Getting out of the joint

Cognitive bias modification and the treatment of substance use with detained young offenders

van der Baan, H.S.

Publication date
2024

Document Version
Final published version

Getting Out of the Joint

Cognitive Bias Modification and the Treatment of Substance Use with Detained Young Offenders

Hans S. van der Baan

Getting Out of the Joint:

Cognitive Bias Modification and the Treatment of Substance Use with Detained Young Offenders

Hans S. van der Baan

Universiteit van Amsterdam

ISBN: 978-94-93330-74-0

Cover design and layout: Nick Boogert

Print: Proefschriftspecialist │www.proefschriftspecialist.nl

Getting Out of the Joint:

Cognitive Bias Modification and the Treatment of Substance Use with Detained Young Offenders

ACADEMISCH PROEFSCHRIFT

ter verkrijging van de graad van doctor

aan de Universiteit van Amsterdam

op gezag van de Rector Magnificus

prof. dr. ir. P.P.C.C. Verbeek

ten overstaan van een door het College voor Promoties ingestelde commissie,

in het openbaar te verdedigen in de Aula der Universiteit

op vrijdag 26 april 2024, te 11.00 uur

door Hans Sieberen van der Baan

geboren te Amsterdam

Promotiecommissie

Promotor:	prof. dr. R.W.H.J. Wiers	Universiteit van Amsterdam
Copromotor:	dr. A.M.L. Collot D'Escury-Koenigs	Universiteit van Amsterdam
Overige leden:	prof. dr. A.E. Goudriaan	Universiteit van Amsterdam
	prof. dr. K.R. Ridderinkhof	Universiteit van Amsterdam
	dr. E. Billen	Universiteit van Amsterdam
	prof. dr. L.M.C. Nauta-Jansen	Vrije Universiteit Amsterdam
	prof. dr. J.-L. van Gelder	Universiteit Leiden

Faculteit der Maatschappij- en Gedragswetenschappen

Contents

Chapter 1

General Introduction

Substance (ab)use in young offenders is a matter of significant concern. Research indicates that world-wide, a considerable number of young offenders engage in substance use with a high prevalence of illicit drug, alcohol, and tobacco use compared to their non-offending peers (Kepper et al., 2009; Loeber & Farrington, 2000; Mulvey et al., 2011; Ogunwale et al., 2012; Putniņš, 2001; Vreugdenhil et al., 2003). Furthermore, young offenders are at an increased risk for the development of substance use disorders (SUDs), with a substantial number meeting the criteria (Kinner et al., 2014; Plattner et al., 2012; Vreugdenhil et al., 2004). The presence of frequent substance use significantly impacts general practices during detention (Young et al., 2011), as well as the odds of delinquent recidivism post-detention (Putniņš, 2003).

The relationship between substance use and juvenile delinquency is complex and has been prominently studied. Research has consistently shown a strong association between substance use and criminal offending in youth (Adams et al., 2013; Doran et al., 2012; Schubert et al., 2011). This association appears stronger when the youth is younger, leading to an earlier onset, and increased severity, of offending behavior. An early onset of offending, in turn, increases the likelihood of chronic criminal offending in later life (Barnes et al., 2002; Moffitt & Caspi, 2001; Schubert et al., 2011).

However, the relationship between substance use and criminal offending is bidirectional. On the one hand, as we have seen, substance use can increase the likelihood of becoming involved in delinquent activities due to the need to finance drug habits or the influence of intoxication on aggressive behaviors. On the other hand, individuals involved in delinquency may be exposed to an environment where substance use is prevalent, leading to the initiation and/or escalation of substance use (Mason & Windle, 2002). Classically, both substance abuse and antisocial behaviors (such as offending) are considered disinhibitory psychopathologies, both expressions of impaired cognitive control (Gorenstein & Newman, 1980). Many studies have emphasized the co-occurrence of substance use disorders with other psychiatric disorders, such as anxiety or conduct disorder, in youth (Couwenbergh et

al., 2006; Storr et al., 2012). Comorbidity in adolescents with SUDs further increases the odds of involvement with the judicial system (Vermeiren, 2003), which might explain why a large number of young offenders struggle with one or multiple psychopathologies (Vreugdenhil et al., 2004).

Treating substance use in young offenders is clearly important as it addresses both immediate and long-term consequences for these individuals and society as a whole. Successful early intervention could prevent the escalation of substance use to addiction, which could reduce the likelihood of future criminal behavior and help young offenders reintegrate into society. As these youth typically do not seek treatment for substance use on their own, incarceration in a forensic care institution provides us with an opportunity to introduce them to the idea, highlight the role of substance use in their current predicament, and potentially convince them that treatment could be a good idea, or at least create ambivalence towards it[1]. With that in mind, ***this dissertation aimed to develop a short, effective treatment program based on Cognitive Bias Modification (CBM) paradigms for reducing alcohol and cannabis use in detained young offenders***. In the remainder of this section, we will discuss some existing treatment options, and outline their limitations when applied within a detention setting. Next, we will outline the theoretical basis on which CBM paradigms were built and present the empirical evidence on which our research designs were based. After that we discuss a little more explicitly why young offenders in particular could benefit from CBM training. We also touch on the subject of treatment related motivation in forensic settings and a commonly applied methodology for creating ambivalence in treatment-resistant individuals. Finally, an outline of the dissertation is presented in which the various chapters are introduced.

[1] Please note that we are not advocating that all substance using young offenders should be incarcerated; we merely observe that when a youth is detained by the criminal justice system, it creates an opportunity for forensic care providers.

What are "Young Offenders"

Young offenders are individuals charged with committing a criminal offense who are tried by a juvenile justice system as opposed to being tried as an adult. Where adult justice systems focus on punishment, juvenile justice systems focus more on rehabilitation and education, while still levying a punishment for the offense. The parameters that determine whether or not someone is tried according to juvenile justice vary per legal system, but the most common one is age. Most legal systems have an age below which individuals cannot be tried at all (typically 12 or 14), and will try offenders as adults when they are at least 18 years old at the time of committing the offense. Youth in-between these ages are usually tried as juveniles. However, exceptions can be made. If an older youth (typically 16-17) has had numerous previous convictions, or is charged with a particularly severe felony, they may be tried as an adult. Conversely, some legal systems have provisions where older individuals may be tried as juveniles if they mentally function well below their biological age. Generally, the final decision is up to the judge. All that said, specifics can vary quite a bit between legal systems, and (despite being required by international law) not every country has a juvenile justice system.

Young offenders can be tried for offenses ranging from misdemeanours (e.g., chronic truancy) to severe felonies (e.g., rape or arson). Like adults, convictions do not necessarily lead to detention but may also result in e.g., fines or community service sentences. If a youth is detained by a juvenile justice system, they will serve their sentence in a juvenile detention center, not in an adult facility (or at least, separate from the adults). The youth will remain there until their sentence is served, and will not transfer to an adult facility if they turn 18 during their detention. Young offender populations are thus typically comprised of convicted youth in their early adolescence to (very) early 20's.

Throughout this dissertation, when we refer to detained young offenders, we refer to both detained (short-stay) and incarcerated (long-stay) offenders adjudicated by a juvenile justice system, but not to youth involved in parole or diversionary programs. We also

presume that youth detention facilities are considered forensic care institutions where the youth have access to, and are in fact expected to engage with, mental health services, and that these are not merely punitive facilities where they serve their adjudicated sentence. As mentioned earlier, this is not necessarily the case world-wide, but the results of this dissertation should be informative for the treatment of youthful offenders regardless of the specific legal systems that they find themselves involved with.

Treating Substance (ab)Use in Young Offenders

In forensic care, as in other mental health care contexts, evidence-based treatment is considered best practice. One of the most extensively studied treatment methods for substance use (or indeed, practically every other psychopathology) in youth is Cognitive-Behavioral Therapy (CBT; Fadus et al., 2019; McHugh et al., 2010; Waldron & Kaminer, 2004). CBT has demonstrated efficacy in treating substance use disorders in adolescents by helping them to recognize and modify maladaptive thought patterns and behaviors associated with drug use, and to equip them with coping skills, problem-solving strategies, and relapse prevention techniques, with the goal to foster long-term recovery and to reduce recidivism (Benjamin et al., 2011). Many effective, evidence-based programs have been based around CBT principles, and have been designed to provide care of interventions at either the individual or at the group-level. Recent evidence suggests that CBT-based programs can benefit from complimentary methods to provide a more holistic treatment approach (Fadus et al., 2019; Lebowitz et al., 2013).

One complimentary approach that is frequently mentioned in the context of substance-use specifically is Contingency Management (CM; McHugh et al., 2010; Petry, 2011). CM utilizes positive reinforcement to encourage abstinence and compliance with treatment goals, offering tangible rewards or incentives for substance-free behaviors. Research has shown that contingency management interventions effectively motivate adolescents to remain engaged in treatment and sustain abstinence from drugs or alcohol

(Godley et al., 2014; Prendergast et al., 2006), and has also been shown to be effective in reducing substance use in young offenders (Henggeler et al., 2012).

In addition to individual-based therapies, family-based interventions have proven to be valuable in addressing substance use among non-offending and offending adolescents alike. Multisystemic Therapy (MST) is one such evidence-based approach that focuses on the family system and its impact on the youth's behavior (Pickrel & Henggeler, 1996; Randall et al., 2018; Tighe et al., 2012). Another effective family-based intervention that is often mentioned in the context of young offenders is Functional Family Therapy (Hartnett et al., 2017). Therapies like MST and FFT aim to improve family functioning, enhance communication, and strengthen relationships, thereby reducing the likelihood of relapse and delinquent behaviors. By involving parents or caregivers in the treatment process they address environmental risk factors and create a supportive home environment that promotes recovery and rehabilitation. Both MST and FFT have proven reliable and effective treatment options (Eeren et al., 2018; Elliott et al., 2020).

Challenges to Treatment

While these treatment options are all promising, they come with a number of complications when it concerns treating young offenders while they are detained in a forensic care institution. For starters, some effective elements of these treatment options often cannot be fully realized while the youth are detained, such as active family involvement (Chassin et al., 2009). This means MST and FFT, whilst very effective before or after incarceration as part of parole or diversionary programs, are likely not achievable during incarceration. This leaves CBT-based programs, possibly supplemented with Contingency Management. However, while there are many validated CBT-based programs, very few evidence-based programs exist that are specifically designed for youth detained in a forensic care institution (Koehler, Hamilton, et al., 2013; Koehler, Lösel, et al., 2013). Furthermore, there is some evidence that suggests that, even if they are evidence-based, CBT-based programs are less effective when executed inside a forensic care institution (Koehler,

Hamilton, et al., 2013; Lipsey, 2009). Contingency Management, meanwhile, could be effective, but is very dependent on well-trained and skilled staff (Gendreau et al., 2018).

Finally, there are two more general considerations that make treatment of substance use within a forensic care institution complicated. The first is an issue of time; detention within these facilities is based on the length of the judicial sentence, not on treatment protocol. Most detained youth are not detained for all that long. The median stay for American youth, for example, is 64 days (Office of Juvenile Justice and Delinquency Prevention, 2021). Combined with all the time that goes into intake, adjustment, and general reticence (which is to be expected with this demographic), it does not leave a lot of time to complete a full treatment program. The second issue is that treatment within a forensic care institution is only mandatory to the extent of the sentencing, and even then, youth cannot be forced to participate. If a youth is convicted for an offense that does not involve substance use, it is unlikely that the judge will order substance use treatment. As such, many young offenders who could benefit from substance-focused treatment do not receive it during their detention (Young et al., 2007).

Clearly, there is a need for substance use treatment programs that are relatively brief, effective, and well-suited for young offenders in a forensic care institution. One promising candidate can be found in Cognitive Bias Modification (CBM) programs (Maddern et al., 2022).

Cognitive Biases: Theoretical Background

The concept of cognitive biases derives from Dual Process theories (Wiers & Stacy, 2006). These conceptualizations of behavior posit that (non-reflexive) behavior is the result of a semi-autonomous decision-making process in response to a cue or stimulus, whereupon a familiar action-pattern is selected based on an evaluation of the cue and the predicted outcome of the action. For example, the sight of an ashtray (cue) may induce a smoker to reach for their cigarettes (approach action), initiating a chain of behaviors (familiar

action-pattern) that will culminate in a rapid absorption of nicotine into the bloodstream with its associated short-term effects on brain chemistry (predicted outcome). This initiation of an action-pattern in response to a cue occurs almost automatically, as the brain triggers a well-established pattern and the hands reach for the cigarettes before active deliberation has taken place. However, there are often other considerations to be taken into account. In the case of smoking, there could be concerns regarding long-term effects on health, or third-party factors that discourage smoking in this particular instance, e.g., the presence of children in the room. This is where active deliberation allows us to overrule the initial automatic response. It is thus posited that behavior, being the expression of these action-patterns, is controlled by a duality of cognitive processes; an automatic, implicit process and a deliberate, explicit process.

If a particular action-pattern, associated with a specific cue or category of cues, consistently yields an outcome that is perceived as positive, or at least as more positive than the abeyance of that behavior, that action-pattern becomes more salient to the individual. This means that it is increasingly likely to be chosen in response to those cues, whilst alternatives are denied or not even considered. This type of partiality towards a specific action-pattern is called a cognitive bias.

While the Dual Process model informed the theoretic basis of the project outlined in this dissertation, it should be acknowledged that theories on decision making processes and cognitive biases have developed over time. Strict dual process models have fallen out of favor, and researchers are now conceptualizing decision making and behavior initiation through dynamic, more integrated models. This will be addressed further in the discussion.

Cognitive Biases and Substance Use

It's not difficult to see how cognitive biases might play a role in shaping and maintaining substance use behavioral patterns (Stacy & Wiers, 2010; Wiers et al., 2007). The immediate intoxication that follows substance use is often experienced as pleasant, thus

translating to a desirable outcome. Repeated use may turn into habitual use, which adds more factors that reinforce the choosing of use behavior, such as an increased number of cues (e.g., specific places where you stop for a cigarette), scheduled use (e.g., grabbing a beer when you come home from work), tolerance to the substance (requiring a higher dosage to achieve intoxication) and, should habitual use turn into dependency, counteracting withdrawal symptoms. These use-related (or conditional) cues gain salience as the individual acts upon them and they are subsequently strengthened by the perceived pleasurable outcomes of substance use (or unconditional cues). This leads to a reinforcement cycle where engagement with the conditional cues, or substance-use inducing behavior, is increasingly incentivized, particularly when no salient alternatives (i.e., non-use behaviors) are presented and/or the individual has low executive control (Robinson & Berridge, 2003, 2008). These predilections towards engagement with conditional cues are cognitive biases.

Cognitive biases related to the use of various substances have been shown in adult users (Rooke et al., 2008; Zhang et al., 2018) and adolescents (Ames et al., 2005; van Hemel-Ruiter et al., 2016; Willem et al., 2013), and have been implicated in the development and maintenance of habitual substance use (Beraha et al., 2015; Reich et al., 2010; Schmits et al., 2014). However, if strengthening cognitive biases towards conditional cues encourages substance use, it would follow that weakening these biases would discourage it. This is attempted through Cognitive Bias Modification (CBM).

Cognitive Bias Modification in Substance Use

CBM attempts to modify cognitive biases by repeatedly training specific biases towards a desired conditional cue (or away from an undesired one) through cognitive tasks designed for this purpose (Beard, 2011; MacLeod et al., 2002; Wiers et al., 2013). While there are many different cognitive biases, the ones most commonly targeted with CBM are the attentional bias and the approach bias (Boffo et al., 2019). An attentional bias is a predilection toward focusing one's attention on specific (un)conditional cues, and/or having a difficult time disengaging one's attention from them. When entering an unknown room, a

smoker, for example, might immediately spot an ash-tray, and feel inclined to light up a cigarette. An approach bias, meanwhile, is a predilection towards physically approaching specific cues. A thirsty alcoholic, upon opening the fridge and examining its content, is more likely to grab a beer than a soda.

There has been a significant amount of research done with CBM in recent years. While there has been some critique levelled against the method, particularly questioning its clinical relevance (Cristea et al., 2016; Field et al., 2014), there are several clinical studies that have shown positive effects on the cognitive biases, as well as on substance use, particularly in alcohol treatment patients (Eberl et al., 2013; Manning et al., 2021; Rinck et al., 2018; Salemink et al., 2022; Wiers et al., 2011). CBM appears to be most effective when it is not administered as a stand-alone treatment, but in combination with another effective treatment program such as CBT, allowing CBM to enhance its effects (Boffo et al., 2019; Wiers et al., 2018, 2023).

While the effects of CBM have primarily been studied in alcohol and tobacco use, the field is expanding to include other substances, such as methamphetamines (Manning et al., 2019) and cannabis (Sherman et al., 2018). As it stands, these are for now understudied areas, as are young offenders since all of the CBM studies reported above have been done with non-offending, adult populations. There are several aspects to CBM that would suggest it to potentially be a very effective treatment option for young offenders, and a very practical one to apply within a forensic care institution.

Why CBM Might Be Extra Effective With (Offending) Teenagers

Cognitive biases may be extra influential in contributing to substance use behavior for individuals with poor executive cognitive control (Grenard et al., 2008; Houben & Wiers, 2009; Thush et al., 2008; Wiers, Beckers, et al., 2009; Wiers et al., 2010). Neurobiological studies have shown that brain regions responsible for self-control, such as the prefrontal cortex, continue to develop throughout adolescence and into adulthood, which may explain

the higher impulsivity seen in younger age groups (Casey et al., 2008; Krank & Goldstein, 2005). Several studies have linked a lack of inhibitory control to increased substance use in youth, particularly when there is decreased control with regards to the substance specifically (Leeman et al., 2012; Peeters et al., 2012; Toplak et al., 2011; Wardell et al., 2016). Conversely, increased executive control acts as a protective factor against problematic substance use (Lavigne et al., 2017; Willem et al., 2013). If CBM can reduce the impact of cognitive biases that promote substance use, it would enable the adolescents to regulate their substance use behavior better and reduce the risk of developing chronic use and dependency issues.

