officer. Moreover, the freedom of choice to make use of the intervention encourages the preservation of the offender's autonomy. The contact with a patient expert can give the person hope for a different life and may offer him the opportunity to choose to commit himself to others and to enhance pro-social involvement. Reducing offenders association with criminal others and enhancing association with pro-social others, as well as enhancing social involvement, reward and satisfaction by providing pro-social leisure pursuits are considered central risk/need factors and important targets for treatment (Andrews & Bonta, 2017).

CONCLUSIONS

The following conclusions can be drawn based on the studies presented in this thesis:

- In our CRT we could not demonstrate that SAU plus MEI was better than SAU with respect to time to addiction treatment initiation, time to re-arrest, proportion of treatment retention, or abstinence of primary substance or re-arrest in a group of re-offenders with SUDs.
- Motivation at the start of probation and mandated addiction treatment in verdict are associated with treatment entry at one year follow-up, whereas treatment motivation was the strongest predictor for starting treatment in the first year of probation supervision in male re-offenders with SUDs under probation supervision of the Dutch Addiction Probation Service.
- Low behavioural inhibition (punishment sensitivity) is associated with alcohol use at follow-up, whereas a combination of high baseline cannabis use and behavioural approach (reward sensitivity) is associated with increased cannabis use at follow-up.



A

A. Probation supervision in the Netherlands

B. Summary

C. Samenvatting

D. References

E. Abbreviations

F. Woorden van dank

G. Portfolio and list of publications

H. About the author

APPENDIX A. PROBATION SUPERVISION IN THE NETHERLANDS

In the Netherlands, probation activities are carried out by three distinct probation organisations, recognized for this purpose by the Ministry of Security and Justice: the Social Rehabilitation for Addicted Offenders (*Stichting Verslavingsreclassering GGz* or SVG), the Salvation Army (*Leger des Heils*), and the Dutch Probation Foundation (*Reclassering Nederland* or RN). All probation officers from these three probation organizations work with offenders with problematic substance use and receive an internal basic course on addiction and motivational interviewing. However, the offenders, for whom substance use is related to their criminal behaviour, are mainly referred to the SVG. The SVG is a network organisation with eleven addiction care institutes with a permit for probation services. The SVG specializes in working with offenders with problematic substance use and is an integral part of addiction care. Approximately 30% of the requests for probation services go to the SVG. About 10% of the requests go to the Probation Department of the Salvation Army which focuses primarily on offenders that are homeless. The remaining 60% goes to the RN that serves the general offender group.

The three probation organizations share the overarching mission of preventing recidivism and promoting social reintegration into society. To achieve this two-part mission, the probation organizations are embedded in the criminal justice chain and work closely with health care services. To bridge the gap between justice and mental health care, the SVG is embedded in the addiction care institutes. Therefore, the SVG often has closer ties with addiction care than the other two probation organizations.

Supervision is one of the main activities of the probation service. About 40% of the activity of the probation service is spent on supervision (Poort, 2009). Supervision includes encouraging and motivating the convicted person to adhere to the imposed conditions (guidance), in addition to checking compliance with that condition and identifying (imminent) violations (Ministerie van Veiligheid en Justitie, 2017, Explanation of Article 1, Section C, p. 7). It is carried out by the probation service in the context of a conditional sanction and is, as such, not voluntary for the offender on probation. With a conditional sentence, there is a so-called 'general condition' that states that the offender does not re-offend during the probationary period. Moreover, the court can also impose special conditions that are specifically tailored to the situation of the offender. In the case of supervision, one of the special conditions is always a 'notification order at the probation service' (*meldingsgebod bij de reclassering*). In addition, special behavioural conditions (e.g., a ban on the use of drugs and/or alcohol, behavioural interventions) or care-oriented conditions (e.g., clinical care, outpatient care, social relief) are often imposed on offenders with problematic substance use.

When imposing a special condition, such as treatment, the judiciary also considers both the motivation of the offender to comply with the condition and his attitude during the trial. In case the offender pertinently refuses to cooperate in treatment both the Public Prosecutors and the judges doubt the usefulness of imposing a special condition (Harte, Malsch, Dijk, & Vergouw, 2014). The probation service supervises the compliance with the conditions and identifies and reports (im-

minent) violations to the Public Prosecution Service. If the offender does not comply with the conditions set, a sanction can follow, namely the execution of (part of) the conditional punishment. The Public Prosecution Service is responsible, among other things, for decisions on the progress of supervision and the decision when enforcement of the remaining sentence is demanded from the court for violation of a condition.

Every year 20 thousand offenders are referred to the SVG, of whom 84% suffer from a SUD and 16% have other mental problems (Van Laar, Van Gestel, Cruts., Van der Pol, et al., 2018). Other criminogenic factors of the offenders supervised by the SVG are debt- and housing issues. Offenders with SUDs have more severe problems and are at a higher risk of re-offending, therefore, an important part of probation supervision is to motivate and stimulate the offender to treatment. The probation officers have a challenging dual-task of both guidance and surveillance. It requires a high degree of professionalism from the officer to manoeuvre between motivating the offender for change and checking on his criminal and substance use behaviour.