Impulsivity and self-control issues are particularly prevalent factors contributing to risky behavior such as delinquency and substance use among young offenders. Young offenders often exhibit higher levels of impulsivity compared to their non-offending peers (Carroll et al., 2006). Moreover, environmental factors, including adverse childhood experiences and dysfunctional family dynamics, can contribute to the development of poor self-regulation skills and relatively weak impulse control (Lambert et al., 2013). These types of adverse environmental factors have frequently been shown to be more prevalent in the circumstances of offending and high risk-taking youth (R. J. DiClemente et al., 2001; P. A. Fisher et al., 2011; Gibbons et al., 2004; LaGasse et al., 2006). With so many compounding risk factors tied to low executive or inhibitory control, it seems that young offenders could benefit greatly from treatment options that enhance their ability to execute a bit more control over their cognitions in risky situations. CBM could do just that, by enhancing disengagement from substance use triggers, thereby lessening their automatic impact.

The Advantages of CBM For Application Inside Forensic Care Institutions

Earlier we outlined a number of challenges to treatment within a forensic care institution that limit treatment availability and effectiveness. A CBM training program based on existing paradigms negates a lot of the factors that make it difficult to design and execute an effective treatment within a judicial detention facility, making it particularly suitable.

- *CBM does not require family involvement*. CBM training paradigms are an individual training form. Each juvenile can go through a training session on their own.

- *CBM seems to be well suited for detained youth*. While this is speculative based on the presumed benefits that youth with high levels of impulsivity can gain from increased cognitive control (see above), it does suggest that CBM is very compatible with the target demographic. Furthermore, CBM training paradigms are typically entirely composed of computerized tasks, where participants react to visual stimuli. There is little need to read instructions, none if a staff member can provide explanation, and no individual items to read or verbal responses to formulate. This format is beneficial as detained youth typically exhibit low levels of reading comprehension (Flores & Barahona-Lopez, 2020), and there is some evidence that it is extra effective with impulsive youth (Weckler et al., 2017).

- *CBM does not require specialized or skilled staff*. To implement a CBM training paradigm in a forensic care institution, the care providing staff do not require extensive courses or training to be proficient in administering CBM. Most studied training programs consist of computerized tasks that the youth can run through individually (Boffo et al., 2019).

- *CBM programs can be relatively brief*. A single session in a typical CBM training takes 5 to 10 minutes, which means it can relatively easily be added on to treatment sessions of the regular treatment that's being applied within any given institution (as CBM is most effective as an adjunctive treatment; (Wiers et al., 2018)). Additionally, CBM training only requires a handful of sessions to show effects. Research has repeatedly shown that effects can happen after only 4 to 6 sessions (Eberl et al., 2014; Manning et al., 2022). This greatly increases the likelihood that a CBM training can be engaged in to a point where effects can occur, before a youth is released.

- *CBM is not resources intensive*. Both in terms of time and material, a CBM training does not require much from the institutions. As they are typically computerized, access to a computer is all that is needed. As for time requirement, as mentioned above a session does

not take long and is ideally added to another treatment. As such, it is complementary, and does not compete with other treatments for the limited time that is available.

Motivation

Motivation is a key factor in mental health treatment (Drieschner et al., 2004), being predictive of treatment completion and outcomes (Drieschner & Verschuur, 2010). It is a primary enabler of goal-directed behavior (Ryan & Deci, 2000b) and as such, is what allows individuals to achieve treatment goals. The importance of motivation is reflected in its prominence in clinical literature, including literature on substance use treatment (e.g., Contreras-Rodríguez et al., 2020) and forensic treatment (Mathys, 2017). However, motivation tends to suffer in forensic treatment settings. Since entry into the treatment context is adjudicated, many decisions made with regards to treatment are out of the offender's control, which impacts motivation negatively.

While little can be done about the fact that treatment with young offenders is typically adjudicated, it is an important facet of the treatment process to keep in mind. Motivation for treatment will likely remain extrinsic, but the quality of that motivation can be improved. Treatment design should aspire to keep the demands of treatment and its format suited to the idiosyncrasies of the young offender population. As we mention above, CBM appears to have many features that would suit well in this regard, making it congruent with the young offenders' abilities and preferences.

Aims and Outline of This Dissertation

As stated, ***this dissertation aimed primarily to develop and test the efficacy of a short treatment program based on Cognitive Bias Modification (CBM) paradigms for reducing alcohol and cannabis use in detained young offenders***. We attempted this by developing a nation-wide, multi-site randomized controlled trial (RCT) where we tested the effectiveness of CBM, and a second pilot study where we tested the effectiveness of CBM plus a motivation enhancement training. ***A secondary aim*** that emerged during the

execution of these studies ***is the dissemination of pertinent information for the (future) development of effective treatment programs aimed at detained young offenders***. To this end we have included a review on motivation in detained youth, and an opinion piece on best-practices for research in detention settings.

In ***Chapter 2*** we report on our multi-site RCT where we tested the effectiveness of CBM. 156 young offenders from 7 Dutch forensic care institutions were included after screening for alcohol and/or cannabis use. In addition to Care-As-Usual, these youth got 6 sessions of CBM consisting of two training tasks, one targeting approach bias and one targeting attention bias. Substance stimuli used in the training was dependent on which substance each individual youth reported using most; alcohol or cannabis. The study employed a 2x2 design where for each CBM task, youth would randomly be assigned an active training version or a sham version. This resulted in 2 groups (alcohol trained and cannabis trained), each group consisting of 4 conditions (2 active training tasks, active approach and sham attention training, sham approach and active attention training, or 2 sham training tasks). Each group was assessed for change in cognitive biases, substance use at 1-year follow up and delinquent behavior at 1-year follow up. We also examined several potential moderators of treatment effects to identify potential subgroups for which the training would be more effective, or less.

In ***Chapter 3*** we provide a systematic scoping review on the use of “Motivation” in the scientific literature on the treatment of young offenders detained in a forensic care institution. Motivation, as a concept, is ubiquitous in the clinical literature and no less so in the forensic clinical literature. However, it is often a poorly defined, heterogeneous construct, or even entirely conceptual without being empirically evaluated. The only constants regarding motivation in this context tend to be that a) its importance for successful treatment cannot be overstated, and b) young offenders don’t have any. This review attempts to identify the main forms of motivation and scientific research on motivation, outline their

findings and the current state of knowledge regarding motivation, and describe notable gaps in the literature.

In ***Chapter 4*** we report on our pilot RCT where we tested the effectiveness of CBM plus a motivational training. As it became clear that CBM is not effective as a stand-alone treatment, combining it with motivational enhancement was a logical next step. Fifty-two young offenders from five Dutch forensic care institutions were included after screening for alcohol and/or cannabis use. The set-up for the CBM portion of this study was identical to that outlined in ***Chapter 2***. The motivational training consisted of 7 sessions of a Motivational Interviewing (MI) protocol based on the protocol used by Dutch parole services when treating substance abuse in adult parolees. Each MI session preceded one of the CBM sessions, except for the 7th MI session, which was done on its own. Each participant of the pilot was matched with a participant from the RCT outlined in ***Chapter 2*** to create a control group. Groups were compared on changes in motivation, as well possible interactions with CBM-conditions.

In ***Chapter 5*** we provide an opinion piece on best-practices for performing complex or sensitive research with young offenders in a forensic care institution. Pooling experiences from several researchers in the field we provide several recommendations and examples of how to go about collecting potentially sensitive data or perform complex research designs in ways that will allow researchers to get the most, high quality data. We underscore the advice with examples of successful application.

Finally, in ***Chapter 6*** we summarize the findings from the studies presented in this dissertation. Reflections on the findings and several key issues that they have highlighted will be discussed, as well as the important takeaways from this project. Finally, we give our thoughts on future research into CBM with young offenders, and provide an overarching conclusion.

Chapter 2:

The Effectiveness of Cognitive Bias Modification in Reducing Substance Use in Detained Juveniles: An RCT

Hans S. van der Baan, Annematt L. Collot D'Escury-Koenigs, & Reinout W. Wiers

This chapter will be published as:

Van der Baan, H. S., Collot D'Escury-Koenigs, A. L., & Wiers, R. W. (2024). The effectiveness of Cognitive Bias Modification in reducing substance use in detained juveniles: An RCT. *Journal of Behavioral Therapy and Experimental Psychiatry, 82*.

https://doi.org/10.1016/j.jbtep.2023.101916

Abstract

Background and objective: Young offenders show high levels of substance use. Treatment programs within detention settings are less effective. Cognitive bias modification (CBM) is a promising supplement to substance use treatment. This study tests the effectiveness of CBM in young offenders to reduce cannabis and alcohol use, and delinquent recidivism.

Method: A randomized controlled trial added CBM to treatment as usual (TAU), among 181 youth in juvenile detention centers. In a factorial design, participants were randomly assigned to either active- or sham-training for two varieties of CBM, targeting attentional-bias (AtB) and approach-bias (ApB) for their most used substance. Substance use was measured with the Alcohol and Cannabis Use Disorder Identification Tests. Delinquent recidivism was measured with the International Self-Report Delinquency (ISRD) survey.

Results: At pretest, participants showed AtB but no ApB for both substances. For alcohol, a decrease was found in AtB in the active-training group. For cannabis, a decrease was found in AtB for both active- and sham-training groups. Regardless of condition, no effects were found on substance use or ISRD scores at follow-up.

Limitations: The sample is judicial, not clinical, as is the setting. TAU and participant goals are not necessarily substance related.

Conclusions: Young offenders show a significant attentional-bias towards substance cues. CBM changed attentional-biases but not substance use. Combining CBM with a motivational intervention is advised. Follow-up research should better integrate CBM with running treatment programs. New developments regarding CBM task design could be used that link training better to treatment.

Trial Registration: Netherlands Clinical Trial Registry (NTR6458); https://www.trialregister.nl

Keywords: Cannabis, Alcohol, Young Offenders, Cognitive Bias Modification, Randomized Controlled Trial

Young offenders use more substances than non-offenders, both internationally (Mulvey et al., 2011; Ogunwale et al., 2012; Putniņš, 2001) and in the Netherlands (current study's location; Kepper et al., 2009; Vreugdenhil et al., 2004), and run increased risks of developing substance use disorders (SUDs; see Appendix A for abbreviations; Kinner et al., 2014; Plattner et al., 2012). SUDs are associated with various negative outcomes and related societal costs (Chen & Lin, 2009; French et al., 2008; Marshall, 2014), as well as delinquency (Arseneault et al., 2002; Doran et al., 2012). In detention, alcohol and (hard)drug use typically decrease, while cannabis use remains high, with motives like passing time (Cope, 2003) or self-medication (e.g., to mitigate ADHD symptoms; Gudjonsson et al., 2012). Heavy usage in young offenders is a major concern in forensic care, both regarding work inside juvenile detention centers (JDC; S. Young et al., 2011) and delinquent recidivism (Putniņš, 2003).

Several substance-use interventions have been developed for young offenders, mostly based on cognitive behavior therapy (CBT). However, there is evidence that CBT is less effective when applied inside a JDC (Koehler, Hamilton, et al., 2013; Lipsey, 2009). Important factors in adolescent substance-use treatment (e.g., family involvement; Chassin et al., 2009) often cannot be realized. Given the need for effective treatment, there is much to be gained from improving available programs.

One potential improvement is cognitive bias modification (CBM). CBM interventions are relatively simple, targeting cognitive biases involved in the maintenance of substance-use behavior. Cognitive biases are cue processing predilections, which elicit specific reactions. For example, spotting someone attractive will focus attention with accompanying eye-movements. This is called an Attentional Bias (AtB). Similarly, cues may evoke approach tendencies, like reaching towards candy in the supermarket before reconsidering. This bias is called an Approach Bias (ApB; Wiers, Rinck, et al., 2009). AtB and ApB are the most commonly targeted biases in substance-use. Studies have found cognitive biases related to alcohol and cannabis use in adolescents (Ames et al., 2005; van Hemel-Ruiter et

al., 2016; Willem et al., 2013), and implicated them in the development and maintenance of SUDs (Rooke et al., 2008). Heightened attention for substances, and a strong impulse to use them provide a powerful impetus that is difficult to stop.

Several studies have investigated the effects of re-training cognitive biases through CBM, mostly in alcohol and tobacco SUDs. While initial doubt was expressed regarding behavioral outcomes (including clinical effectiveness; Field et al., 2014), reviews show positive effects on targeted biases (Boffo et al., 2019; Wiers et al., 2013). Success has been achieved when CBM was auxiliary to existing treatment in clinical populations (review: Wiers et al., 2018; meta-analysis: Boffo et al., 2019). CBM has potential as an add-on to SUD treatment, but research should identify for which populations it is effective (Field et al., 2014; Wiers et al., 2018).

CBM has several characteristics that facilitate implementation within a JDC. It is easily operationalized as computerized tasks and administration does not require specific training or education. CBM studies have shown effects after 4 sessions (Manning et al., 2020); one week of daily training may suffice. As treatment duration in detention is determined by sentence, rather than treatment protocol, shorter (effective) treatments are preferable.

Studies have found that cognitive biases are stronger when cognitive control is weak (Peeters et al., 2012; Toplak et al., 2011), whereas good attentional control was reported as a protective factor in adolescent alcohol use (Willem et al., 2013). Automatic cognitive processes may be more important in explaining adolescent than adult behavior, as executive processes are still developing (Krank & Goldstein, 2005). Young offenders show a greater incidence of impulsivity-related problems, indicating weak cognitive control (Carroll et al., 2006). Therefore, CBM might have greater effects in impulsive youth.

Note that much research has been done since this project started and our understanding of CBM's working mechanisms has evolved. Consequently, some of the

assumptions, paradigms, and evidence on which this study is based could now be regarded as somewhat outdated. This is addressed further in the discussion.

The current study's aim was to examine the effectiveness of a brief CBM training protocol on top of treatment as usual (TAU) within the JDC, in reducing alcohol and cannabis use. TAU, in this context, can be defined as treatment programs participants receive during their detention. In Dutch JDCs, all youth receive the EQUIP program (Gibbs et al., 1995), targeting behavioral problems, and continue secondary education. If juvenile courts orders substance use treatment, or a youth requests it, they receive Brains4Use (*Brains4Use*, 2015).

We targeted AtB with a training-version of the Visual Probe Task (VPT; Bradley et al., 1998) and ApB with a training version of the Approach-Avoid Task (AAT; Wiers, Rinck, et al., 2009). Our primary aim was to examine whether adding CBM to TAU resulted in reduced self-reported substance use at 12-month follow-up. In line with previous research on CBM's clinical effects (Eberl et al., 2013; Manning et al., 2016, 2020; Schoenmakers et al., 2010; Wiers et al., 2011), we expected to find substance-focused biases at pretest, and a reduction in biases after training in participants who received active-CBM. Active-CBM was also expected to lead to a significant reduction in substance use, compared to sham-CBM. The secondary aim was to examine whether self-reported delinquency at 12-month follow-up was also reduced after active-CBM. Given relations between substance use and offending (Arseneault et al., 2002; Doran et al., 2012; S. Young et al., 2011), we expected active-CBM to reduce delinquent behavior compared with sham-CBM. Finally, we explored potential moderators of treatment effects: initial substance use, age, gender, initial biases, motivation, self-control and working memory, and whether substance use treatment (Brains4Use) was received. The goal here was to identify potential subgroups for whom CBM could be differentially effective.

Methods

Trial Design

The study was a double-blind RCT with a 2x2 factorial design. Participants were randomly assigned to active- or sham-training versions for both ApB modification (ApBM) and AtB modification (AtBM), resulting in four groups:

1. active-ApBM, active-AtBM;

2. active-ApBM, sham-AtBM;

3. sham-ApBM, active-AtBM;

4. sham-ApBM, sham-AtBM.

This design minimized the number of participants receiving only sham-training (25%), whilst still allowing for comparisons of active with sham-training. Data was collected as part of the SCREEN project, a collaborative study between the University of Amsterdam (UvA) and Vrije Universiteit Amsterdam. Protocols have been approved by an Ethics Committee (UvA, 2013-DP-3165; 2013-DP-3142). The study has been registered in the Netherlands Clinical Trial Registry (NTR6458). The SCREEN project was funded by the Dutch Ministry of Justice and Safety, who had no role in study execution, data collection or analysis, nor in writing this manuscript.

Experimental Tasks used to assess and re-train cognitive biases

We employed two tasks to assess cognitive biases, the AAT to assess ApB and the VPT to assess AtB, for substance-related stimuli. Both tasks had two versions, an assessment- and a training-version. The training-version was either active (aimed at retraining the bias) or sham (i.e., continued assessment).

AAT-assessment: Participants were shown substance pictures, or visually-matched neutral images (soft-drinks for alcohol or office-supplies for cannabis). Participants were

instructed to press a keyboard key as quickly as possible that would either move the picture towards or away from them. The required response depended on the picture's shape, not its contents. After an approach response, the picture was enlarged, after a push response, it shrank, creating a sense of approach and avoidance, respectively (Wiers, Rinck, et al., 2009). On a mistake, a large red X appeared on screen. The assessment-version of the AAT consisted of 80 trials where each picture-type (substance or neutral) was approached or avoided equally often (50-50). Trials were presented in two blocks, separated by a short break.

AAT-training: The training-version consisted of a short assessment block (64 trials), followed by training (192 trials). The approach-avoid ratios for the training trials varied between condition (active or sham): in active, all substance pictures were to be pushed away, in sham, half were pushed and half pulled.

VPT-assessment: Participants were shown paired pictures, one substance and one neutral, followed by an arrow appearing at either location. Participants indicated which way the arrow pointed by pressing a key (up or down). If an incorrect response was given, a big red X appeared on screen. The assessment-version of the VPT consisted of 80 trials using substance and neutral stimuli. The arrow appeared at both locations in equal measure (50-50).

VPT-training: The training-version consisted of a short assessment block (64 trials), followed by training (192 trials). The appearance ratio of the arrow was contingent on group. In sham the ratio was again 50-50, in active the ratio was 100-0 for substance stimuli.

See Appendix B for more technical details regarding these tasks.

Participants

Participants were 449 adolescents detained in seven JDCs in the Netherlands, from both short-stay and long-stay groups (> 3 months). Youth were placed after a juvenile court conviction of a felony, or while awaiting trial. Participant recruitment ran from 2014 to 2016.

Selection was organized in three phases: 1) open invitation through personal communication at the center; 2) eligibility assessment (T0); and 3) randomization (T1). Exclusion criteria for both eligibility assessments and randomization were: (a) placement in Very Intensive Care or Forensic Observation groups, as participation was too intrusive in these conditions, (b) insufficient mastery of the Dutch language and (c) colorblindness.

Procedure

Recruitment and data collection were performed by SCREEN researchers, unaffiliated with the Dutch judicial system. Candidate participants were approached after having been detained for at least two weeks. The first two weeks are filled with institutional assessments and acclimatization for the youth. Participants were first recruited for the larger SCREEN project (T0 and follow-up measurements). They were told that we wanted to collect a broad array of information to gain more insight into the youths themselves, and that all youth in the institutions would be approached; they were not singled out. Information about the study was given both verbally and in writing. Youth who consented (and, where necessary, of whom we'd obtained parental consent) were then administered the SCREEN test battery, which included the instruments used for our eligibility assessment. This was scheduled 24 hours after the youth agreed to participate (=T0). T0 was administered digitally by SCREEN researchers and took 1.5-2 hours. Participants provided demographics, followed by a battery of instruments including the Alcohol Use Disorder Identification Test (AUDIT; Saunders et al., 1993), the Cannabis Use Disorder Identification Test – Revised (CUDIT-R; (Adamson et al., 2010), a self-control questionnaire and a task assessing working memory (for details see Appendix C). The software in which both the questionnaires and tasks were embedded was developed by the University of Amsterdam.

Following T0, eligibility was assessed off-site by the lead researcher, keeping research-staff remained blind to condition. Participants were eligible if they reported either alcohol or cannabis usage during the past year. This low threshold meant third-party observers (e.g., JDC staff) could not infer the timing or extent of usage from participation,

ensuring confidentiality. Participants were eligible for alcohol- or cannabis-focused training depending on their highest score (AUDIT or CUDIT-R). After eligibility was determined, on-site staff was told which participants were eligible for which training (alcohol or cannabis). These youth were again approached for participation in the training sessions (T1-T6). They were told that the training was intended to improve self-control over their substance use and that participation (or non-participation) would not affect their sentence or their stay in the JDC. We also explained that the JDC staff would not be informed about the details, that nothing incriminating could be inferred from participation, and that we would not report to the staff what substance they were being trained for. IC was obtained anew. Where necessary, IC was again obtained from parents, but to retain confidentiality parents were told that the training intended to improve self-control, without mentioning the substance-use context.

Figure 1 shows a CONSORT diagram of the participant flow. Sample characteristics are shown in Table 1.

Figure 1. CONSORT flow diagram

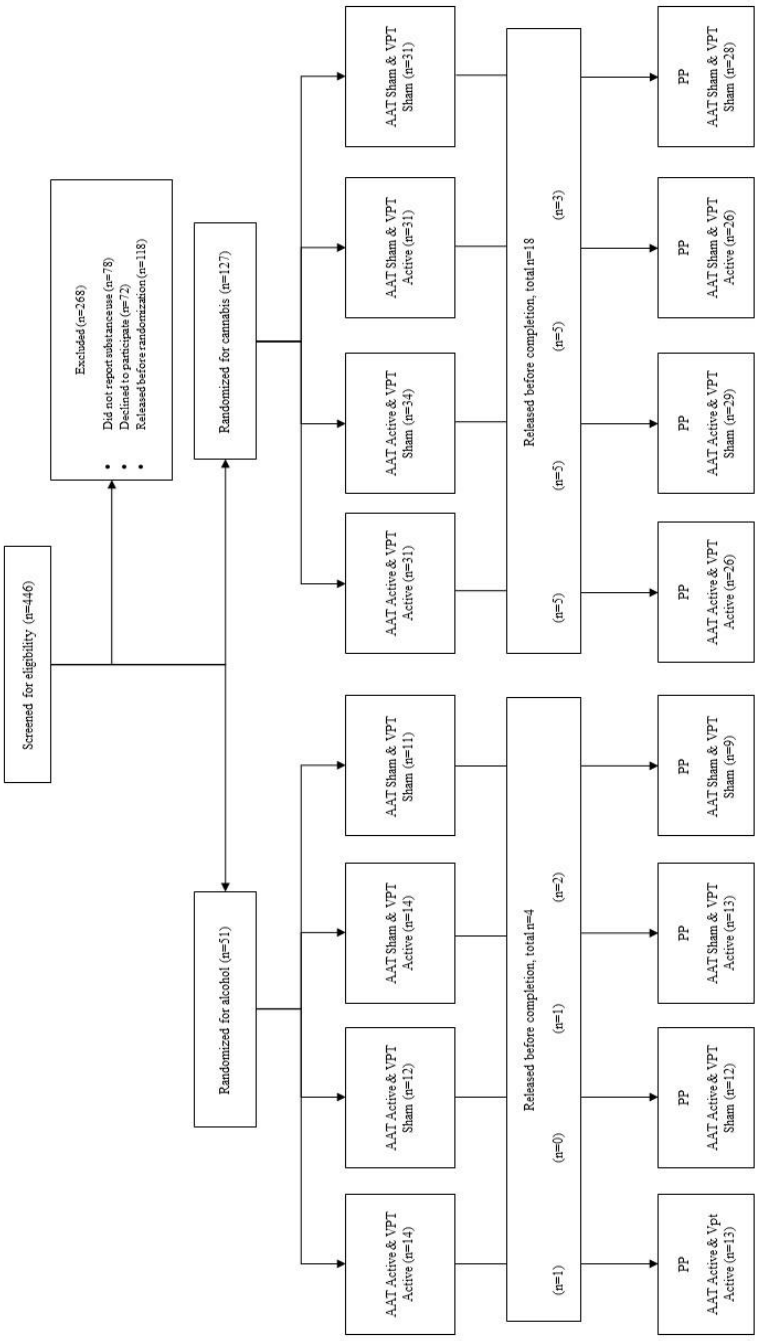


Table 1.

Sample characteristics

	Alcohol training				Cannabis training			
Groups	AAT Active – VPT Active	AAT Active – VPT Sham	AAT Sham – VPT Active	AAT Sham – VPT Sham	AAT Active – VPT Active	AAT Active – VPT Sham	AAT Sham – VPT Active	AAT Sham – VPT Sham
N	14	12	14	11	31	34	31	31
Gender (% male)	92.90	100	100	100	93.50	88.20	93.50	93.50
Brains4Use	1	2	2	2	4	6	5	9
Age	19.01 (2.62)	19.21 (1.77)	18.56 (1.54)	18.37 (1.69)	18.67 (2.03)	18.50 (1.96)	18.51 (1.82)	18.67 (2.03)
AUDIT	7.36 (7.76)	4.00 (3.02)	8.21 (7.15)	6.09 (4.37)	4.48 (4.24)	5.09 (4.79)	4.61 (4.53)	4.48 (4.24)
CUDIT-R	4.43 (7.72)	1.33 (3.4)	1.21 (4.00)	3.09 (3.83)	11.94 (5.06)	13.18 (6.44)	12.97 (5.54)	14.27 (6.22)
BSCS	43.29 (9.59)	47.42 (6.79)	46.36 (8.57)	45.73 (7.56)	43.13 (8.37)	42.64 (9.03)	44.77 (7.44)	43.13 (8.37)
SOPT	11.36 (3.52)	11.42 (3.94)	9.57 (3.39)	9.45 (4.93)	10.26 (5.89)	11.35 (6.10)	11.00 (5.59)	10.26 (5.89)
Motivation	30.77 (31.18)	42.25 (39.45)	63.15 (41.70)	57.00 (47.48)	47.13 (36.09)	47.16 (36.74)	54.90 (38.10)	47.13 (36.09)

Note. Numbers between brackets = Standard errors. Brains4Use = N participants receiving Brains4Use; AUDIT = Alcohol Use Disorder Identification Test - Revised, range 0-40; CUDIT-R = Cannabis Use Disorder Identification Test, range 0-32; BSCS = Brief Self-Control Scale, range 13-65; SOPT = Self-Ordered Pointing Task, range 0-48; Motivation = Motivation to quit/reduce substance use, range 0-100; Motivation was formulated to be substance specific (alcohol or cannabis).

The training (T1-T6) consisted of baseline assessments of AtB & ApB and motivation (T1), and five training sessions (T2–T6), scheduled between 24 hours and one week apart. Sessions occurred in a designated room with only the participant and data-collector present. At T1, participants indicated to what extent they wanted to use their substance right now, were motivated for the training, and to change their substance use, followed by two computer tasks to measure AtB and ApB. At this point the software randomized both the order in which the participant would receive the tasks (i.e., AAT first or VPT first), as well as which version of each task they would receive (active or sham). This randomization was stratified across institutions, aiming for a roughly equal distribution between the four experimental groups in each institution.

Later sessions (T2–T6) were the same, except participants now performed training versions of the CBM tasks (active or sham depending on experimental group). Each session took 20–30 minutes.

All participants were approached for follow-up measurements (T7–T9), approximately 1, 3 and 12 months after their last session. They were contacted as of the allotted date, but as they were often unavailable or unreachable at first attempt, further contact/scheduling attempts were made up to two weeks after. T7–T9 were conducted in the same setting as T0–T6, if the participant was still detained. If no longer detained, participants were contacted by phone or visited at home. The follow-up included questionnaires on substance use and delinquent recidivism, but no cognitive-bias measurements as these were unobtainable over the phone. For privacy reasons, questions regarding sensitive information (e.g., delinquent recidivism) required only 'yes' or 'no' answers. The interview took 10–15 minutes.

At T0 participants were given a choice of rewards of approximately €5. Rewards varied per JDC and were selected in consultation with the staff, most commonly personal-hygiene products or phone credits. There was no reward for training participation. Rewards for follow-up participation were €5 at T7, €10 at T8, and €15 at T9. If the youth was still detained, rewards were similar as at T0.

IC and permission to access data from institutional files were obtained from the participants and, where required, from a parent or guardian.

Materials

Alcohol use: AUDIT (Saunders et al., 1993) assesses potentially hazardous and harmful alcohol use during the past year. Internal consistency was good (α = .86).

Cannabis use: The CUDIT-R (Adamson et al., 2010) assesses potentially hazardous and harmful cannabis use during the past year. Internal consistency was good (α = .85). The AUDIT and CUDIT-R were used to assess eligibility and as baseline measure to assess long-term outcomes.

Self-Control: The Brief Self-Control Scale (BSCS; Tangney et al., 2004) was used to assess dispositional self-control. Internal consistency was good (α = .80).

Working Memory: The Self-Ordered Pointing Task (SOPT; Ross et al., 2007) was used to assess working memory (Colom et al., 2003). The SOPT was included as a potential moderator. Our version used concrete pictures, with instructions to click each picture once. The outcome is the total number of errors (Ross et al., 2007).

Motivation: Participants indicated how motivated they were to change their substance use on a visual analog scale ranging from 0 (“not at all”) to 100 (“completely”). Participants answered these questions regarding the substance they were trained for.

Delinquency: The International Self-Report Delinquency (ISRD; Enzmann et al., 2010) measures delinquency by asking whether respondents engaged in several delinquent behaviors. Internal consistency was good (α = .84). As the execution of the project and data collection proved very intensive and time-consuming we were unfortunately unable to obtain police records, as proposed in the preregistration.

Data Analysis

Two data sets were created, an Intention-To-Treat (ITT) set and a Per Protocol (PP) set. The ITT data included all participants who were randomized. The PP data included all participants who had completed at least 1 training session. The main analyses outlined below were conducted with ITT data first, then repeated for PP data. Moderation analyses were only done with PP data. Analyses examined the alcohol- and cannabis-trained groups separately, unless stated otherwise. Given the relatively small sample sizes, significance is reported as of $p<.10$ unless stated otherwise. It is often difficult to achieve large sample-sizes for clinical studies with young offenders, making this type of study rare. Yet the importance of effective treatment, and the potential benefit thereof to the youth themselves and society, can hardly be overstated. As CBM training carries low costs and practically no risks, we feel this lower significance threshold is justified (Palesch, 2014).

Desired sample sizes were derived from literature. Assuming a medium effect (Schoenmakers et al., 2010; Wiers et al., 2011), we aimed for 50 participants per group, per substance. This would give us enough power (.80), even with 25% dropout (Cohen, 1992). A post-hoc power analysis was conducted on the PP participants with GPower (Faul et al., 2007). Our PP data consisted of 109 cannabis participants, and 47 alcohol participants. To detect a medium effect within and between four groups using ANOVA with α=.10, our PP data for the cannabis participants had power >.80. Our PP data for the alcohol participants had power = .76, which is slightly below the optimal .80 threshold. Note that our original effect size expectations are likely no longer valid, as new research has emerged since. This is addressed further in the discussion.

Bias scores: The presence of biases at T0 was evaluated with one-sample T-tests (difference from 0). Change-over-time was evaluated with a mixed factorial ANOVA with Time as within-subject factor (comparing scores at T0 with T6) and Group as between-subjects factor (alcohol or cannabis, and training or sham, creating 4 groups). Changes were further explored with paired-sample T-tests. These analyses examined VPT-scores (AtB), AAT-scores for substance stimuli (substance-ApB), and AAT sores for control stimuli (control-ApB). Note that participants in the ITT data who were not included in the PP data, have only provided baseline bias scores (they dropped out after T1). Change-over-time for bias scores is thus only presented for the PP data.

Clinical effects: We analyzed the prediction of substance use at T9 with a hierarchical multiple regression. In step 1 we enter background variables (use at T0, age, gender and biases), in step 2 training factors (AAT group, VPT group, # of sessions, and the interaction term AATgroup*VPTgroup).

Recidivism: A between-subjects ANOVA was used to evaluate group differences (training vs. sham) in delinquent recidivism at T9.

Moderation: Given the numerous variables involved, and the relatively small participant groups, a base model was first established, followed by separate tests for each moderation effect. To establish the base model, a hierarchical regression analysis was conducted with established predictors (prior use, age, gender, motivation, working memory, self-control, biases and Brains4Use enrolment) in step 1, adding training factors in step 2. The base model was compiled by retaining those predictors where $p < .30$. Separate analyses were then run for each potential moderator, adding the main effect of the moderator in step 1 or 2 (if it wasn't retained in the base model) and an interaction term with group, once for AAT and once for VPT.

Results

Biases at T1 ITT:

One-sample T-tests showed a small difference from 0 for VPT-scores for alcohol stimuli at T1 ($M = 9.46$, $SD = 32.00$, $t(48) = 2.07$, $p = .04$), and a moderate difference for cannabis stimuli at T1 ($M = 15.97$, $SD = 33.08$, $t(123) = 5.38$, $p < .001$). AAT-scores for alcohol stimuli at T1 did not differ significantly from 0 ($M = 2.67$, $SD = 105.06$, $t(47) = .18$, $p = .86$), nor did AAT-scores for cannabis stimuli at T1 ($M = -3.46$, $SD = 123.73$, $t(122) = -.31$, $p = .76$). AAT-scores for control stimuli at T1 also did not differ significantly from 0, neither for alcohol ($M = -.65$, $SD = 100.21$, $t(48) = -.05$, $p = .97$), nor for cannabis ($M = 4.30$, $SD = 120.39$, $t(122) = .40$, $p = .69$). Hence, attentional bias was confirmed for both substances at pretest, but not approach bias.

Training Effects ITT:

Table 2 shows mean AUDIT and CUDIT-R scores at T0 and T9. Regression statistics predicting AUDIT-scores at T9 for the alcohol participants and regression statistics predicting CUDIT-R scores at T9 for the cannabis participants can be found in Appendix D. For alcohol, only the first model containing basic predictors explained a significant proportion of the variance in AUDIT-scores at T9, $R^2 = .34$, $F(6, 26) = 2.23$, $p = .07$. Of those predictors, only

AUDIT-scores at T0 predicted AUDIT scores at T9, β = .35, $t(26) = 1.79$, $p = .08$. For cannabis, no model significantly explained variance, and only CUDIT-R scores at T0 predicted CUDIT-R scores at T9, β = .20, $t(72) = 1.68$, $p = .098$. We found no effects of CBM on either alcohol or cannabis use a year later.

Table 2.

Substance use at T0 and T9

	T0				T9			
ITT								
Groups	AAT Active – VPT Active	AAT Active – VPT Sham	AAT Sham – VPT Active	AAT Sham – VPT Sham	AAT Active – VPT Active	AAT Active – VPT Sham	AAT Sham – VPT Active	AAT Sham – VPT Sham
AUDIT	7.36 (7.76)	4.00 (3.02)	8.21 (7.15)	6.09 (4.37)	5.22 (5.76)	5.29 (3.04)	5.00 (5.34)	4.00 (4.76)
CUDIT-R	11.94 (5.06)	13.18 (6.44)	12.97 (5.54)	14.27 (6.22)	12.95 (7.27)	11.19 (8.85)	8.26 (6.32)	9.74 (7.24)
PP								
Groups	AAT Active – VPT Active	AAT Active – VPT Sham	AAT Sham – VPT Active	AAT Sham – VPT Sham	AAT Active – VPT Active	AAT Active – VPT Sham	AAT Sham – VPT Active	AAT Sham – VPT Sham
AUDIT	7.85 (7.85)	4.00 (3.02)	6.33 (2.23)	7.33 (3.78)	5.88 (5.79)	5.29 (3.04)	4.75 (5.65)	4.67 (4.84)
CUDIT-R	12.58 (4.65)	13.90 (6.62)	12.81 (5.59)	13.64 (6.31)	12.44 (7.47)	10.11 (9.10)	8.15 (6.55)	10.75 (6.96)

Note. Numbers between brackets = Standard Deviation. AUDIT = Alcohol Use Disorder Identification Test - Revised, range 0-40; CUDIT-R = Cannabis Use Disorder Identification Test - Revised, range 0-32; AUDIT data presented only for the alcohol-trained participants; CUDIT-R data presented only for the cannabis-trained participants.

Delinquent recidivism ITT:

Table 3 shows mean ISRD scores at T9. A one-way, between-subjects ANOVA showed no significant effect of CBM-group for the alcohol participants ($F(3, 28) = 1.02$, $p = .40$), nor for the cannabis participants ($F(3, 81) = .10$, $p = .96$). We found that actively-trained participants did not show less delinquent recidivism compared to sham-trained participants.

Table 3.