APPENDIX B. SUMMARY

Introduction

In **chapter 1**, the background of this thesis is discussed. The research in this thesis is carried out in the context of the probation supervision of the Social Rehabilitation for Addicted Offenders (*Stichting Verslavingsreclassering GGz* or SVG) that is specialized in working with offenders with problematic substance use. The consistent findings that substance use disorders (SUDs) are common among offenders (Fearn et al., 2016) and increase the risk of recidivism (Håkansson & Berglund, 2012) raise two questions that we aimed to answer in this thesis. In answering the first question about how substance use and criminal behaviour are related to each other, we hypothesized that impulse control deficits may play a role in the relationship between recidivism and substance use. Previous studies have shown that impulse control deficits are a risk factor of crime and recidivism (Åkerlund et al., 2016; Carroll et al., 2006; Lee et al., 2017; Mishra & Lalumière, 2017; Moffitt et al., 2011) and contribute to the risk of problematic substance use (De Wit, 2009; Perry & Carroll, 2008). In addition, deficiencies in impulse control have been suggested to underlie the pathogenesis and pathophysiology of SUDs (Goldstein & Volkow, 2002; Verdejo-García et al., 2008) and to negatively affect the ability to achieve and maintain abstinence during and following addiction treatment (Stevens et al., 2014). Therefore, the study of impulse control is essential in understanding patterns of substance use, criminal behaviour and prevention of SUD relapse and recidivism. In answering the second question, how supervision can contribute to preventing the influence of substance use on recidivism, we hypothesized that supervision can contribute by enhancing the motivation of offenders for treatment during supervision. A widely used technique for motivation enhancement is motivational interviewing (MI). Several meta-analyses showed that MI is effective in reducing substance use disorders (SUDs), and has a positive effect on treatment engagement (e.g., DiClemente, Corno, Graydon, Wiprovnick, & Knoblach, 2017; Hettema et al., 2005; Lundahl & Burke, 2009; Lundahl, Kunz, Brownell, Tollefson, & Burke, 2010). Although there has been relatively little research on MI in the criminal justice context and within probation supervision, in particular, the available evidence is promising for MI being effective in offenders. Schippers, Baron, Campen and Koeter (2010) developed a motivation enhancing intervention (MEI) for the SVG called Step by Step (*Stap voor Stap*; SvS). The main aim of the study described in this thesis was to compare the effectiveness of supervision plus a brief manual-based MEI with that of supervision as usual (SAU). Moreover, we aimed to explore the predictive role of behavioural measures of impulse control in substance use and criminal behaviour, and of motivation in treatment entry.

Findings

In **chapter 2**, the results of the study into the role of impulse control in substance use and recidivism of re-offenders with a SUD were reported. The predictive role of impulsive and risky decision-making and self-reported trait impulsivity was studied using (respectively) the delay-discounting task (DDT), the balloon-analogue risk task (BART) and the behavioural inhibition and behavioural

approach system (BIS/BAS) scale in a group of re-offenders with SUDs. Logistic regression analysis showed that self-rated impulsivity measures (BIS/BAS) were associated with substance use at follow-up. Specifically, higher BIS at baseline predicted lower alcohol use at 12-month follow-up and explained 18% of the variance. Moreover, a combination of higher BAS and cannabis use at baseline was the strongest predictor of increased cannabis use at follow-up. For cannabis uses, baseline use interacted with impulse control measures to predict cannabis use at follow-up, and a (trend-level) interaction between delay-discounting and risky decision-making (BART) predicted higher cannabis use at follow-up. Other substance at follow-up was not predicted by BIS/BAS measures or any of the behavioural impulsivity measures and was only associated with baseline other substance use. The use of other substances at follow-up was not predicted by BIS/BAS or any other impulse control measure and was only associated with baseline other substance use. Our results indicated no predictive value of impulsivity measure for criminal behaviour. However, at trend level, a positive association was observed between baseline BAS and property crime at follow-up.

In **chapter 3**, we examined two research questions. First, what factors at the start of probation are associated with addiction treatment entry at 12-month follow-up? Second, to what extent is treatment motivation at the start of probation related to the prediction of addiction treatment entry at 12-month follow-up? To control for a potential bias of the MEI, we used the data on 83 offenders that were allocated to the control condition of the cluster-randomized-trial (CRT) - that received SAU and no MEI. Offenders were asked at 12-month follow-up if they had entered addiction treatment in the follow-up period. At follow-up, thirty-eight offenders (46%) indicated that they had entered addiction treatment and 45 offenders (54%) that they had not. Offenders who entered addiction treatment at 12-month follow-up had higher levels of motivation at the start of probation and were more often mandated to treatment than offenders who did not enter addiction treatment at follow-up. In addition, addiction treatment appears to be more appealing to offenders with a history of addiction treatment, where a positive association was observed at trend level between self-reported treatment entry and lifetime history of addiction treatment. We found no association between treatment entry and demographic characteristics, substance use, or criminal involvement. Regarding the predictive value of treatment motivation, the results of the multiple regressions showed that offenders with higher levels of treatment motivation were twice as likely to start addiction treatment compared with those with lower levels of treatment motivation, and that treatment motivation was the strongest predictor of subsequent addiction treatment entry.