Mean ISRD at T9

Group	Alcohol	Cannabis
	ITT	
2x Active	1.78 (2.22)	1.33 (1.93)
AAT Active	.71 (1.11)	1.67 (3.37)
VPT Active	1.11 (2.62)	1.25 (2.47)
Sham	.14 (.38)	1.37 (2.98)
	PP	
2x Active	2.13 (2.23)	1.47 (1.91)
AAT Active	1.29 (1.11)	2.28 (3.46)
VPT Active	1.38 (2.77)	2.15 (2.43)
Sham	.50 (.84)	2.13 (3.05)

Note. Numbers between brackets = Standard deviation; ISRD = International Self-Report Delinquency

Establishing PP data:

For PP analyses, we excluded participants who were randomized but received no training. A binominal logistic regression was applied to predict dropout from our baseline predictors. As the number of dropouts was low (14), we combined dropouts from the alcohol and cannabis training. Appendix E shows the results of the dropout analysis. We found that participants with higher AUDIT scores were 10% more likely to drop out, while participants with higher CUDIT-R scores were 14% less likely. This was not unexpected, as alcohol is much harder to obtain in detention than cannabis. Subsequently, considering baseline substance use was measured over the year prior to T0, higher alcohol-scores were to be expected in recently detained youth. Since most leave the detention centers within two months, new arrivals have a greater chance of dropping out compared to those serving a heavier sentence. We also found that participants with a greater approach bias for control stimuli were 1% more likely to drop out.

Biases at T1 and change over time PP:

One-sample T-tests showed a small difference from 0 for VPT-scores for alcohol stimuli at T1 (M = 10.92, SD = 34.22, t(45) = 2.16, p = .04), and a moderate difference for cannabis stimuli at T1 (M = 15.75, SD = 31.59, t(108) = 5.21, p < .0). AAT-scores for alcohol stimuli at T1 did not differ significantly from 0 (M = .21, SD = 107.45, t(44) = .01, p = .99), nor did AAT-scores for cannabis stimuli at T1 (M = -.34, SD = 126.48, t(108) = -.03, p = .98). AAT-scores for control stimuli at T1 also did not differ significantly from 0, neither for alcohol (M = 2.42, SD = 100.75, t(44) = .16, p = .87), nor for cannabis (M = -.70, SD = 116.18, t(108) = -.06, p = .95). Hence, attentional bias was confirmed for both substances at pretest, but not approach bias.

A mixed ANOVA showed an effect of time for AAT-scores for substance stimuli (F(1, 117 = 3.29, p = .07) and for VPT-scores (F(1, 118) = 14.29, p < .001), but not for AAT-scores for control stimuli (F(1, 117) = .95, p = .33). Finally, the interaction of Time*Group was not significant in any of the analyses. Hence, attentional bias for substances changed over time, but did so for both the active- and sham-training groups. More details were obtained with paired samples T-tests (see Table 4).

Table 4.

Bias scores over time

Substance	Group	Task	T1	T5/6	Cohen's *d*
Alcohol	Active	AAT Substance	-4.37 (85.49)	-1.16 (102.15)	-.03
		AAT Control	-3.87 (101.64)	-18.71 (108.78)	0.11
		VPT	11.82 (26.48)	-5.66 (25.01)	.52*
	Sham	AAT Substance	14.87 (130.56)	41.60 (112.68)	-.25
		AAT Control	13.82 (106.13)	12.82 (100.26)	.01
		VPT	10.66 (38.14)	-8.69 (33.86)	.32
Cannabis	Active	AAT Substance	-11.08 (104.24)	8.54 (92.63)	-.13
		AAT Control	24.26 (107.50)	9.84 (85.01)	.11
		VPT	16.41 (28.60)	3.46 (25.39)	.31*
	Sham	AAT Substance	-5.41 (71.49)	33.68 (85.48)	.38*
		AAT Control	2.72 (105.20)	-15.14 (104.36)	.13
		VPT	8.99 (29.10))	-8.37 (38.82)	.37*

Note. Columns 'T1' and 'T5/6' list average response times in milliseconds; numbers between brackets = *SD*; AAT = Approach-Avoid Task; VPT = Visual Probe Task; *$p < .05$

The alcohol-active group showed a medium decrease in attentional bias ($t(21) = 2.42$, $p = .02$), but not the sham group ($t(15) = 1.29$, $p = .22$), confirming our hypothesis. Approach bias for the alcohol participants did not change significantly. The cannabis-active group showed a small decrease in attentional bias ($t(44) = 2.06$, $p = .04$, but the cannabis-sham group also showed a small decrease ($t(38) = 2.33$, $p = .02$. Furthermore, the cannabis-sham group showed a small increase in approach bias ($t(37) = -2.36$, $p = .02$), again counter expectations.

Training Effects PP:

Table 2 shows mean AUDIT and CUDIT-R scores at T0 and T9. Regression statistics predicting AUDIT scores at T9 for the alcohol participants and regression statistics predicting CUDIT-R scores at T9 for the cannabis participants can be found in Appendix F. For alcohol, again only the first model explained a proportion of the variance in AUDIT scores at T9, $R^2 = .36$, $F(6, 23) = 2.12$, $p = .09$, similar to the ITT data, but no significant individual predictors.

For cannabis, again neither model explained any variance. CUDIT-R scores at T0 predicted CUDIT-R scores at T9 (β = .26, $t(62) = 2.04$, p =.046, as did the number of sessions completed (β = -.30, $t(58) = -2.31$, p =.02). Contrary to expectations, no effects of CBM were found on either substance a year later, although cannabis users did show a reduction of use after training, irrespective of group.

Delinquent recidivism PP:

Table 3 shows mean ISRD scores at T9. Same as the ITT data, there was no significant effect of CBM-group for the alcohol participants ($F(3, 25) = .76$, $p = .52$), nor for the cannabis participants ($F(3, 67) = .30$, $p = .83$).

Moderation:

For the alcohol participants, Appendix G show the statistics for the base model, and the moderation analyses. For cannabis, Appendix H show the base model, and the moderations. For alcohol, the interaction with Brains4Use was significant for both the AAT-training group (β = .45, $t(21) = 2.19$, $p = .04$) and the VPT-training (β = .35, $t(21) = 1.90$, p = .07). Unexpectedly, participants who received Brains4Use during detention (N=4), showed higher alcohol use at T9 when they received active AAT-training (N=2) or VPT-training (N=1). The interactions are plotted in Appendix I. We also found a significant interaction for VPT-training with working memory (β = .45, $t(21) = 2.10$, $p = .048$), indicating that participants who received active VPT-training (N=16) drank more at T9 if they scored relatively poorly on working memory, whereas participants with a sham VPT (N=13) did not (Appendix I).

For cannabis we found a significant interaction between the approach bias for neutral stimuli and AAT-training (β = .29, $t(62) = 2.04$, $p = .046$). Participants who received active AAT-training (N=34) showed more cannabis use at T9, if they had a high approach bias for the neutral stimuli at T1, whereas participants with a sham AAT (N=36) showed less (Appendix I).

Discussion

This study examined the effectiveness of CBM as add-on to TAU in reducing alcohol and cannabis use in detained juveniles. We hypothesized that substance-focused biases would be present at pre-test, which was found for AtB for both substances, but not for ApB. We further hypothesized that these biases would be reduced after active training. This was partially confirmed; AtB decreased after active alcohol AtBM, but cannabis AtB decreased after both active and sham AtBM. As for the effectiveness of ApBM, contrary to our hypotheses, no training effects were found for either substance. Finally, while we found some potentially worrying interactions, the (very) low number of alcohol participants make these results unreliable, thus we cannot confidently identify any clinically-relevant subgroups.

While AtB for both substances were found at pretest, no ApB were found. It's possible that the relative complexity of the AAT's required response (view stimulus, note angle, recall rule regarding translation of angle into required key to press, press correct key) vs. the VPT (if the arrow points up, press up, if down, press down) could explain this. There is some evidence that irrelevant-feature tasks reduce reliability when measuring cognitive biases (Field et al., 2011). We nevertheless chose this format because the assessment-version of the task can be changed to the training-version without changing the instructions (Wiers et al., 2011). This allows the assessment-version and the training-version to be virtually identical barring the proportion of active stimuli approached vs. avoided, thus reducing the chances of participants realizing which condition they are in, when comparing their experiences with other participants (not unimaginable, considering they're detained together). At the time, research suggested that CBM worked best when participants were unaware of training contingencies (Grafton et al., 2014), although more recent studies suggest otherwise (Van Dessel et al., 2015, 2020). Note further that our tasks were operated via the keyboard, whilst for the AAT a joystick generally shows stronger effects (Kahveci et al., 2020). Finally, cannabis AtB decreased regardless of group. This was unexpected, but

recent literature shows that cognitive biases can be influenced by sham-training (Wiers et al., 2018). Participants in either group were exposed to equal numbers of cannabis-related stimuli but could not immediately respond with use-behavior. The decrease may be due to participants in both groups 'learning' to disregard cannabis stimuli to avoid the frustration of appetitive arousal when it cannot be sated.

The task paradigms used can now, at the time of publication, be regarded as somewhat outdated. Specifically, theses paradigms have shown efficacy as an add-on to abstinence-oriented treatment of alcohol use disorders (Eberl et al., 2013; Manning et al., 2022; Rinck et al., 2018; Salemink et al., 2022; Wiers et al., 2011) but not in online studies (Wiers et al., 2015), or in healthy volunteers (Lindgren et al., 2015; Van Dessel et al., 2019; Wiers et al., 2018, 2020). Recent studies have further investigated CBM's active mechanisms and the conditions under which effects are found (Grafton et al., 2014; Van Dessel et al., 2015, 2020). Our understanding of the processes involved has shifted from automatic action-evaluative associations to a recursive inferential model with an increased focus on client agency and salience (Van Dessel et al., 2019; Wiers et al., 2020). It is now clear that repeatedly disengaging from the substance is unlikely to effect behavioral adaptation unless the participant can meaningfully link disengagement with positive outcomes, e.g., achieving personal goals. Based on these new insights we would have tested a new variety of training (Wiers et al., 2020). However, at the time our task choices were reasonable and expected to be functional based on then-current scientific evidence.

The lack of clinical effects of CBM is disappointing, but again we can find an explanation in recent research. It's become increasingly clear that CBM has no effects as a stand-alone treatment but may increase the effectiveness of other therapy (Wiers et al., 2018). The large majority of our participants were not in treatment for substance use and for them CBM was a stand-alone treatment. Furthermore, the training targeted behavior that they might not experience as problematic. They may have had little reason to reduce their substance use, particularly at one-year follow-up when most were no longer detained (70%

of detained Dutch youth are released within three months). Without motivation to change behavior, no effects can be expected. Recent studies into CBM and addiction treatment argue that behavior is inherently goal-directed and highlight the importance of incorporating clients' goals in achieving positive outcomes (Wiers et al., 2020).

Some participants underwent substance use treatment, and the interaction between Brains4Use and active alcohol training was somewhat worrying. Youth enrolled in Brains4Use showed more alcohol use at follow-up when they received active-, rather than sham-training. As Brains4Use is focused on recognizing usage-inducive situations, it's possible that reducing attention to substance cues detracted from treatment. However, the number of youths in the alcohol training that received Brains4Use was very low (N=4), making it difficult to generalize these findings. Furthermore, no information was available regarding the substance(s) the youths were treated for. It is possible that none of the alcohol-trained youth received alcohol treatment. Therefore, no reliable conclusions can be drawn from these results, but large RCTs with alcohol-dependent patients have shown positive add-on effects (Eberl et al., 2013; Manning et al., 2016, 2020; Wiers et al., 2018).

We also found an interaction for the alcohol training between working memory and VPT-group. Youth with lower working memory showed higher alcohol use, which is in line with a moderating effect of working memory on use. Curiously, this effect was only present in the active VPT group, not in the sham group. Again though, the number of participants was low (N=29), so this finding may not be reliable.

For the cannabis training, only one significant interaction was found, related to the ApB for neutral stimuli. However, given the issues raised earlier regarding AAT data, this finding is unlikely to be relevant for clinical practice.

When this study started, CBM addiction studies had only been performed within clinical, abstinence-oriented treatment settings or in student volunteers. As youth detention centers in the Netherlands are treatment settings where abstinence is imposed, it seemed

reasonable to expect comparable effect-sizes. However, recent studies have shown that in non-abstaining volunteers, effects are much smaller, if existing at all (van Deursen, 2019; Wiers et al., 2015, 2018). In hindsight, our participants are much closer to non-abstaining volunteers than to clinical abstinence-oriented patients; our participants (presumably) don't have abstinence as a goal. They have not sought out treatment and do not have treatment motivations related to substances, as one might expect in clinical populations.

CBM effects are therefore likely to be small, if any. Our original power analysis was too optimistic as it was based on effects found in clinical samples. This likely means our actual power is lower than calculated, and our results should be evaluated accordingly. Any effects that have been found should also be considered critically due to the relatively low number of inclusions, and relatively low average usage levels. It should also be noted that, contrary to standard RCTs, the TAU in this study did not necessarily relate to substance use. Nevertheless, there are still several strengths to the current study. Our CBM reduced substance AtBs, suggesting that it could support behavioral change if the participant wants to change. It is the first RCT investigating CBM effectiveness for detained youth. The study included most Dutch JDCs, increasing generalizability, and examined effects after a relatively long follow-up period (a year). Finally, the study has been executed with great independence from the judicial system. This makes the self-report data more reliable, as participants could be shown that we had no connections with the police, or anyone involved in their case.

It's become increasingly clear that CBM is not a catch-all solution, which this study corroborates. Despite relatively heavy cannabis use in our population, CBM alone did not result in change. Future research could focus on CBM as auxiliary treatment, in detained participants who receive treatment for substance use issues next to their court-mandated treatment. Additionally, those developing CBM should incorporate current views on task-design into their studies, such as using feature-relevant tasks and participant-salient alternatives, rather than universally neutral cues, and highlight the consequences of use vs.

personally-relevant alternatives (Wiers et al., 2020). This new variety of cognitive training should preferably be tested in an integrated form with treatment for substance use.

Chapter 3:

Motivation in Detained Young Offenders: A Scoping Review

Hans S. van der Baan, Annematt L. Collot D'Escury-Koenigs, & Reinout W. Wiers

This chapter has been submitted for publication as:

Van der Baan, H. S., Collot D'Escury-Koenigs, A. L., & Wiers, R. W. (n.d.). Motivation in detained young offenders: A scoping review. *Submitted for publication*.

Abstract

Background: Motivation is considered essential for successful treatment, perhaps even more so when treatment is adjudicated. Yet young offenders in detention settings often show very little motivation. This scoping review aims to provide an overview of the current knowledge of motivation in detained young offenders.

Method: After a systematic search, 55 articles on detained youth were included.

Results: We found that, while detained youth are often assumed to be poorly motivated, they can in fact show good motivation provided they themselves experience the treatment offered as appropriate or necessary. We further found that their academic motivation was comparable to non-delinquent populations, but not affected by the same factors as in a regular school setting. We also found that motivation enhancing therapies provide mixed results and are rarely focused on improving motivation for delinquent desistance. Finally, we note several gaps in the literature.

Conclusions: Research often uses motivation as an umbrella term, whereas we recommend that separate motivational constructs should be concretized and further studied. Motivation should be encouraged by increasing the salience of the treatment and its outcomes for the youth, both during and post-detention.

Keywords: Motivation, Juveniles, Detention, Treatment, Adjudication

This article will outline the scientific use and understanding of “motivation” as it is applied in research on young (adolescent) offenders treated within forensic care facilities. Adolescence is a period of rapid psychosocial development where both positive and negative events can leave a lasting impact. Effective treatment for (mental) health issues have long-lasting results, making adolescents a compelling demographic for research and investment (Dahl et al., 2018). Motivation is considered to be a crucial component in mental health treatment (Drieschner et al., 2004; Gannon et al., 2011; Mathys, 2017; Ward & Gannon, 2006). However, what motivation exactly is, is often a complicated question as it is a distinctly heterogeneous construct applied across diverse domains (Drieschner et al., 2004; Vu et al., 2022). Furthermore, several exogenous factors will impact client motivation, such as the level of autonomy that is granted them within the treatment setting (Simoneau & Bergeron, 2003). Forensic care facilities are treatment settings where feelings of autonomy, as well as several other motivation-enhancing factors, are often jeopardized (Van Der Helm et al., 2013), making treatment vulnerable to motivation deficiencies.

Motivation is a driving force behind goal-directed behavior (Ryan & Deci, 2000b) and most treatment is goal-oriented; the client sets (behavioral) goals that they want to achieve. Models of behavioral change (e.g., the Transtheoretical Model; Prochaska & Velicer, 1997) and theories underlying prevalent treatment methods emphasize the need for client motivation to effect this change (Lou et al., 2018; Mathys, 2017). Its prominence is reflected in the scientific literature on many common mental issues, such as addictions (Contreras-Rodríguez et al., 2020; Gerdner & Holmberg, 2000; Kennedy & Gregoire, 2009), anxiety disorders (e.g., Marker & Norton, 2018; Richey et al., 2019), and eating disorders (Dray & Wade, 2012; Vitousek et al., 1998).

Whilst the word ‘motivation’ is ubiquitous in the literature, it typically refers to one of several related but distinct concepts. Traditionally, motivation was seen as being either intrinsic (i.e., motivated because the behavior engaged in is inherently interesting or enjoyable) or extrinsic (i.e., motivated by the expected outcome of engagement; Ryan &

Deci, 2000a). However, Self-Determination Theory posits that there are several types of motivation that exist on a continuum. For example, when an individual voluntarily engages in behavior that is meaningful to them, they are *autonomously* motivated, whereas their motivation is *controlled* when engagement is driven by external forces (Ryan & Deci, 2000b). While similar to intrinsic and extrinsic motivation, this model allows for more nuance, making several forms of intrinsic and extrinsic motivation possible depending on where they fall between autonomous and controlled. This means that when motivation is extrinsic (as it mostly is in detention settings), young offenders could still be motivated if the institution could instill a sense of autonomy in the treatment process, or provide more salience for the treatment.

In therapy-related literature the issue of motivation is further confounded by the fact that we are often interested in clients' motivation for two distinct but interwoven behaviors, namely their motivation for engaging in the treatment process, and their motivation for changing the behavior or cognitions that the treatment targets. In this context, motivation is most commonly conceptualized by means of the Transtheoretical Model (TTM; Prochaska & Velicer, 1997) of behavior change. Motivation, in this model, is both a starting factor (i.e., initial motivation) and a continuous factor within the treatment, where greater motivation (or treatment readiness, or readiness for change) is equated with progression through several stages of change. Programs designed to enhance client motivation during therapy often follow a similar stage-structure (e.g., Motivational Interviewing; Miller & Rollnick, 2002). In this context, the categorization of motivation (e.g., intrinsic vs extrinsic) is often only relevant in so far as it effects the process over time.

That's not to say that motivational quality is not relevant for therapy considerations. For example, research has shown that intrinsic motivation levels pretreatment predicted the outcome of treatment for eating disorders (Clausen et al., 2013). This still holds true in treatment environments where motivation is often considered almost entirely controlled, or extrinsic, i.e., prison environments. Contrary to what one might expect, pretrial detainees

show reasonable levels of treatment motivation, even though they are not yet adjudicated (Weinrath et al., 2019). That said, during treatment it is important to maintain motivation. Factors that boost autonomous or intrinsic motivation, such as the therapeutic relationship, lead to the best results (Gideon, 2010; Sainsbury et al., 2004).

Motivation is similarly prevalent in the literature focused on adolescent therapy (e.g., S. J. Becker et al., 2016; Cornelius et al., 2011), preventive interventions (e.g., Paulsamy et al., 2021), and school functioning (Vu et al., 2022). Like adults, adolescents are motivated to engage behaviorally or cognitively based on the perceived relevance, or "motivational salience" of the program (Crone & Dahl, 2012). Adolescents seeking treatment will set goals that they are motivated to achieve (Fuligni, 2019). Research has shown that the specifics of motivational processes differ between adolescents and adults, such as determinants of motivational salience (Ernst et al., 2011) and development of motivation-related neurocircuitry (Bjork et al., 2010). It is therefore important to examine the specifics of motivation in treatment contexts during adolescence (Dahl et al., 2018).

In residential treatment of young offenders, motivation is assumed to be essential for success (Mathys, 2017). Successful treatment, in this context, is often defined as desistance from delinquent behavior post-release and as such represents a concrete change in the youth's behavior and attitudes towards delinquency. Forensic clinicians as well as court officials name motivation as one of the primary factors that they consider when making important decisions, such as treatment planning (Hillege et al., 2018) and whether the youth should even be placed in a detention setting (Degue et al., 2008; ter Beek et al., 2018). However, low motivation is considered endemic in this population (e.g., Armelius & Andreassen, 2007). This could be explained by the fact that court-mandated treatment is not oriented towards client-set goals; the goal of the treatment, desistance of delinquent behavior, is determined extrinsically. This treatment's motivational salience for the youths is therefore likely to be low initially.

Given that the effectiveness of involuntary treatment has been called into question (Hachtel et al., 2019; Parhar et al., 2008; Snyder & Anderson, 2009), and that juvenile detention centers are likely sub-optimal environments for the treatment of antisocial behavior in juveniles (Dishion & Tipsord, 2011), the ability to enhance motivation for behavioral change is perhaps even more relevant than it is in regular treatment settings. Clarity on what we know about motivation for treatment in detained young offenders is therefore important. That being said, clarity is hard to find where motivation is concerned. In addition to the various types of motivation outlined above, studies tend to vary substantially in terms of their operationalization and measurement methodology (Dray & Wade, 2012; Drieschner et al., 2004). This makes it infeasible for a review to adhere to a homogeneous definition of the term 'motivation', or systematically analyze it, unless you specify a sub-element of the concept and focus on that exclusively, e.g., only write about treatment motivation. This would cause problems, however, as not only would large areas of motivation-related information be missed, it would also eliminate articles in which the authors were perhaps less exact in their formulations of motivation as they applied it. As a consequence, we decided to spread a wider net and examine the various ways in which 'motivation' is used in the literature on treatment with detained youth and outlines the findings on the subject.

This systematic scoping review attempts to provide a clear picture of the current state of knowledge regarding motivation in the forensic residential treatment of young offenders. Based on the articles found, we identify four categories of studies: research on motivation's role in the treatment process; research on motivation's effect on treatment outcomes; research that examines academic motivation within the context of a forensic residential treatment center; and research that evaluates explicit motivational training to enhance motivation. We discuss each of these subgroups. with the overall aim to aid clinicians and researchers in their understanding of motivation in this context and try to identify gaps in the collective knowledge where we can improve and enhance this important treatment element.

Methods

This review is a scoping review, as we outline and summarize the information found in the literature rather than analyze a homogeneous construct. However, it is also systematic in that we have applied a systematic literature search to collect literature on motivation in detained young offenders. In the execution of this search, as well as the rest of the reviewing process, the authors have adhered to PRISMA guidelines where applicable. Articles were collected from PsychInfo, Web of Science Core Collection, SocINDEX, and Scopus electronic databases, from inception, up to August 28th, 2023. Applied search terms consisted of various synonyms of motivation, detention, youth, and treatment, compiled into systematic search commands composed for each individual database. The full search strategy is presented in Appendix J.

After duplicate elimination, titles and abstracts were screened. Inclusion criteria were: 1) published in 1996 or later in a peer-reviewed journal, 2) the paper discusses juveniles, and 3) the juveniles discussed in the paper were adjudicated to a residential forensic treatment setting. Exclusion criteria were a) papers on the development or validation of motivation-related instruments, b) papers examining offenders' motivation for offending prior to detention, and c) populations on parole or involved in non-residential diversionary programs (e.g., Teen Court). Posters and research protocols were not included, but follow-up searches were done based on the primary author's name and/or project title to find any related published papers. If the above-mentioned criteria could not conclusively be determined from abstract screening (e.g., no explicit mention of the age of the population), articles were retained for the full-text assessment phase. Abstract screening was done by the lead author, while a Master student independently screened 10% of the identified articles for control. There was agreement on 96% of the dual-screened abstracts. The disputed 4% were subsequently agreed upon after in-person discussion.

The retained articles were assessed full-text, confirming (or ruling-out) the in- and exclusion criteria mentioned above, as well as a fourth inclusion criterion that could not be

reliably assessed by only screening the abstracts: 4) the paper makes some mention of motivation, treatment readiness, readiness for change or a similar term. Articles that were not in either English or Dutch were translated with DeepL Translator (DeepL SE, n.d.; n=3). If a full-text copy could not be obtained, articles were excluded (n=3). If the inclusion criteria could not be conclusively determined from the text (e.g., the article speaks only of 'prisoners' without specifying adults or youth), articles were also excluded. A flowchart detailing our selection process is presented in Figure 1. Summaries of the selected articles are presented in Table 1.

Figure 1. Article selection

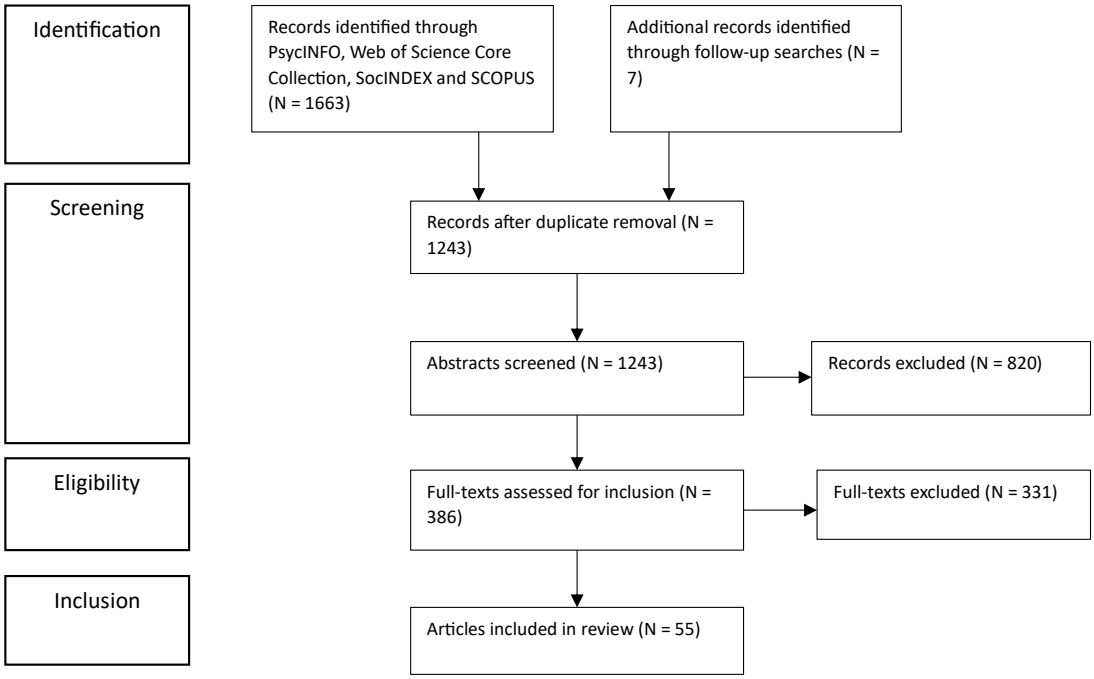


Table 1. Summaries of selected papers

Authors	Operationalization	Study design	Sample	Motivation Assessment	Motivation in paper
Motivation in the Treatment Process					
Bisback et al., 2022	Treatment engagement	Cross-Sectional Network Analysis	Ages 16-17 (n=261, mAge=16.9, 100% male)	A Dutch language treatment engagement instrument (O. Colins et al., 2012)	Motivation is part of the Expectancy dimension of Treatment Engagement
Carl et al., 2020	Initial treatment motivation and Treatment engagement	Longitudinal through retrospective institution file assessment	Ages 15-21 (n=161, mAge=18.8, 100% male)	Coded qualitative clinicians' assessments from institutional files	Initial treatment motivation is a predictor of both treatment engagement and treatment attrition. Treatment engagement is itself also a predictor for attrition.
Clinkinbeard & Murray, 2012	Social Cognitive Theory of Motivation(Dweck & Leggett, 1988)	Cross-sectional	Ages 12-20 (n=409, mAge=16.5, 71.4% male)	-	Positive strategies linked to interpersonal interactions, conforming to Motivational Theory
Clinkinbeard & Zohra, 2012	Motivational Capital (a collection of social and cognitive resources which […] provide momentum for behavior)	Cross-sectional	Ages 12-22 (n=543, mAge=16.49, 71% male)	-	Developing concrete and plausible post-detention strategies could enhance motivational capital
Colins et al., 2017	Treatment engagement	Cross-sectional	Ages 13-17 (n=75, mAge=16.22, 100% female)	A 22-items questionnaire developed in an earlier project	Dimensions of psychopathy predicted treatment engagement
Collier et al., 2001	Treatment motivation is conceptualized as the self-reported extend of "drug use resistance", "treatment engagement", and "rapport with staff"	Longitudinal	Ages 14-18 (n=48, 100% male), substance users	Non-standardized survey from the Cognitive Enhancements for Treatment of Probationers Project (no reference given)	Node-link mapping enhanced sessions lead to greater treatment motivation
DiPierro-Sutton et al., 2021	Problem recognition and Treatment readiness as related but distinct factors of treatment motivation	Cross-sectional	Ages 11-17 (n=111, mAge=15.25, 71.2% male)	Motivation for Youth's Treatment Scale (Breda & Riemer, 2012)	Internalizing symptoms linked to Problem recognition, but not to Treatment readiness
Duindam et al., 2021	Therapeutic functions, consisting of Treatment motivation and Therapeutic Alliance as factors	Longitudinal	Ages 12-25 (n=138, mAge=18.4, 83.3% male)	The Adolescent Treatment Motivation Questionnaire (van der Helm et al., 2013)	Dog Training Program had no effect on Treatment motivation
Harder et al., 2012	TTM (Prochaska & Velicer, 1997)	Longitudinal	Two response groups; Group 1: Ages 13-20 (n=22,	The Motivation for Treatment questionnaire (van Binsbergen, 2003)	High motivation is beneficial for treatment outcomes but

			mAge=16.2, 68.2% male) Group 2: Ages 12-20 (n=51, mAge=16, 64.7% male)		likely to deteriorate during detention
Hillege et al., 2018	-	Qualitative	Clinicians (n=34, 38% male)	Motivation is a domain that emerged from their research	Motivation encapsulates Attitude toward treatment, Request for help, Treatment motivation and Peer influence
Leenarts et al., 2013	Treatment motivation (C. C. DiClemente et al., 2004)	Cross-sectional	Ages 13-18 (n=154, mAge=16, 100% female)	The Nijmegen Motivational List 2 (Keijsers et al., 1999)	Past emotional abuse contributes to higher treatment motivation
LeGrand & Martin, 2002	Quality of Motivation Theory	Cross-sectional	Ages 9-17 (n=100, mAge=13.5, 100% male), sex offenders	The Quality of Motivation Questionnaire (Martin, 1989)	Quality of Motivation in juvenile sex offenders differs from general population norms
Patel et al., 2008	TTM (Prochaska & Velicer, 1997)	-	-	-	Suggests motivational counseling might be effective with juvenile sex offenders
Pniewski et al., 2019	Combines motivation for change and treatment motivation	Longitudinal	Ages 15-27 (n=15, mAge=19.2,	Therapy Evaluation and Quality Assurance Scales (Scheuffgen et al., 2016)	Motivation does not change during regular treatment
Rodriguez et al., 2018	Readiness for change	Cross-sectional & Qualitative	Ages 15-19 (n=22, mAge=16.9, 100% male)	Readiness for Change Scale (Englebrecht et al., 2008)	Motivation related to relationship with staff, not youth-centric factors
Roest et al., 2016	Treatment Motivation	Longitudinal	(n=174, mAge=16.1, 73% male)	Adolescent Treatment Motivation Questionnaire (van der Helm et al., 2013)	Therapeutic alliance is unrelated to motivation
Serie et al., 2023	Treatment Motivation	Qualitative	Ages 14-18 (n=20, mAge=16.50, 100% male)	Semi-structured interviews	Young offenders reported several factors that would enhance their treatment motivation
Simpson et al., 2013	Therapeutic Alliance	Cross-sectional	Ages 15-18 (n=58, mAge=16.81, 100% male)	The Working Alliance Inventory (Horvath & Greenberg, 1989)	Youth high on CU traits score high on both therapeutic alliance and violent incidents
van Damme et al., 2015	Motivation to change as a dimension of Treatment engagement	Longitudinal	Ages 14-17 (n=108, mAge=16.2, 100% female)	A Dutch language treatment engagement instrument (O. Colins et al., 2012)	Both internalizing and externalizing symptoms affect treatment engagement

van der Helm et al., 2009	Treatment motivation	Cross-sectional & Qualitative	(n=49, mAge=16.5, 78% male)	The Readiness for Change Questionnaire (van Binsbergen, 2003)	The role of group climate in treatment motivation
van der Helm et al., 2014	Treatment motivation	Cross-sectional	Ages 12-20 (n=59, mAge=16.1, 43% male)	The Readiness for Change Questionnaire (van Binsbergen, 2003)	The role of group climate in treatment motivation
van der Helm et al., 2018	Self-Determination Theory (Ryan & Deci, 2000b)	Longitudinal	Ages 12-20 (n=179, mAge=16.2, 66% male)	Adolescent Treatment Motivation Questionnaire (van der Helm et al., 2013)	The role of group climate in treatment motivation
van der Laan & Eichelsheim, 2013	-	Cross-sectional & Qualitative	Ages 13+ (n=207, 87% male)	-	Suggest that factors surrounding prison adjustment can be useful in increasing motivation
Motivation and Treatment Outcomes					
Abrahams & Van Dooren, 2018	-	RCT	Ages 14-18 (n=6, 50% male) diagnosed with ADHD, ADD, ODD and/or CD	-	Motivation incorporated in research question but not quantified or addressed in results. Conclusions based on observation and feedback post-study.
de Ruigh et al., 2019	TTM (Prochaska & Velicer, 1997)	Longitudinal	Ages 14-24 (n=186, mAge=18.58, 100% male)	The Adolescent Treatment Motivation Questionnaire (van der Helm et al., 2013)	Treatment motivation did not predict quality of life post-detention
Fox et al., 2008	Goal attainment	Longitudinal	Ages 12-19 (n=190, predominantly male)	The Goal Attainment Scale (Shefler et al., 2001)	Variety in treatment options through telemedicine led to greater goal setting and attainment
Grimley et al., 2000	Motivation for change; TTM (Prochaska & Velicer, 1997)	Cross-sectional	Ages 14-19 (n=203, mAge=16.24, 79% male)	5 separate 4- or 5-item staging algorithms	The authors interpret progress through the TTM's stages of change as increased motivation.
Robertson et al., 2006	the Information-Motivation-Behavioral Skills model (J. D. Fisher & Fisher, 1992)	Cross-sectional	Ages 13-18 (n=523, mAge=15.3, 62.7% male)	16 items for Condom Attitudes, drawn from various instruments	Motivation for specific behavior strongly correlates with that behavior, but extrinsic factors may mediate
Salekin et al., 2010	Motivation to change	Cross-sectional	Ages 11-18 (n=140, mAge=15.3, 66% male)	The Risk–Sophistication–Treatment Inventory (Salekin, 2004)	Motivation to change as a protective factor against delinquent recidivism