In **chapters 4 and 5** we reported the key findings of our CRT. The primary aim of the CRT was to investigate whether the adding of a brief, manual-based motivation enhancing intervention (MEI) to supervision as usual (SAU) would result in less time to addiction treatment initiation. Secondary, we aimed to examine whether adding MEI to SAU would result in larger improvements on the following secondary outcomes: proportion of treatment retention, primary substance abstinence, time to re-arrest, and proportion of re-arrest. We used a cluster-randomized design with probation officer as a cluster variable and did not alter the usual allocation procedure of new offenders to minimize inconvenience for both officers and offenders. A total of 73 probation officers, from

six probation offices, were recruited and randomized to one of the two supervision conditions; supervision-as-usual (SAU) or motivation enhancing intervention (MEI) condition. Offenders were assigned to a probation officer following the usual procedure of the probation office. Probation officers in the MEI condition provided SAU plus MEI and probation officers in the SAU condition provided SAU (no intervention). A total of 220 re-offenders with a SUD participated and received SAU ($n = 109$) or SAU plus MEI ($n = 111$). Given that the use of MI is part of SAU, probation officers in both the SAU and MEI condition received an eight-hour small group MI-training (8 to 12 officers) provided by a trainer of the Motivational Interviewing Network of Trainers (MINT) to equalize any differences in MI proficiency. In addition, only probation officers in the MEI condition received an 8-hour training in working with the MEI that was followed-up with four-hour booster sessions after four and eight weeks.

In **chapter 4** we report on the effects of the adding of MEI to SAU on time to treatment initiation (primary outcome), and on the proportion of treatment retention and primary substance abstinence. Dichotomous outcome variables were created to indicate whether treatment initiation, treatment retention and abstinence of primary substance occurred and reported time to treatment initiation. Registered treatment initiation and treatment retention were assessed via addiction treatment records of the addiction care institutes that fell under the same health care organization as the participating probation offices. Treatment initiation was scored positive when a participant started a new substance use treatment during the 12-month follow-up period. Time to treatment initiation was defined as the number of days between entry into the study and the date of the first registered treatment contact. Treatment retention was scored positively when a participant engaged in a minimum of 90 days of substance use treatment during the 12-month follow-up period. Self-reported abstinence of primary substance in the past 30 days (yes/no) was assessed at 12-month follow-up. The primary substance of use was defined as the substance that causes the most problems according to the offender and assessor. Results demonstrate that 80 offenders (80/163; 49%) initiated treatment during the 12-month follow-up period with the average time to initiation being 104 days. There were no significant group differences in time to treatment initiation. No significant intervention effects were found for treatment retention and primary substance abstinence rate. During the 12-month follow-up period, 46.8% of the 111 offenders from the MEI condition and 47.7% of the 109 offenders from the SAU condition remained for at least 90 days in substance abuse treatment. Of the offenders who completed the follow-up assessment, 36.8% of the 77 offenders in the MEI condition and 28.0% of the 83 offenders in the SAU condition reported at follow-up abstinence of their primary problematic substance in the past 30 days.

In **chapter 5** the effect of adding MEI to SAU on recidivism rate and time to re-offending was examined. In addition, we investigated if there is a difference between offenders who completed the intervention versus those who did not complete the intervention on these two outcomes. Recidivism was operationalized as any new offence during the 12-months follow-up period. We distinguished between three recidivism outcomes: self-reported recidivism, registered recidivism, and a combination of self-reported and registered recidivism. Self-reported recidivism was defined

as reported re-offending and obtained from 160 offenders (77 from MEI and 83 for SAU) at the 12-month follow-up assessment. Registered recidivism was defined as any new entry in the national police identification service system due to a criminal offence. Combined recidivism was operationalized as a combination of either reported or registered involvement in criminal activity. Time to re-offending was based on registered recidivism by the police and defined as the number of days between the date of entry into the study and the first re-offence date. For censored cases, this date was set at 365 days (12 months). There were no significant group differences in recidivism between MEI (completers) and SAU in self-reported, registered or combined recidivism. No significant differences in time to re-offending were found between the SAU plus MEI (completers) and SAU.

Discussion

In the general discussion in **chapter 6**, the major issues that were evaluated in this dissertation were discussed, directions for future research were proposed, and methodological considerations and recommendations for implementing MI were included. It is discussed that the lack of difference between the SAU plus MEI and SAU primarily raises three questions: First, what are the working mechanisms of MI? Second, what is needed for a successful implementation of MI? Third, what offender and context factors are predictive of MI outcome? It is proposed that in general and especially in the forensic context, more research is needed not just on *if* interventions work, but also on *how* specific mechanisms and *what* MI aspects affect behaviour change and for *whom* and *when* MI is effective. In addition, it is argued that future research on implementation strategies for MI training in the criminal justice setting, such as probation, is needed and will improve the quality of MI training implementation in these contexts. Although we found no difference between the effectiveness of SAU plus MEI and SAU, it is argued that - based on our finding that motivation plays an important role in predicting treatment initiation - the use of motivational interviewing is advised in offenders with SUDs. Given the lack of difference between working with or without an MI-based manual at the start of probation supervision and the context of coercion, it is conceivable that making the protocol available as a means for the offender to use, for example in the form of a no-obligation application that he can use himself, would increase its effectiveness. It is further suggested that the finding that sensitivity to punishment and reward is related to cannabis and alcohol use in offenders, respectively, can be a starting point for further research within supervision into which positive or negative reinforcements can be used to encourage offenders to change their alcohol or cannabis use. Moreover, it is suggested that other factors than in the current study included (neuro)psychological factors that are related to impulsivity and reward and punishment sensitivity are important in explaining crime and problematic substance use in offenders.

APPENDIX C. SAMENVATTING

Introductie

In **hoofdstuk 1** wordt de achtergrond van dit proefschrift nader beschreven. Het onderzoek in dit proefschrift is uitgevoerd in het kader van het reclasseringstoezicht van de Stichting Verslavingsreclassering GGZ (SVG) dat gespecialiseerd is in het werken met delinquenten met problematisch middelengebruik. Problematisch middelengebruik en delinquentie komen vaak samen voor en zijn op elkaar inwerkende risicofactoren. De consistente bevindingen dat stoornissen in middelengebruik veel voorkomen onder delinquenten (Fearn et al., 2016) en het risico op recidive verhogen (Håkansson & Berglund, 2012) roept twee vragen op die we in dit proefschrift beoogden te beantwoorden. De eerste vraag is hoe middelengebruik en crimineel gedrag met elkaar samenhangen. Bij het antwoorden van die vraag formuleerden wij de hypothese dat tekorten in de impulsbeheersing een rol kunnen spelen in de relatie tussen recidive en middelengebruik. Eerdere studies hebben laten zien dat een gebrek aan impulsbeheersing een risicofactor is voor criminaliteit en recidive (Åkerlund et al., 2016; Carroll et al., 2006; Lee et al., 2017; Mishra & Lalumière, 2017; Moffitt et al., 2011) en bijdraagt aan het risico van problematisch middelengebruik (De Wit, 2009; Perry & Carroll, 2008). Er zijn bovendien aanwijzingen dat tekortkomingen in de impulsbeheersing ten grondslag liggen aan de pathogenese en pathofysiologie van stoornissen in middelengebruik (Goldstein & Volkow, 2002; Verdejo-García et al., 2008). Tevens zijn tekortkomingen in de impulsbeheersing van negatieve invloed op het vermogen tot het bereiken en behouden van abstinentie tijdens en na een verslavingsbehandeling (Stevens et al., 2014). Onderzoek naar de impulsbeheersing is dan ook essentieel voor het begrijpen van patronen van middelengebruik, crimineel gedrag en voor het voorkomen van terugval in problematisch middelengebruik en recidive. De tweede vraag is hoe reclasseringstoezicht kan bijdragen aan het voorkomen van de invloed van middelengebruik op recidive. Bij het beantwoorden van die vraag formuleerden wij de hypothese dat reclasseringstoezicht dit kan doen door de motivatie van daders voor behandeling tijdens reclasseringstoezicht te vergroten. Een veelgebruikte techniek voor het vergroten van de motivatie is motiverende gespreksvoering (MG). Verschillende meta-analyses toonden aan dat MG effectief is bij het verminderen van stoornissen in het middelengebruik en dat MG een positief effect heeft op de mate van betrokkenheid bij de behandeling (bijv. DiClemente, Corno, Graydon, Wiprovnick, & Knoblach, 2017; Hettema et al., 2005; Lundahl & Burke, 2009; Lundahl, Kunz, Brownell, Tollefson, & Burke, 2010). Hoewel er relatief weinig onderzoek is gedaan naar MG in het strafrechtstelsel en in het bijzonder in reclasseringstoezicht, is het beschikbare bewijs veelbelovend wat betreft de effectiviteit van MG bij delinquenten. Schippers, Baron, Campen en Koeter (2010) ontwikkelden een motivatie bevorderende interventie (*motivatin enhancing intervention* oftewel MEI) voor de SVG genaamd Stap voor Stap (SvS). Het belangrijkste doel van het onderzoek beschreven in dit proefschrift was om de effectiviteit van supervisie inclusief deze korte geprotocolleerde MEI te vergelijken met reguliere supervisie (*supervision as usual* oftewel SAU). Bovendien wilden wij de

voorspellende rol onderzoeken van gedragsmatige impulsbeheersingsmaten bij middelengebruik en crimineel gedrag, en van motivatie bij het starten van een behandeling.