Shannon & Abrams, 2007	-	Qualitative	Ages 15-17 (n=7, mAge=16.3, 100% male), fathers	Qualitative	Fatherhood as a motivator for desistance from delinquency
Academic Motivation					
Bewley, 1999	ARCS Instructional Design (Keller, 1987) model of motivation	Cross-sectional	Ages 12-17 (n=23, 74% male)	Non-standardized survey based on the ARCS Instructional Design	Assessment shows good motivation for multimedia teaching tools
Harder et al., 2014	Teacher rating of motivation	Longitudinal	Ages 12-20 (n=53, mAge=16.3, 69.8% male)	Teacher Report Form (Dutch; Verhulst et al., 1997)	Intelligence and academic achievement linked to academic motivation
McCray et al., 2018	None	Qualitative	A selection of 16 participants from a larger pool, drawn from institutions housing youth ages 13-19, as well as 28 staff members from same	Qualitative	Discusses both motivation for participating in the program, as motivation for academia in general, without clearly differentiating
Motivational Enhancement Training (MET)					
Andretta & Oliveira, 2011	TTM (Prochaska & Velicer, 1997)	Longitudinal clinical trial without control.	Ages 13-20 (n=50, mAge=16.33, 88.90% male), substance users	University of Rhode Island Change Assessment (McConnaughy et al., 1983)	The authors interpret progress through the TTM's stages of change as increased motivation. They also assume low motivation for adolescents.
Bryan et al., 2009	FRAMES (W. R. Miller & Sanchez, 1994)	RCT	Adolescents (n=484, mAge=15.8, 82.7% male)	-	Application of MET to reduce risky sexual behavior
Bryan et al., 2018	FRAMES (W. R. Miller & Sanchez, 1994)	RCT	Ages 14-18 (n=460, mAge=15.8, 75.4% male)	-	Application of MET along with substance use-related information to reduce risky sexual behavior
Clair et al., 2013	Motivational Interviewing (MI; Miller & Rollnick, 2002)	RCT	Ages 14-19 (n=181, mAge=17.12, 85.7% male), substance users	-	Motivational Interviewing effective in reducing substance use across various ethnicities
Clair-Michaud et al., 2016	Motivational Interviewing (W. R. Miller & Rollnick, 2002)	RCT	Ages 14-19 (n=181, mAge=17.12, 85.7% male), substance users	-	Effect of Motivational Interviewing on delinquent behavior moderated by depressive symptoms

Goldman et al., 2022	Motivational Interviewing (W. R. Miller & Rollnick, 2002)	Implementation of a vaccination program	Ages 10-21 (n=108)	-	MI used in protocol to encourage COVID-vaccinations
Leonardi et al., 2017	None	Qualitative	Ages 16-21 (n=66, 100% male)	Qualitative	Program improved motivation, but unclear if it was motivation for the program, treatment in general, prosocial behavior or all of the above
Offermans et al., 2020	Treatment motivation	Longitudinal	Ages 18-24 (n=6, 83% male)	2 items from The Motivation for Treatment Questionnaire (van Binsbergen, 2003)	Participation in a dog training program did not improve treatment motivation
Rijo et al., 2022	Compassionate motivation (Gilbert, 2017)	RCT	Ages 14-18 (n=119, mAge=15.8, 100% male)	Various instruments measuring Shame, Fears of Compassion, Social Safeness, Self-Compassion, and Compassion for Others	Enhancing compassionate motivation to promote pro-social attitudes
Rosengard et al., 2007	Motivational Interviewing (W. R. Miller & Rollnick, 2002)	RCT	(n=114, mAge=17.07, 89.5% male)	-	MET reduced unsafe sex in conjunction with cannabis, but not in conjunction with alcohol. MET was primarily substance-use oriented.
Salekin et al., 2012	Uses motivation for change and treatment motivation seemingly interchangeably	Longitudinal clinical trial without control & Qualitative	(n=24, mAge=14.7, 100% male)	The Risk–Sophistication–Treatment Inventory – Self Report (Ang et al., 2018)	Applied an intervention with motivational components to improve treatment motivation
Schmiege et al., 2009	FRAMES (W. R. Miller & Sanchez, 1994)	RCT	Ages 14-17 (n=484, mAge=15.8, 82.7% male)	-	Treatment + MET affects mediators of behavior compared to only treatment, but not behavior itself
Schmiege et al., 2021	Motivational Interviewing (W. R. Miller & Rollnick, 2002)	RCT	Ages 14-18 (n=460, mAge=15.9, 73.4% male)	-	MET leads to improved behavioral oucomes compared to non-MET historical control
Slavet et al., 2005	Motivational Interviewing (W. R. Miller & Rollnick, 2002)	Longitudinal	Ages 15-19 (n=10, mAge=16.9, 70% male)	Contemplation Ladder (Biener & Abrams, 1991). In this study it was about “drugs”.	MET did not improve motivation to stop using drugs

Sroka et al., 2017	Motivational Account (Inzlicht & Schmeichel, 2012)	Longitudinal	Ages 17-23 (n=57, mAge=19.6, 100% male)	-	MET and Mindfulness both effective in improving self-control compared to a control group.
Stein et al., 2006a	Motivational Interviewing (W. R. Miller & Rollnick, 2002)	Longitudinal	Ages 14-19 (n=130, mAge=17.2, 90% male), cannabis users	-	Participants report more positively on MI than Relaxation Therapy (RT)
Stein et al., 2006b	Motivational Interviewing (W. R. Miller & Rollnick, 2002)	Longitudinal	Ages 14-19 (n=105, mAge=17.1, 89.5% male), alcohol or cannabis users	-	MI reduced drinking and driving, but only at low levels of depression. No effect on driving with cannabis
Stein, Clair, et al., 2011	Motivational Interviewing (W. R. Miller & Rollnick, 2002)	Longitudinal	Ages 14-19 (n=189, mAge=17.1, 85.7% male), alcohol or cannabis users	-	MI reduced cannabis-related problems more than RT
Stein, Lebeau, et al., 2011	Motivational Interviewing (W. R. Miller & Rollnick, 2002)	Longitudinal	Ages 14-19 (n=162, mAge=17.1, 84% male), alcohol or cannabis users	-	MI reduced substance use more than RT
Stein et al., 2020	Motivational Interviewing (W. R. Miller & Rollnick, 2002)	Longitudinal	Ages 14-19 (n=199, mAge=17.1, 80% male), alcohol or cannabis users	-	MI slightly better than RT at reducing aggression in alcohol users, but RT more effective in reducing alcohol use
Tennity & Grassetti, 2022	Motivational Interviewing (W. R. Miller & Rollnick, 2002)	Longitudinal	Ages 12-28 (n=21, mAge=15.3, 83.7% male)	The University of Rhode Island Change Assessment (C. C. DiClemente et al., 2004)	Evaluation of a novel MI-based program.
Watson et al., 2003	Motivational Interviewing (W. R. Miller & Rollnick, 2002) / Readiness for change	-	-	-	Outlines a treatment program for detained adolescent substance users, incorporating MI elements

Results

1. Motivation in the Treatment Process:

Synthesizing research on motivation into one coherent picture is made challenging by, amongst others, the heterogeneity in constructs and samples studied. For example, LeGrand & Martin (2001), and Patel and colleagues (2008), both examined motivation and potential treatment challenges in young sex offenders, but they did so from two different operationalizations of motivation. LeGrand & Martin applied the Quality of Motivation Theory (QMT) to identify offender characteristics related to treatment, while Patel et al., applied the TTM to illustrate a methodology for motivational counseling as a treatment modality. Both papers offer a framework to aid clinicians in improving treatment of juvenile sex offenders: LeGrand & Martin use a standardized assessment to identify targetable motivational areas (as per QMT), while Patel et al., argue for the addition of motivational counseling to treatment. In contrast, Clinkinbeard and colleagues focus on motivation post-detention (Clinkinbeard & Murray, 2012; Clinkinbeard & Zohra, 2012). Specifically, they applied the concept of Motivational Capital, conceptualized as strategies to achieve a desired "self" post-detention, to a heterogeneous group of offenders. They found that, while most youth could speculate on possible selves post-detention, Motivational Capital to achieve the desired selves was often lacking and staff-related factors that contributed to the development of Motivational Capital were different for male and female juveniles. These three example papers illustrate how the treatment centers can take motivation into account, but they also provide three distinctly different operationalizations of "motivation". It should also be noted that they do not examine change in motivation, although Patel et al., do provide a case study illustrating their use of motivational counseling in treatment to effect change.

Studies that have examined motivation longitudinally found that motivation significantly impacts the treatment process and typically does not improve over time. Carl and colleagues (2020) found that initial treatment motivation was a significant predictor of treatment engagement and attrition, with high motivation acting as a buffer against attrition-bolstering

factors. Van Damme and colleagues, (2015) and Pniewski and colleagues (2019) both found that treatment motivation and satisfaction did not improve over the course of regular treatment. Pniewski and colleagues also found that participant self-report, and staff report, could differ quite significantly, with participants being far more optimistic about their own capabilities, possibly indicating a reduced perceived need for treatment. Harder and colleagues (2012) found some positive effects of high treatment motivation at admission but noted that higher motivation was also more likely to deteriorate during detention. Roest and colleagues (2016) found a similar deterioration for therapeutic alliance, but also found that therapeutic alliance was not related to motivation for youth in compulsory residential care. Detained young offenders themselves indicate that, while therapeutic alliance is important to them, other factors such as autonomy and personal relevance are at least equally important (Serie et al., 2023). That said, there is the question of sincerity, as seen in, e.g., Simpson and colleagues (2013). They found that youth high in Callous-Unemotional (CU) traits, and their therapists, reported higher quality therapeutic alliance, while also having more violent institutional infarctions during treatment. This is contradictory and the authors suggest that the reported therapeutic alliance quality may be superficial and an attempt at manipulation. CU traits are a notable dimension of psychopathy, and Colins and colleagues (2017) found that indeed, psychopathy dimensions were predictive of treatment engagement. On the other hand, Bisback and colleagues (2022) found that it was not the dimensions as a whole, but specific subscales of said dimensions that were most predictive. Do note, however, that these two studies differed both in populations (girls vs boys) and instrument used to quantify psychopathy. It is therefore unclear whether these results are due to group or operationalization differences.

Other studies have found significant group differences within the young offender population related to motivation of treatment. Leenarts and colleagues (2013) found that age and ethnicity were significant predictors of treatment motivation in detained girls. They also found that participants with more experiences with emotional abuse experienced higher

levels of distress but were also more (motivationally) prepared to engage in treatment. Van Damme and colleagues (2015) similarly found that internalizing symptoms were positively related to treatment motivation in girls, while DiPierro-Sutton and colleagues (2021) found that, while anxiety and depressive symptoms predicted greater problem recognition, they did not predict greater treatment readiness. This would corroborate the notion that detained youth are motivated for treatment, provided it's for an issue they experience as problematic.

Researchers have identified several factors related to the treatment centers and particularly the staff that impact motivation. Van der Laan & Eichelsheim (2013) found that positive adjustment to the prison environment seems more related to institution- and staff-related factors, than youth's individual characteristics. Rodriguez and colleagues (2018) found that a positive bond with the institution's staff was a significant predictor for readiness for change, whereas attribution of responsibility (i.e., whether the participant felt themselves responsible for their behavior) was not. In fact, Bisback and colleagues (2022) found that Motivation and Readiness for Change (the Expectancy dimension of treatment engagement) were less important than Collaboration on Goals and Tasks (the Clarity dimension). This would suggest that the relationship between youth and therapist is leading in the youth's treatment engagement. A similar environmental impact was shown by van der Helm and colleagues, with a supportive group climate promoting treatment motivation (van der Helm et al., 2009, 2014, 2018).

Motivation plays a significant role in the treatment process. The studies outlined above paint a picture of a dynamic construct that is enhanced or decreased by the therapeutic environment the young offenders find themselves in. It appears to be something that can be shaped, and forensic care institutions need to be mindful of it, and work on it, throughout the treatment process. Even if motivation is high going in, it will not stay that way unless encouraged.

2. Motivation and Treatment Outcomes:

A number of studies have examined the effect of motivation on the (often) primary treatment outcome of forensic care, i.e., disengagement from delinquency post-release. Salekin and colleagues (2010) found that motivation to change, measured with structured interviews, was a protective factor against delinquent recidivism in youth with high psychopathy scores. In contrast, De Ruigh and colleagues (2019) found that treatment motivation in detained youth was not related to quality-of-life post-detention. Finally, Shannon & Abrams (2006) found that becoming a father was a significant motivator for delinquent desistance.

Besides delinquency, motivation also plays a role in interventions targeting other risky behaviors. Robertson and colleagues (2006) examined predictors of condom use in detained youth. Working from the Information-Motivation-Behavioral Skills model (J. D. Fisher & Fisher, 1992), they found a relatively strong relation between motivation (measured as positive attitudes towards condom use) and condom self-efficacy, which in turn predicted condom use (prior to detention). However, they also noted the difficulties in conceptualizing 'motivation', as well as noting that despite indicators of higher motivation, female participants reported lower condom use. They attribute this discrepancy to contextual factors limiting girls' abilities to act on their motivation. Grimley and colleagues (2000) examined several substance-use risk behaviors alongside condom use. Applying the TTM, they found that their participants showed almost no readiness for change with regards to risk behaviors other than condom use with incidental partners. These results suggest that motivation can impact risky behavior in detained youth, and that they can show good motivation. However, motivation to change is low for behavior that is (likely) experienced as positive or beneficial (e.g., substance use), and contextual factors may limit the extent to which behavior can be put into practice, regardless of motivation.

There is also evidence that the format in which the treatment is presented to the youth is relevant. Fox and colleagues (2008) found that providing remote access to more specialist

treatment options (both for psychiatric and non-psychiatric medical treatment) via videoconferencing led to an increase in goal setting and attainment compared to the years prior. Similarly, Abrahams & van Dooren (2018) reported high motivation for music-based attentional control training, although this was derived from qualitative feedback that they obtained from participants after the training.

The studies outlined above, although varying in their definitions, theoretical perspectives and operationalizations of motivation, do suggest certain trends. It appears that detained youth are not necessarily low on treatment motivation. They can be motivated when they see the relevance; in other words when the problem they are treated for is one that they themselves experience as problematic. Additionally, they seem sensitive to treatment context and form of treatment. In contrast, when an adolescent is detained and treated for behavior they like, but that society wants them to stop, their motivation will be low. If they can see that issues are addressed that bother them too, and in a format that is tailored to their needs, their motivation will increase.

3. Academic Motivation:

Since detained youth are (by and large) still teenagers, school and education are part of their daily schedule. Harder and colleagues (2014) found that academic motivation predicted better academic performance, whereas low IQ and externalizing problems were associated with lower academic motivation. Perhaps surprisingly, they also found that teacher-related factors (e.g., student-teacher bond) were not related to academic performance, while this has often been reported in regular (i.e., non-detention) academic contexts (e.g., Banerjee & Halder, 2021; Stroet et al., 2013; Zee & Koomen, 2016). Similarly, McCray and colleagues (2018) found that adolescent motivation for engaging in a literacy intervention program was associated with individual characteristics rather than with program-specific characteristics. Interestingly, they also touched upon the impact of negative teacher and peer attitudes, giving several examples where these negatively impacted motivation for those around them. Finally, Bewley (1999) found that the use of multimedia and hypermedia teaching tools

improved motivation, compared to more classical teaching methods. Taken together, these studies suggest that negative teacher, peer and school environment related factors have a significant impact on academic motivation in detained youth, while positive factors, such as the student-teacher bond, do not provide as strong a buffer as they do in regular educational settings.

4. Explicit Motivation Training:

Slavet and colleagues (2005) implemented a pilot study of the Family Check-Up (FCU), an assessment and feedback intervention based on Motivational Interviewing (MI; Miller & Rollnick, 2002). MI is one of the most frequently applied motivational interventions with detained youth (Brauers et al., 2016). While the FCU is primarily designed to support appropriate parenting, Slavet and colleagues applied it within the context of detained adolescents' substance use. They found that, while adolescents reported more confidence in resisting drug use and their parents reported more confidence in impacting their adolescent's risky behavior and high treatment satisfaction, adolescents were not more motivated to change their substance use behavior. Salekin and colleagues (2012), on the other hand, applied an intervention with an explicit motivational component to treat conduct disorder in detained youth with callous-unemotional traits. They found a significant improvement in self-reported treatment motivation. Similarly, Bryan and colleagues (2018) administered a sexual risk-reduction intervention based on the principles of motivational enhancement therapy and found a significant decrease in sexual risk-taking. Finally, Andretta and Oliveira (2008) found that an MI intervention aimed at substance use increased abstinence as well as motivation to change (based on TTM principles). However, none of these studies included a control group without a motivational intervention, making the specific effects of the interventions unclear.

There have, however, been several studies into motivation enhancement that did include control groups. Clair and colleagues (Clair et al., 2011, 2013; Clair-Michaud et al., 2016) found that MI aimed at substance use improved motivation to change and reduced

substance use behavior and alcohol related aggression after detention. Schmiege and colleagues (2021) ran a similar study to that of Bryan and colleagues mentioned above, comparing outcomes to those of a historical control group. They found that the motivational enhancement intervention resulted in greater reductions in sexual risk-taking behavior. Finally, Stein and colleagues (Stein, Clair, et al., 2011; Stein, Colby, et al., 2006a; Stein, Lebeau, et al., 2011) compared MI with relaxation training in reducing substance-related behavior. They found that MI showed greater reductions in substance-related behavior, particularly cannabis use, as well as evidence suggesting that this effect might be moderated by depressive symptoms, with the effects being reduced at higher levels of depressive symptoms.

Most of the above-mentioned studies have applied MI principles in attempting to increase motivation. It is viewed as more positive than other treatments by participants and negates the effect of negative treatment engagement (Stein et al., 2006a). Rather than being a stand-alone treatment, it is often recommended as an addition to existing treatment options (e.g., Goldman et al., 2022; Watson et al., 2003). However, it should be mentioned that there are also several studies that implemented MI in detained youth populations without finding significant improvements in behavioral outcome variables (Bryan et al., 2009; Rosengard et al., 2007; Schmiege et al., 2009; Stein et al., 2006b; 2020). What's interesting to note is that the studies that did report positive behavioral results after MI, and those that did not, have many authors in common. This makes it less likely that conflicting results are due to differences in expertise, interests, or study context.

There are a few other programs aimed at improving motivation that did not employ MI principles. Sroka and colleagues (2017) compared mindfulness with the motivational effects of group identification. They found that both approaches led to improvements in self-control. Rijo and colleagues (2022) applied a program enhancing compassionate motivation to reduce psychopathy traits. They found that compassionate motivation increased after controlling for baseline psychopathy traits. Collier and colleagues (2001) showed that

enhancement modules (in this case, node-link mapping, an exercise that visually represents the client's thoughts, actions and feelings and their interrelations as a network; Dansereau et al., 1993) designed to improve existing substance use treatments can improve treatment motivation. Participants were more motivated to engage with the treatment, and to build rapport with the staff. Finally, dog training programs in prison aim to improve pro-social motivation in youth through caring contact with animals. Leonardi and colleagues (2017) examined the experiences of detained youth with a dog training program. Using semi-structured interviews, the youth reported improvements in their motivation, which they attributed to the dog training program. However, Offermans and colleagues (2020), using objective measurements, found no convincing effects of dog training programs. More alarmingly, Duindam and colleagues (2021) reported not just a lack of effects, but an active decrease in the quality of the therapeutic alliance (an iatrogenic effect, see Dishion et al., 1999). Another iatrogenic effect of motivational enhancement was reported by Tennity and Grassetti (2022). They found that motivation for substance use treatment increased in youth with high levels of substance use, but decreased for youth with low levels of use.