Bevindingen

In **hoofdstuk 2** worden de resultaten beschreven van het onderzoek naar de rol van impulsbeheersing bij middelengebruik en recidive in recidivisten met een stoornis in het gebruik van middelen. Wij onderzochten de voorspellende rol van impulsieve en risicovolle besluitvorming en zelfgerapporteerde eigenschapsimpulsiviteit met behulp van (respectievelijk) de *delay-discounting* taak (DDT), de *balloon-analogue-risk* taak (BART) en de schaal voor het gedragsinhibitie- en gedragsbenaderingssysteem (*behavioural inhibition system / behavioural activation system* - BIS/BAS) in een groep recidivisten met stoornissen in het gebruik van middelen. Logistische regressieanalyse toonde aan dat zelf-beoordeelde impulsiviteitsmetingen (BIS/BAS) geassocieerd waren met middelengebruik bij follow-up. Meer specifiek voorspelde een hogere gedragsinhibitie (BIS) bij baseline een lager alcoholgebruik na 12 maanden follow-up en dit verklaarde 18% van de variantie. Bovendien was een combinatie van een hogere gedragsbenadering (BAS) en cannabisgebruik bij baseline de sterkste voorspeller van verhoogd cannabisgebruik bij follow-up. Cannabisgebruik bij follow-up werd voorspeld door een interactie tussen cannabisgebruik gebruik bij baseline en impulsbeheersingsmaten. Tevens voorspelde een (trendniveau) interactie tussen *delay-discounting* en risicovolle besluitvorming (BART) een hoger cannabisgebruik bij follow-up. Andere middelen bij follow-up werden niet voorspeld door BIS/BAS-metingen of één van de gedrags-impulsiviteitsmaten en waren alleen geassocieerd met het gebruik van andere middelen bij baseline. Het gebruik van andere stoffen bij de follow-up werd niet voorspeld door BIS/BAS of andere impulsbeheersingsmaten en was alleen geassocieerd met het gebruik van andere middelen bij baseline. Onze resultaten lieten geen voorspellende waarde zien van impulsiviteitsmaten voor crimineel gedrag. Op trendniveau werd echter wel een positieve associatie waargenomen tussen baseline BAS en vermogenscriminaliteit bij follow-up.

In **hoofdstuk 3** hebben we twee onderzoeksvragen onderzocht. Ten eerste, welke factoren aan het begin van de proeftijd geassocieerd zijn met het starten van een verslavingsbehandeling na 12 maanden follow-up? Ten tweede, in hoeverre is de motivatie voor behandeling aan het begin van reclasseringstoezicht gerelateerd is aan de voorspelling van start verslavingsbehandeling na 12 maanden follow-up? Om te controleren op een mogelijke statistische vertekening door de MEI, gebruikten we de gegevens van 83 delinquenten. Zij waren toegewezen aan de controleconditie van het cluster gerandomiseerde onderzoek (*cluster-randomized-trial* - CRT); zij ontving geen MEI, enkel SAU. Bij de 12 maanden follow-up werd aan de delinquenten gevraagd of ze in de follow-up periode een verslavingsbehandeling waren gestart. Bij de follow-up gaven 38 delinquenten (46%) aan met een verslavingsbehandeling te zijn gestart en 45 delinquenten (54%) dat ze niet met behandeling waren begonnen. In overeenstemming met onze hypothesen hadden delinquenten die na 12 maanden follow-up een verslavingsbehandeling waren gestart een hogere motivatie aan het begin van hun reclasseringstoezicht dan delinquenten die bij follow-up geen verslavingsbehandeling

waren begonnen. Tevens werden zij in vergelijking met delinquenten die bij follow-up geen verslavingsbehandeling waren begonnen vaker verplicht tot behandeling. Bovendien lijkt verslavingszorg aantrekkelijker voor delinquenten met een voorgeschiedenis van verslavingsbehandeling. Hierbij werd op trendniveau een positief verband waargenomen tussen de zelf-gerapporteerde start van de behandeling en een geschiedenis van verslavingsbehandeling. Wij vonden geen verband tussen start behandeling en demografische kenmerken, middelengebruik of criminele betrokkenheid. Wat betreft de voorspellende waarde van behandelmotivatie, toonden de resultaten van de meervoudige regressies aan dat delinquenten met een hogere behandelmotivatie tweemaal zoveel kans hebben om met een verslavingsbehandeling te starten dan degenen met een lagere behandelmotivatie. Daarnaast vonden wij dat behandelmotivatie de sterkste voorspeller was van het starten van een volgende verslavingsbehandeling.

In de **hoofdstukken 4 en 5** hebben we de belangrijkste bevindingen van onze cluster gerandomiseerde trial (CRT) gerapporteerd. Het primaire doel van de CRT was om te onderzoeken of het toevoegen van een korte, geprotocolleerde motivatie bevorderende interventie (*motivation enhancing intervention* - MEI) aan reguliere supervisie (*supervision-as-usual* - SAU) zou resulteren in een kortere tijd tot het starten van een verslavingsbehandeling. Ten tweede wilden we onderzoeken of het toevoegen van MEI aan SAU zou resulteren in grotere verbeteringen op de volgende secundaire uitkomsten: de behandelretentie, de onthouding van het primaire probleemmiddelen, de tijd tot een volgende arrestatie en het percentage nieuwe arrestaties. Wij gebruikten een clustergerandomiseerd ontwerp met de reclasseringsambtenaar als clustervariabele en intervierden niet met de gebruikelijke toewijzingsprocedure van nieuwe aanmeldingen van delinquenten. Dat laatste om overlast voor zowel de reclasseringsambtenaren als delinquenten te minimaliseren. In totaal werden 73 reclasseringsambtenaren, afkomstig van zes reclasseringsbureaus, gerekruteerd en gerandomiseerd naar één van de twee toezichtvoorwaarden; reguliere supervisie (SAU) of de motivatie bevorderende interventie (MEI). Overtreders werden volgens de gebruikelijke procedure van de reclassering toegewezen aan een reclasseringsambtenaar. Reclasseringsambtenaren in de MEI-toestand leverden SAU plus MEI. De reclasseringsambtenaren in de SAU-toestand gaven enkel SAU (geen aanvullende interventie). In totaal namen 220 recidivisten met een stoornis in het middelengebruik deel en ontvingen SAU (n = 109) of SAU plus MEI (n = 111). Het gebruik van MG maakt deel uit van SAU. Om eventuele verschillen in MG-vaardigheid te compenseren ontvingen de reclasseringsambtenaren, in zowel de SAU- als de MEI-conditie, een acht uur durende MI-training. De training werd in kleine groepen van 8 tot 12 reclasseringsambtenaren gegeven, door een trainer van de *Motivational Interviewing Network of Trainers* (MINT). Daarnaast kregen alleen de reclasseringsambtenaren in de MEI-conditie een 8-uur durende training in het werken met de MEI. Deze training werd na vier en acht weken opgevolgd met een 4-uur durende boostersessies.

In **hoofdstuk 4** rapporteren we het effect van het toevoegen van de MEI aan SAU op zowel de tijd tot de start van de behandeling (primaire uitkomstmaat), als de behandelretentie en de onthouding van het primaire probleemmiddel. Om aan te geven of de start van de behandeling, behandelretentie en abstinentie van het primaire probleemmiddel optrad zijn er dichotome uit-

komstvariabelen gecreëerd. Tevens is de tijd tot de start van de behandeling gerapporteerd. De gegevens over de geregisteerde start van de behandeling zijn gehaald uit de administratie van de verslavingszorginstellingen die onder dezelfde zorgorganisatie vielen als de deelnemende reclasseringsorganisatie. De start van de behandeling werd positief gescoord als een deelnemer een nieuwe behandeling voor middelengebruik startte tijdens de 12 maanden follow-up. De tijd tot de start van de behandeling werd gedefinieerd als het aantal dagen tussen de start van de deelname aan het onderzoek en de datum van het eerste geregisteerde behandelcontact. De behandelretentie werd positief gescoord wanneer een deelnemer gedurende de 12 maanden follow-upperiode minimaal 90 dagen in een verslavingsbehandeling zat. Na 12 maanden follow-up werd de zelf-gerapporteerde abstinentie van het primaire probleemmiddelen in de afgelopen 30 dagen (ja / nee) beoordeeld. Het primaire probleemmiddel werd gedefinieerd als het middel dat, volgens de delinquent en beoordelende onderzoeker, de meeste problemen veroorzaakt. De resultaten tonen aan dat 80 delinquenten (80/163; 49%) de behandeling begonnen tijdens de 12 maanden follow-upperiode, met een gemiddelde tijd tot initiatie van 104 dagen. Er waren geen significante groepsverschillen in de tijd tot de start behandeling. Er werden geen significante interventie-effecten gevonden voor zowel de behandelretentie, als het percentage abstinentie van primaire probleemmiddelen. 46,8% van de 111 delinquenten van de MEI-conditie en 47,7% van de 109 delinquenten van de SAU-conditie bleef tijdens de follow-upperiode van 12 maanden ten minste 90 dagen in een verslavingsbehandeling. Van de delinquenten die het vervolgonderzoek hebben afgerond, meldde 36,8% van de 77 delinquenten in de MEI-conditie en 28,0% van de 83 delinquenten in de SAU-conditie bij follow-up abstinentie van hun primaire probleemmiddel in de afgelopen 30 dagen.