The studies examining active motivational enhancement training provide too many conflicting results to draw a straightforward conclusion. MI appears as a promising technique in the context of juvenile detention, showing the most concrete behavioral effects. However, we should note that this may (partly) be due to it being the most studied form of motivational training (by some margin). Furthermore, there are several MI studies that did not show behavioral effects. This suggests that, while it can be effective, successful MI implementation is challenging, and motivational enhancement training can be harmful to motivation if the youth does not see the need for treatment in the first place.

Discussion

Motivation is considered a key factor in the indication, treatment and evaluation of detained youth. The general assumption is that motivation for treatment is low, and higher levels of motivation will lead to improved treatment outcomes. However, the past 25 years of

research into motivation and detained youth presented above form a rather motley ensemble. Defining and measuring motivation is complex and conceptualization is inconsistent (Drieschner et al., 2004). Heterogeneity in definition and the applied operationalization of motivation as a construct lead to seemingly little commonality between studies.

Many papers highlight the importance of motivation and present methodology to improve it. However, these are often theoretical or clinical perspectives (e.g., Clark, 1999; Feldstein & Ginsburg, 2006; Fortune, 2018; Gibson & Duncan, 2008; Underwood et al., 2006), not empirical studies evaluating treatment outcomes or measuring changes in motivation. Other papers mention motivation in the discussion only, either as an explanation for negative results or as a potential byproduct of the presented methodology (e.g., Lautenbacher et al., 2021; Padyab et al., 2015).

When papers do incorporate motivation as an empirical construct, the development of motivation is often not (pre)assessed, nor considered as a treatment outcome. Furthermore, since “motivation” is often used as a catch-all term, it is frequently unclear how researchers or clinicians define motivation, and whether the youth is motivated for actual behavioral change or motivated for engaging in treatment while detained. Sometimes, motivation is even assessed inferentially, where increased exhibition of a given behavior is seen as an increase in motivation for that behavior.

As mentioned in the introduction, the Transtheoretical Model (TTM; Prochaska & Velicer, 1997) is the most commonly applied theoretical framework from which treatment motivation is conceptualized. However, in the context of addiction treatment, serious criticisms have been raised against the TTM, in particular concerning the proposed stage structure (West, 2005). It should further be noted that this conceptualization usually focusses on the youth’s motivation to engage in the treatment, which in a detention context can also be seen as the extent to which they are willing to accept the terms of their sentence while detained, rather than their motivation to change their behavior once released. The TTM

would put most adjudicated youth initially in the Precontemplation stage, i.e., low motivation as they have not started considering change (they did not seek out treatment, after all). However, several studies show that motivation can be quite high when the youth is invested and sees the relevance of treatment for themselves.

Academic motivation in detained youth appears to be most strongly determined by personal factors, such as intelligence and levels of externalizing behavioral problems. Contrary to what is found in general population studies, positive teacher and school-environment factors have relatively little impact. However, negative factors like disruptive peers or oppressive work and classroom climates were found to have a harmful impact. This would imply that within the detention context there are fewer supportive buffers for academically motivated students to maintain that motivation in the face of disruptive or demotivating elements. Motivation enhancers that have been effective inside the detention setting, such as multimedia teaching tools, become more important as there are fewer motivational factors available.

Research into the effects of explicit motivation training shows conflicting results. While several studies show positive effects on motivation over time, it is not always clear if the same results would not have arisen without the motivation training, nor whether there is also an effect on behavioral outcomes. Furthermore, not all studies show positive effects, even when employing the same methodology and expertise. There appears to be potential, but more studies into the working elements of motivational enhancement are required.

In compiling all the literature for this review, we have noticed some gaps that do not appear to be addressed in any recent studies. First, there are no comparisons of motivation, be it for treatment or for behavioral change, between adjudicated youth and youth in voluntary treatment. Many studies state that adjudicated youth show low motivation, sometimes linking it to the fact that they are teenagers, but there are no comparisons with non-adjudicated youth with similar levels of substance use and/or externalizing problem-behaviors. A second gap is the influence of peer dynamics on motivation within the

institutions. The influence of peer motivation is briefly addressed in the literature on academic motivation, and the studies on living climate at least acknowledge day-to-day influences from others on youth's motivation, but by and large, studies discussing motivation consider the youth in isolation, not as part of a group of multiple adjudicated youth. This is somewhat surprising, given the evidence for iatrogenic effects in groups of (externalizing) youth (Dishion et al., 1999; Dishion & Tipsord, 2011). Finally, there are almost no studies that examine the effect of explicit motivation training during detention on delinquent recidivism. In fact, only one study (Clair-Michaud et al., 2016) examined this, even though it is the behavioral outcome that most adjudicated youth are primarily treated for.

Based on the literature, we recommend the following:

1. Increase the motivational salience of treatment for detained youth. During adolescence, maturational changes in cognitive and social processing lead to an increased desire for social stature and peer admiration. Adolescents' goals are therefore increasingly dictated by the expected effects they will have on peer perception (Crone & Dahl, 2012). Treatment is more likely to be effective when the participants perceive the intended outcomes as positively affecting their standing amongst their peers (Dahl et al., 2018; Yeager et al., 2018). In general, adolescents feel a need to contribute to their community (Fuligni, 2019). Treatment programs for young offenders could focus on the youth's potential as role models or future councilors, or encourage the youth to take what they learn in treatment to help their friends, who may be struggling with the same issues. Perceiving the treatment as relevant will also diminish iatrogenic effects of the adjudicated programs.
2. More precision in terminology. Given the ambiguity surrounding the term, it seems clear that the term "motivation" is not a catch-all term. Researchers are encouraged to be more exact in which form of motivation they study and how it is conceptualized, to specify if it impacts the treatment process or treatment outcome, and to use more standardized measures of motivation assessment to evaluate its impact (Brauers et al., 2016; Luther et al., 2018). It is currently very difficult to assess whether conflicting results point to underlying

unknowns, or simply disparate instruments and methodologies (see, e.g., Bisback et al., 2022 vs. Colins et al., 2017).

3. Combine sources of motivation assessment. The source with the most knowledge of a given youth's motivation is the youth themselves. However, detained youth may be particularly prone to giving socially desirable answers (Abrams, 2006), since their day-to-day life in these settings is often affected by the extent of their cooperation in the adjudicated treatment (e.g., the withholding of privileges in cases of non-compliance). By combining measures, we can more easily identify disparities between staff assessments and the youth's own perceptions of their motivation (Pniewski et al., 2019; Vu et al., 2022).

4. Improved awareness of the negative impact of disruptive schoolroom factors. While few studies examine academic motivation, the young offender population is at its core an adolescent population and as such, a (largely) school-age one. It is tempting to assume that the same findings from regular school-based studies apply to detention facilities' education, but findings suggest otherwise. Coupled with the fact that low IQ and even intellectual disabilities are more common in detained populations, it seems that traditional teaching methods are more likely to elicit resistance to academic performance than to encourage it.

Motivation is an important element of psychosocial treatment, and no less so in a detention setting. The young offender population is one where great benefit can be gained with successful treatment, both for the youths themselves as for society. While a lot of work remains to be done, it is hopeful to see that good motivation can be attained, even for adjudicated treatment.

Chapter 4:

Combining Motivational Interviewing and Cognitive Bias Modification Training for Substances in Detained Youth.

Hans S. van der Baan, Annematt L. Collot D'Escury-Koenigs, Raoul P. P. P. Grasman, Gerard M. Schippers, & Reinout W. Wiers

This chapter is under review as:

Van der Baan, H. S., Collot D'Escury-Koenigs, A. L. Grasman, R. P. P. P., Schippers, G. M., & Wiers, R. W. (n.d.). Combining Motivational Interviewing and Cognitive Bias Modification training for substances in detained youth. *Under review*.

Abstract

Objective: Motivation is considered a key factor in successful treatment. Unfortunately, detained young offenders typically show weak motivation for treatment and behavioral change. This pilot study examined the effects of a brief Motivational Interviewing (MI) protocol in conjunction with a cognitive bias modification (CBM) intervention aimed at reducing substance use in detained young offenders.

Method: An MI protocol for adult parolees was adapted for adolescents. Fifty-two young offenders received the MI training, aimed at enhancing their insights into their substance use and its potential relation with their offenses, plus substance use treatment. These youth were matched with controls from similar populations who received the same CBM without MI.

Results: Changes in motivation over time were examined with a repeated-measures ANOVA. Results show no change in motivation over time, nor a significant effect of condition (MI vs. no MI).

Conclusions: While application of the MI protocol was feasible, no effect was found on motivation, in contrast to the original adult-focused protocol. Certain core facets of the original protocol, such as client reflection on their history of substance use, may be less applicable to young offenders whose use-history is relatively brief. Severity of their substance use behavior should also be taken into account in any future applications.

Keywords: Young Offenders, Motivational Interviewing, Substances

Client motivation plays a pivotal role in mental health treatment (Drieschner et al., 2004; Gannon et al., 2011; Mathys, 2017; Ward & Gannon, 2006), being predictive of treatment retention and positive outcomes (Carl et al., 2020; Clausen et al., 2013; Drieschner & Verschuur, 2010; Gideon, 2010; Sainsbury et al., 2004; Salekin et al., 2010). However, creating and sustaining motivation in individuals undergoing treatment is a recurring challenge for practitioners, particularly in forensic settings. The involuntary treatment inherent in these settings is considered less effective (Hachtel et al., 2019; Parhar et al., 2008; Snyder & Anderson, 2009), yet successful treatment in forensic populations is greatly beneficial, both to the individual and society. This is particularly true with young offenders (Dahl et al., 2018), who may potentially desist from becoming career criminals. Motivation, in young offenders, is therefore a primary factor of consideration for clinicians in treatment planning (Hillege et al., 2018) and effective motivation enhancement is needed.

Young offenders are often assumed to have little motivation for their adjudicated treatment (Armelius & Andreassen, 2007). Optimally, motivation for engaging in treatment and/or behavioral change should be intrinsic or autonomous, originating from within the individual (Ryan & Deci, 2000a). Adolescents in general derive motivation from personal relevance and perceived effects on social status, rather than long-term societal benefits (Crone & Dahl, 2012; Fuligni, 2019). Detained young offenders typically have little to no autonomy in the decision to be treated, let alone in selection of treatment. Unlike typical clinical populations they haven't arrived at treatment after a process of deliberation, or because of problem recognition. Treatment initiation is highly controlled and engagement enforced extrinsically, as cooperation is often linked to privileges (or lack thereof) during their detention. Moreover, their direct peers, both during and outside treatment, are other young offenders who may not react positively to cooperation with authority. This negatively impacts motivation in what is already a less-than-ideal treatment environment (Simoneau & Bergeron, 2003).

The most common conceptualization of motivation in a clinical context is the Transtheoretical Model (TTM; Prochaska & Velicer, 1997) of behavior change. The TTM

sees motivation as both the initial motivation at commencement of treatment, and as a continuous factor throughout the treatment process, outlined in a sequential stage structure. Progression through the stages is equated with greater motivation for treatment engagement and behavioral change. Young offenders start at a disadvantage as they have not progressed through the precontemplation stage to arrive at the decision to engage in treatment, in contrast with clients seeking voluntary treatment. Another issue is that treatment duration in detention is based on sentence, rather than treatment protocol. In the US, most adjudicated youth are detained for less than three months, with a median stay of 30 days (Office of Juvenile Justice and Delinquency Prevention, 2023). While committed youth are detained for longer (median = 117 days), this is still a limited amount of time in which to execute a complete treatment protocol.

However, despite these challenges to successful treatment in a detention setting, there is much benefit to giving young offenders as positive a treatment experience as possible. An advantage of adjudicated treatment is that it allows clinicians to get a foot in the door, so to speak, by the simple fact that the youth is placed in a treatment context. It is an opportunity for clinicians to turn a youth's disinterest in, or even outright opposition to, treatment into ambivalence. If the youth progresses through the precontemplative stage or even further, and leaves detention with a sense of personal relevance regarding treatment, they may retain that motivation and potentially seek out voluntary treatment or otherwise effect positive behavioral change themselves. Thus, involuntary treatment settings can still greatly benefit from effective motivation enhancement methods.

One method that has been frequently applied with youth in forensic settings (Brauers et al., 2016) is Motivational Interviewing (MI; Miller & Rollnick, 2002) MI is a style of therapeutic communication designed to explore and resolve ambivalence regarding behavioral change. By focusing on intrinsic motivation and building self-efficacy, MI aims to support positive behavioral change. Numerous studies have found that applying MI principles can increase motivation in detained youth, as well as effect behavioral change in various health behavior domains (I. Andretta & Oliveira, 2011; Bryan et al., 2018; Clair et al.,

2011, 2013; Clair-Michaud et al., 2016; Salekin et al., 2012; Schmiege et al., 2021). While not all studies report success (Bryan et al., 2009; Rosengard et al., 2007; Slavet et al., 2005; Tennity & Grassetti, 2022), MI is one of the best validated methods to increase motivation in detained young offenders.

This article outlines the findings of a pilot study where a modified MI protocol, originally designed to enhance motivation for substance use change in adult parolees, was added to a Cognitive Bias Modification (CBM) program targeting substance use in detained young offenders. Young offender populations show high levels of substance use (Mulvey et al., 2011; Vreugdenhil et al., 2004) and are at an increased risk of developing substance use disorders (Kinner et al., 2014; Plattner et al., 2012). This is a major concern in forensic care (Putniņš, 2003; S. Young et al., 2011). CBM interventions are brief training programs that target cognitive biases: cue processing predilections whereby cues trigger specific behavioral responses, implicated in the development and maintenance of substance use disorders (Rooke et al., 2008; Willem et al., 2013). Its relatively brief time-frame and action-oriented format makes CBM potentially very suitable for young offenders. The goal of this study was to see whether adding the MI protocol would be effective in increasing young offender motivation and reducing substance use. We hypothesized that participants receiving the MI protocol would increase in motivation, compared to young offenders who received the same CBM training, without MI. We further hypothesized that the MI group would show a greater reduction in substance use, and that the effect of the CBM training on substance use would be mediated by the increase in motivation.

Methods

Pilot Design

This study was a continuation of the CBM trial conducted by van der Baan and colleagues (van der Baan et al., 2024). The CBM portion of the study consisted of a double-blind 2x2 factorial design. Participants were detained young offenders from several juvenile detention centers who were screened and divided into either alcohol or cannabis training,

depending on which substance they used most. Each training consisted of two tasks (attentional bias modification and approach bias modification), randomly determined to be either an active-training or sham-training task. Participants were also guided through an MI-based seven-step protocol (outlined below) where they explored their substance use development and its link with their delinquent behavior. The first 6 steps of the MI-protocol were paired with one of the CBM-training sessions, while the 7th was done separately.

Study protocols were approved by the UVA-FMG Ethics Committee (UvA, 2013-DP-3165; 2013-DP-3142). The project was funded by the Dutch Ministry of Justice and Safety, who had no role in study execution, data collection or analysis, nor in writing this manuscript.

Participants

Participants were 158 adolescents from five juvenile detention centers in the Netherlands, including both detained and committed youth. Youth were adjudicated after a juvenile court conviction of a felony, or while awaiting trial. Participant recruitment ran from 2016-2017. The selection process consisted of two phases: 1) invitation through in-person communication; and 2) an eligibility assessment (T0). Exclusion criteria were: (a) placement in Very Intensive Care or Forensic Observation groups, as participation was considered too intrusive for these youth, (b) insufficient mastery of the Dutch language and (c) colorblindness.

Procedure

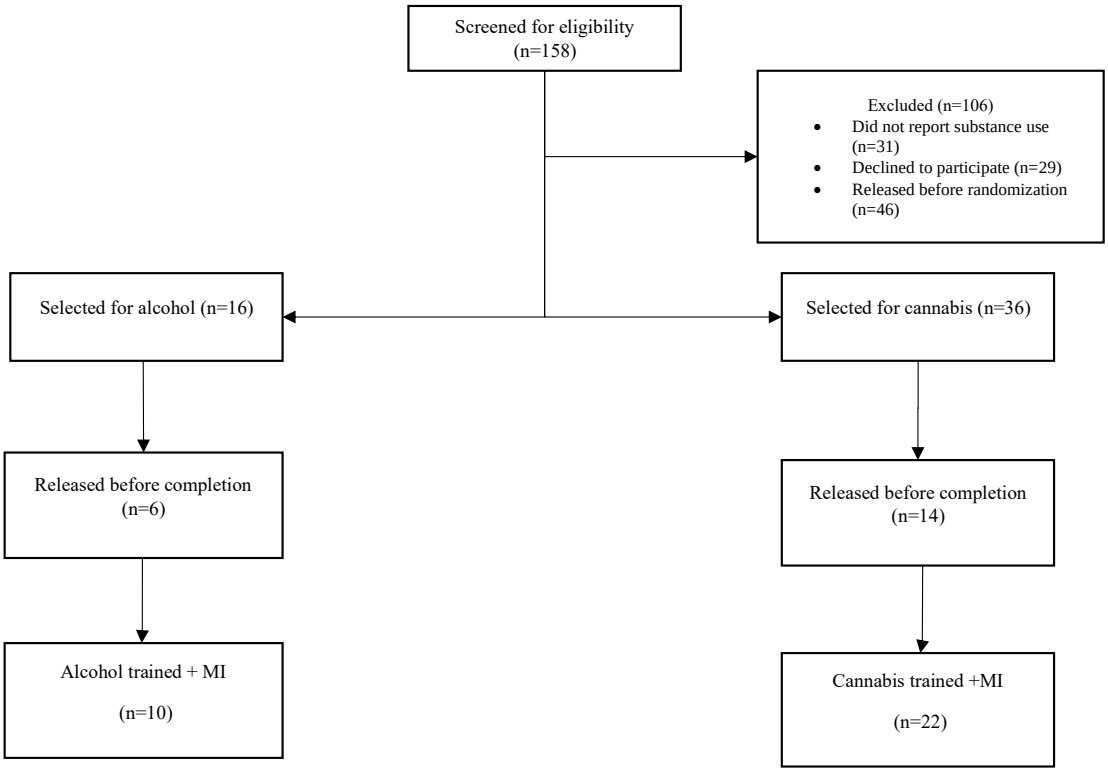
Recruitment and data collection was performed by university-affiliated researchers on-site. Candidates were approached after at least two weeks of detention. This first period is filled with acclimatization and the administration of various standard tests by the institution. To ensure that the youth knew we were independent from the institution, they were only approached afterwards. Participants were told that we wanted information on their behavior from the youths themselves, and that every detained youth would be approached; they were not singled out. Information about the study was given verbally and in a brochure, which the youth could keep in their cells. Consent was obtained from the youth and, if they were younger than 18, their parents or guardians. Our test battery, which included the Alcohol Use

Disorder Identification Test (AUDIT; Saunders et al., 1993) and the Cannabis Use Disorder Identification Test – Revised (CUDIT-R; (Adamson et al., 2010) to screen for substance use, was administered 24 hours after consent was obtained. The test battery was digitally administered and took 1.5-2 hours. All questionnaires, as well as the CBM tasks, were embedded in software developed by the University of Amsterdam specifically for test administration and data recording purposes.