In **hoofdstuk 5** is het effect van het toevoegen van MEI aan SAU op het recidivecijfer en de tijd tot recidive onderzocht. Daarnaast hebben we onderzocht of er een verschil is tussen het recidivecijfer en de tijd tot recidive tussen delinquenten die de interventie wel en zij die deze niet hebben voltooid. Tijdens de follow-upperiode van 12 maanden is recidive als nieuw misdrijf geoperationaliseerd. We hebben onderscheid gemaakt tussen drie uitkomsten van recidive: zelf-gerapporteerde recidive, geregisteerde recidive en een combinatie van zelf-gerapporteerde en geregisteerde recidive. Zelf-gerapporteerde recidive is gedefinieerd als gerapporteerde recidive en verkregen van 160 delinquenten (77 van MEI en 83 voor SAU) na 12 maanden follow-upbeoordeling. Geregisteerde recidive werd gedefinieerd als elke nieuwe opname in het nationale politieherkenningsstelsel ten gevolge van een strafbaar feit. Gecombineerde recidive werd geoperationaliseerd als een combinatie van zowel gerapporteerde als geregisteerde betrokkenheid bij criminele activiteiten. De tijd tot recidive werd gedefinieerd als het aantal dagen tussen de datum van instroom in het onderzoek en de datum van het eerste recidive, en werd bepaald door het door de politie geregisteerde recidive. Voor gecensureerde gevallen werd deze datum vastgesteld op 365 dagen (12 maanden). Er waren geen significante groepsverschillen in recidive tussen MEI (voltooiers) en SAU in zelf-gerapporteerde, geregisteerde of gecombineerde recidive. Er werden geen significante verschillen in tijd tot recidive gevonden tussen de SAU plus MEI (voltooiers) en SAU.

Discussie

In de algemene discussie in **hoofdstuk 6**, worden de voornaamste kwesties die in dit proefschrift zijn geëvalueerd besproken. Er worden aanbevelingen voor toekomstig onderzoek gedaan. Tevens zijn er methodologische overwegingen en aanbevelingen voor het implementeren van MI opgenomen. Besproken wordt dat het ontbreken van een verschil tussen de SAU plus de MEI en SAU drie vragen oproept: Ten eerste, wat zijn de werkingsmechanismen van MG? Ten tweede, wat is er nodig voor een succesvolle implementatie van MG? Ten derde, welke dader- en contextfactoren zijn voorspellend voor de MG-uitkomst? Er wordt gesteld dat er in het algemeen en vooral in de forensische context meer onderzoek nodig is. En dan niet alleen onderzoek naar *of* interventies werken, maar ook naar *hoe* en *welke* specifieke mechanismen gedragsverandering beïnvloeden en voor *wie* en *wanneer* MG effectief is. Bovendien wordt aangevoerd dat toekomstig onderzoek naar implementatiestrategieën voor MG-training in de strafrechtelijke setting, zoals reclassering, nodig is en de kwaliteit van de implementatie van MG-training in deze contexten zal verbeteren. Hoewel wij geen significant verschil vonden tussen de effectiviteit van SAU plus MEI en enkel SAU, wordt er wel geadviseerd om motiverende gesprekken te gebruiken bij delinquenten met stoornissen in het gebruik van middelen, aangezien motivatie een belangrijke voorspeller bleek van start van behandeling. Gezien het gebrek aan verschil tussen het werken met of zonder een op MG gebaseerd protocol en de context van dwang, is het denkbaar dat het ter beschikking stellen van het protocol als middel voor de delinquent om te gebruiken, bijvoorbeeld in de vorm van een vrijblijvende applicatie die hij zelf kan gebruiken, de effectiviteit van het protocol zal vergroten. Verder wordt er beargumenteerd dat de bevinding dat gevoeligheid voor straf en beloning gerelateerd is aan respectievelijk cannabis en alcoholgebruik bij delinquenten, een startpunt kan zijn voor verder onderzoek binnen toezicht naar welke positieve en negatieve bekrachtigers gebruikt kunnen worden om daders te stimuleren hun alcohol en cannabisgebruik te veranderen. Bovendien wordt gesuggereerd dat andere factoren dan de in huidige studie opgenomen (neuro)psychologische factoren die gerelateerd zijn aan impulsiviteit en gevoeligheid voor beloning en straf belangrijk kunnen zijn bij het verklaren van criminaliteit en problematisch middelengebruik bij delinquenten.

APPENDIX D. REFERENCES

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APPENDIX E. LIST OF ABBREVIATIONS

AMI	Adaptations of Motivational Interviewing
BART	Balloon Analogue Risk Task
BIS	Behavioural Inhibition System
BAS	Behavioural Approach System
CJS	Criminal Justice System
CRT	Cluster Randomized Trial
DDT	Delay Discounting Task
MATE	Meten van Addicties voor Triage en Evaluatie
MfT	Motivation for Treatment
MG	Motiverende Gespreksvoering
MI	Motivational Interviewing
MINT	Motivational Interviewing Network of Trainers
MEI	Motivation Enhancing Intervention
RCT	Randomized Controlled Trial
RN	Reclassering Nederland
SAU	Supervision As Usual
SUD	Substance Use Disorder
SVG	Stichting Verslavingsreclassering GGz
SvS	Stap voor Stap

APPENDIX F. WOORDEN VAN DANK

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APPENDIX G. PORTFOLIO AND LIST OF PUBLICATIONS

PhD student: Lilach Shaul

Period: 2012 to 2021

Supervisors: dr. Maarten W. J. Koeter†, prof dr. Gerard M. Schippers,
dr. Marleen M. De Waal, dr. Matthijs Blankers,
prof. dr. Anna E. Goudriaan

Courses

- 2012 Basic course on Regulations and Organisation for clinical investigators, BROK registration, AMC Graduate School
- 2012 Practical Biostatistics, AMC Graduate School
- 2012 PubMed, AMC Graduate School
- 2013 Oral presentation in English, AMC Graduate School
- 2014 Scientific writing AMC Graduate School

Clinical training

- 2015 VGCT course (100-uurs basiscursus), Forta Opleidingen
- 2016 CBT for substance use disorders, Arkin
- 2017 Basic course schematherapy, RinoGroep
- 2018 Adanced schematherapy, Van Genderen opleidingen
- 2018 Mentalisation Based Treatment (deel 1 en 2), MBT-Nederland
- 2018 EMDR (basis en verdieping), ACT-EMDR Centrum
- 2019 SCID-5-P training, De Viersprong
- 2019 Dialectical Behavioural Therapy, Dialaxis
- 2020 Groepsdynamica
- 2020 GZ-opleiding

Conferences/presentaties

- 2012 European Association of Substance Abuse Research (EASAR), Nijkerk, the Netherlands
- 2013 Forum Alcohol en Drugs Onderzoek (FADO), Utrecht, the Netherlands
- 2014 EASAR, Luneburg, Germany
- 2014 NVvP Voorjaarscongres symposium: beïnvloeding van motivatie bij verslaving: van geld tot hersenimplantaat.
- 2014 Voorjaarscongres Nederlandse Vereniging voor Psychiatrie (NVVP), Maastricht, the Netherlands
- 2019 EASAR, Lake Velence, Hungary

Publications

Rieser, N. M.*, Shaul, L.*, Blankers, M., Koeter†, M. W. J., Schippers, G. M., & Goudriaan, A. E. (2019). The predictive value of impulsivity and risk-taking measures for substance use in substance dependent offenders. *Frontiers in Behavioural Neuroscience*, 13(192), 1-12. (chapter 2)

Shaul, L., Blankers, M., Koeter†, M. W. J., Schippers, G. M., & Goudriaan, A. E. (2019). The role of motivation in predicting addiction treatment entry among offenders with substance use disorders under probation supervision. *International Journal of Offender Therapy and Comparative Criminology*, 1-13. (chapter 3)

Shaul, L., de Waal, M. M., Blankers, M., Koeter†, M. W. J., & Schippers, G. M., Goudriaan, A. E. (2019). Effectiveness of a brief motivation enhancing intervention on treatment initiation, treatment retention, and abstinence: Results from a multi-site cluster-randomized trial. *Journal of Substance Abuse Treatment*, 110, 28-36. (chapter 4)

Shaul, L., Koeter†, M. W. J., & Schippers, G. M. (2016). Brief motivation enhancing intervention to prevent criminal recidivism in substance-abusing offenders under supervision: a randomized trial. *Psychology, Crime & Law*, 22(9), 903-914. (chapter 5)

van den Berg, I., Shaul, L., van der Veen, & F., Franken, I. (2012). The role of monetary incentives in feedback processing: why we should pay our participants. *NeuroReport*, 23(6), 347-353 (not in this thesis)

* Authors share first authorship

† Maarten Koeter passed away during this research project

APPENDIX H. ABOUT THE AUTHOR

Lilach Shaul was born on May 4th 1982 in Nahariya, Israël. She completed her secondary education at the Johannes Fontanus College in Barneveld in 2000. After her graduation, she studied Accountancy at the Hogeschool van Amsterdam where she completed her propedeutic phase. She then moved to live for one year in Israël to improve her Hebrew by completing a one-year program at the University of Tel Aviv. In 2005 she returned to the Netherlands and studied Business Administration at the Erasmus University of Rotterdam for two years till she enrolled to the study Psychology at the Erasmus University Rotterdam, where she obtained her bachelor's and master's degree in Clinical Psychology. She did her master project on the role of monetary incentives in feedback processing and published the results in collaboration with the supervisors of her master thesis in *NeuroReport*. In 2011 she started her psychology internship at the department of first psychosis of the Delta Psychiatric Hospital. In 2012 she took on a position as a PhD student at the Department of Psychiatry, Amsterdam Institute of Addiction Research at the Academic Medical Center of Amsterdam, University of Amsterdam, investigating the effectiveness of a brief motivation enhancement intervention in offenders with substance use disorders who are under probation supervision. The results of this research are presented in this thesis. This research was carried out under the supervision of dr. M.W.J. Koeter, dr. M.M. De Waal, dr. M. Blankers, prof. dr. G.M. Schippers, and prof. dr. A.E. Goudriaan. From 2015 Lilach combined her research with clinical work. She started working as a psychologist in the addiction field, after which she specialized in working with persons who suffer from personality disorders. In 2020 she enrolled into the training program for a clinical license as a mental health psychologist (GZ-psycholoog). She finished the first year of training as a GZ-psychologist at the Department of Geriatric Psychiatry of Antea and started with the second year at the Department of Eating Disorders of PsyQ.