Following screening, eligibility was assessed by the lead researcher off-site. All participants that reported alcohol or cannabis usage during the previous year were eligible. This is a low inclusion threshold, which was necessary to ensure that third-party observers (e.g., institution staff) could not infer specifics regarding substance use from a youth's participation, thus ensuring confidentiality. Participants were then assigned to either alcohol or cannabis CBM, depending on which substance they reported the highest level of use for. Further details regarding randomization within the CBM tasks can be found in the main RCT paper (van der Baan et al., 2024).

Figure 1 shows a CONSORT diagram of the participant flow.

Figure 1. CONSORT flow diagram



The CBM training consisted of 6 sessions, paired with the sequential steps of the MI protocol. At the start of each session, participants reported their motivation for participating in the training program, and for reducing their substance use. After these 6 sessions the MI protocol concluded with a final session during which no data was collected. Sessions were scheduled at least 24 hours apart, but no more than one week. During the sessions, which took place in a designated room within the facility, only the participant and data-collector were present.

Participants were once again approached for follow-up measurements, approximately 1 and 3 months after their last session. Researchers attempted to contact them as of their allotted date, and would attempt contact for a period of two weeks. If the

participant was still detained, follow-up measurements were administered digitally. If, however, the participant was no longer detained, they were contacted by phone or visited at home. The follow-up was then administered either over the phone or in person.

For the screening participants were given a choice of rewards worth approximately €5. Rewards were most commonly phone credits or personal hygiene products. The exact items varied per institution, but their value did not. Rewards for the follow-up measures were similar, worth €5 at 1 month and €10 at 3 months. There were no rewards tied to training participation, and all participants received follow-up measures, even if they did not participate in the training. Training participation, therefore, carried no extrinsic rewards.

Materials

The CBM Tasks: Two CBM tasks were used to target two different biases: an Approach bias re-training based on the Approach-Avoid task (AAT), and an attentional bias retraining based on a Visual Probe Task (VPT). Both tasks used a mix of neutral stimuli (office supplies) and substance-related stimuli (alcohol or cannabis). Two versions of each task were used, an assessment- and a training-version. The training-version was either active (i.e., retrained the bias) or sham (intended to not retrain the bias; continued assessment). More detailed descriptions of these tasks can be found in the main RCT paper (van der Baan et al., 2024).

The MI Protocol: The protocol was based off the Stap-voor-Stap (Step-by-Step) protocol employed by the “Stichting Verslavingsreclassering GGZ” (Stichting Verslavingsreclassering GGZ, 2019), the Dutch mental-healthcare department that handles post-incarceration care of former offenders whose parole includes (continued) addiction treatment. Stap-voor-Stap is a brief sequential protocol based on the principles of Motivational Interviewing (W. R. Miller & Rollnick, 2002) to increase motivation for behavioral change (i.e., reducing substance use). It guides clients through the first stages of the behavioral change model (precontemplation, contemplation, preparation/determination). The purpose of the protocol and the counselor is to accompany the client in exploring, and

provide an overview of, the link between their addiction and offending behavior, and help them arrive at a decision regarding abstinence and seeking help in achieving it. The original protocol consists of seven steps, during which the client performs assignments and answers questions to increase insights into their offending behavior and its link with their substance use history. Stap-voor-Stap is designed for adults, and as such required adaptation for use with young offenders. It was also geared towards addiction in general (including gambling). For this study, the formulations were changed to be substance use-specific. We'll outline each step of our module and describe how it was adapted from the original (if at all). Participants were given a Stap-voor-Stap workbook, in which they took notes and answered questions. The workbooks were their personal property; they could take it with them to their cells.

The first step was a program introduction, and brief self-assessment of the youth's current situation. They were asked to relate, in their own words, what the verdict was in their court case, as well as their thoughts and feelings about that verdict and their detention.

During the second step, clients were invited to think about their current substance use, offending behavior, and any problems they experience in their day-to-day life (e.g., poor relations with siblings, no fixed residential address, etc.). In adjusting the protocol, we changed the wording that referred to their substance use and made it explicit that they should think about their use-behaviour outside the detention center. We also adjusted the day-to-day areas by removing marriage (instead asking about romantic relationships) and making school more prominent.

In the third step, participants were asked to indicate on a graph plot, presented on a transparent sheet in the workbook, their substance use at various ages. Next, on a graph plot presented on a different (opaque) page, they graphed their offending behavior during the same period. The transparent page could then be placed on top of the opaque page, so both progression lines were visible. Participants were asked to reflect on what they saw, and any possible relations between the two graphs. Next, they would think about their day-to-day life at the various ages, and reflect on problems they did or did not encounter in times of little

use, heavy use, less offending behavior and increased offending, based on what was graphed out. As our participants were teenagers, we had to adjust the age-ranges displayed on the graph plots, changing the range to 9 through 25.

During the fourth step, participants were asked to list advantages and disadvantages of their substance use and offending behaviors. They were then asked to imagine changing their substance use, and reducing their offending, and list advantages and disadvantages of that as well. It is worth noting that we did not talk about explicitly reducing their substance use, or quitting entirely; the protocol is simply there to encourage thinking about behavior change, and letting them draw their own conclusions about what form that change should take.

In the fifth step, participants thought about ways that they could help themselves to change their behavior. They listed potential goals (formulated as agreements made with themselves) that they might reach (e.g., no daily drinking, or don't steal from children). They also thought about times where they had achieved such goals before, and what traits and strengths helped them achieve those goals.

Our sixth step combined the original protocol's last two steps. Like the previous step, clients explored resources that could help them in reaching behavior-change goals. They first examined institutionalized help (e.g., detox clinics or self-help groups), reflecting on earlier experiences, what was good and what wasn't, what those sources could do for them now, obstacles, and potential gains. Next, they reflected on the same issues, now regarding sources of aid from their direct environment (outside detention, e.g., family, schools, etc.).

These first six steps coincided with the six sessions of the CBM training. We added another step, administered after CBM-training had completed, called the Future Film (Greenwald, 2009). In this session, participants were invited to imagine their future life as a movie, starting with the end: What did their character's life (i.e., their future), look like? What had they achieved? Next, they reflected on their characters' journey, how had they got from where the youth was now, to where they imagined them in the film? How had they managed it? What steps could the youth take to achieve the same? This provided the youth with a fun,

creative session with which to round off the protocol, but also provided more opportunity for planning.

The protocol was administered by university-affiliated researchers on-site. The researchers had received a general Motivational Interviewing training, as well as specific instruction regarding this protocol.

Alcohol use: The AUDIT (Saunders et al., 1993) assesses alcohol use and problems and is a screener of hazardous and harmful alcohol use during the past year. Total scores were used to assess alcohol use at screening. Since the follow-up measures were within a year of the screening, the AUDIT could not reliably be administered again. Alcohol use at follow-up was therefore assessed with three items; the first asked how often participants consumed alcohol in the past two weeks, the second used timeline-follow back reasoning to get the units of alcohol consumed on each day of the preceding week (e.g., if the follow-up was administered on a Tuesday, we'd start by asking how many units they consumed the day before, Monday, then the day before that, Sunday, etc.), and the third item asked an estimate of the number of times they'd consumed 5 units or more in one sitting during the past two weeks (as an estimate of binge-drinking).

Cannabis use: The CUDIT-R (Adamson et al., 2010) assesses cannabis use and problems and is a screener of potentially hazardous and harmful cannabis use during the past year. Total scores were used to assess cannabis use at screening. Like the AUDIT, the CUDIT-R could not reliably be administered at follow-up. Cannabis use at follow-up was therefore assessed with the same three items as alcohol use was, but formulated for cannabis instead.

Motivation: Participants indicated how motivated they were on a visual analog scale ranging from 0 ("not at all") to 100 ("completely"). There were two motivation items, the first asking "*Indicate on the line below how motivated you are right now to participate in this training?*" (referring to the CBM training); the second asked "*Indicate on the line below how motivated you are right now to quit/reduce (drinking alcohol / using cannabis*; the wording of

this part of the item depended on which substance participants were being trained for)?" The first item purports to measure Treatment Motivation, the second Reduction Motivation.

Data Analysis:

We created a control group by case-control matching our participants with participants from the main RCT study (van der Baan et al., 2024). Like our MI-trained youth, these were detained young offenders from several juvenile detention centers in the Netherlands who underwent the exact same study protocol absent the MI intervention. Participants were first matched on age, ethnicity, gender, the institution they were detained at, and the substance for which they received CBM training. This gave us 38 matches. Comparing the participant pools, however, we found that they did not differ significantly in age ($t(84) = -.97$, $p = .12$), and as such decided to drop that requirement. Furthermore, as the Netherlands is a small country, it is very common for young offenders to be detained in a different province than where they reside. In other words, detention in any given institution is not representative of locality, and thus does not equate to a significantly different population than any other institution. This requirement was also dropped. Matching only on ethnicity, gender and substance gave us matches for all 52 participants.

Sample characteristics are shown in Table 1.

Table 1.

Sample characteristics

	Alcohol		Cannabis		Total	
	MI	Control	MI	Control	MI	Control
N	16	16	36	36	52	52
Gender (% male)	100	100	91.66	91.66	94.23	94.23
Age	18.92 (2.50)	18.88 (2.08)	18.55 (2.00)	18.52 (1.67)	18.66 (2.14)	18.64 (1.79)
AUDIT	6.88 (5.41)	5.02 (2.97)	-	-	5.67 (5.48)	4.88 (4.45)
CUDIT-R	-	-	13.47 (7.36)	12.56 (6.43)	9.87 (8.411)	8.94 (7.69)
Treatment Motivation	67.07 (32.37)	81.37 (20.54)	73.47 (24.36)	67.89 (27.28)	71.68 (26.65)	72.12 (25.93)
Reduction Motivation	51.07 (46.27)	42.25 (41.52)	58.14 (38.70)	53.94 (35.63)	56.16 (40.60)	50.27 (37.56)

Note. Numbers between brackets = Standard errors; AUDIT = Alcohol Use Disorder Identification Test - Revised, range 0-40; CUDIT-R = Cannabis Use Disorder Identification Test, range 0-32; Treatment Motivation = Motivation to engage with the CBM Training, range 0-100; Reduction Motivation = Motivation to quit/reduce substance use, range 0-100; Reduction Motivation was formulated to be substance specific (alcohol or cannabis); Both Motivation measures reflect motivation at the start of treatment.

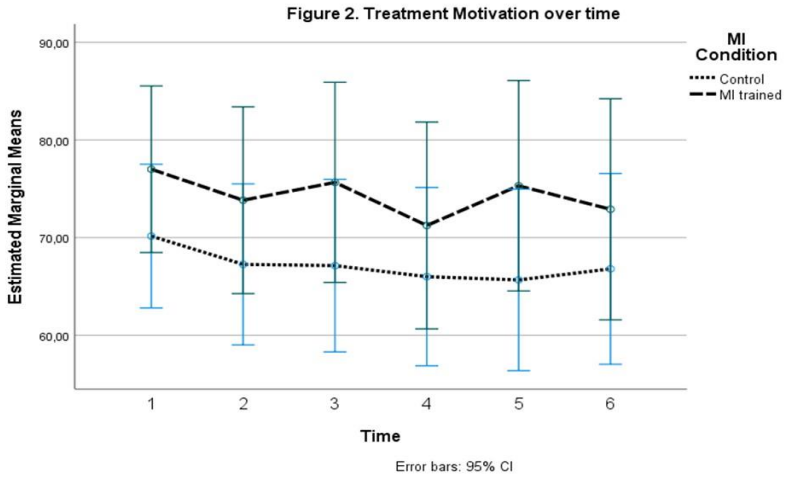
Motivation: Change-over-time for both motivation measures was evaluated with a mixed factorial ANOVA with Time as within-subject factor (comparing item scores at all 6 measurement points) and Condition as between-subjects factor (MI or Control). This analysis included all participants, not separated by substance, as there is no theoretical basis for assuming the effects of MI will differ per substance. Any significant change will be further explored with paired-sample T-tests.

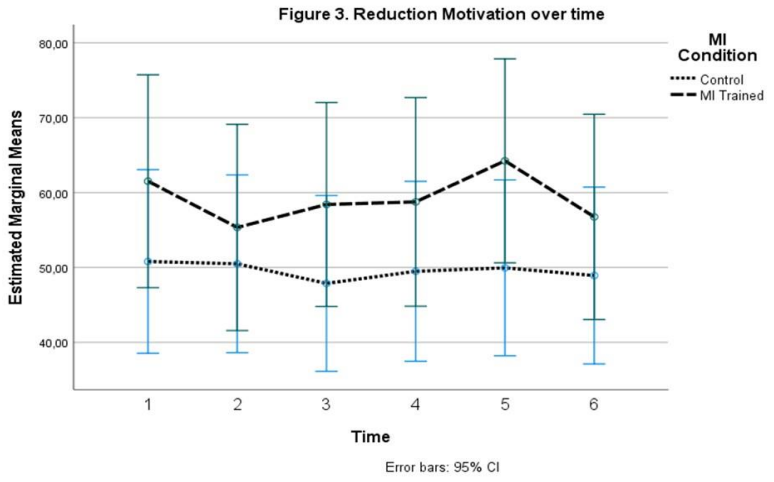
Substance use: Assuming we find significant improvements in motivation in the MI condition participants, differences in substance use at follow-up will be assessed with paired-sample T-tests. These analyses were done separately for each substance-trained group.

Results

Motivation change over time: Figures 2 and 3 show the development of Treatment Motivation and Reduction Motivation respectively. A mixed ANOVA showed no effect of time for either Treatment Motivation ($F(5, 330 = .61$, $p = .69$) or Reduction Motivation ($F(5, 330) = .50$, $p = .78$). Neither was there an effect of condition for either Treatment Motivation ($F(1, 66) = 1.68$, $p = .20$) or Reduction Motivation ($F(1, 66) = 1.50$, $p = .23$). Finally, the interaction

of Time*Condition was not significant for either Treatment Motivation ($F(5, 330) = .15$, $p = .98$) or Reduction Motivation ($F(5, 330) = .37$, $p = .87$). Further analyses showed no meaningful interactions between MI condition and the CBM conditions, with regards to changes in motivation.





These results indicate that the MI protocol did not significantly impact participant motivation throughout CBM training. As such, it is not reasonable to expect different outcomes of the training than those from the original RCT (van der Baan et al., 2024) as our expectation was that increased motivation would lead to better results of the CBM training. Analyses on substance use reduction were therefore deemed unnecessary. However, for the sake of completion, another ANOVA was run, with Time (motivation before and after) as within-subject factors, and MI-condition, VPT-condition and AAT-condition (i.e., the conditions of the CBM training) as between-subject factors. We ran this for both measures of motivation and for each substance separately, as well as with all participants together.

The second ANOVA showed no main effects on Motivation. There were some significant interactions in the alcohol-trained group, but given the relatively low number of participants in this group (n=22), further subgroup investigation would not yield relevant insights. We did find a significant interaction for Treatment Motivation in the cannabis group, and for Reduction Motivation with all participants grouped together. For Treatment Motivation in the cannabis group, we found a significant effect for the interaction of Time*MI*VPT ($F(1, 38 = 5.41, p = .02$). Graphing this interaction showed that participants who received MI training and the training-version of the VPT showed a slight increase in motivation over time, while those that received MI and the control-version of the VPT decreased. For Reduction Motivation in the total participant group, we found a significant effect for the interaction of Time*MI*VPT*AAT ($F(1, 60 = 4.80, p = .03$). However, graphing this interacting showed no discernible patterns. The graphs are presented in Appendix K.

Discussion

This pilot study examined the feasibility and effectiveness of a (brief) Motivational Interviewing protocol in enhancing motivation for treatment and substance use reduction in detained young offenders. Execution of the protocol within a detention setting appeared feasible, however, we found no effects on motivation, contrary to our hypotheses. While

disappointing, this pilot study has identified several issues with the protocol that would require improvement.

One of these is that the Stap-voor-Stap protocol asks the client to name the substance that they consider to be their problem substance (this happens right at the start of step 2). Everything that happens in the program afterwards (the graphing, pros and cons, etc.) is in the context of that substance. However, our motivational measures (notable the Reduction Motivation item) assess motivation to reduce the substance for which they are assigned to CBM training. These might not be the same substances. CBM-assignation was based on reported use of alcohol and cannabis, but they may have picked a different substance (e.g., tobacco) for the MI part of the study. Alternatively, as we've heard happen anecdotally, heavy cannabis users may be more concerned about their drinking as cannabis use is practically normative in their environments but alcohol use is frowned upon, be it for cultural or religious reasons. The MI, as applied in this pilot, was thus not optimally aligned with their treatment or the motivation that we measured.

It is also worth noting that Stap-voor-Stap guides participants through the first stages of behavior change to arrive at preparation, i.e., to initiate steps towards treatment. Our participants, however, received the protocol while already in treatment, both in terms of our CBM training, and their adjudicated treatment. This may have been counterproductive; however, it is also the reality of adjudicated treatment that it often commences regardless of the detainee's intrinsic motivation.

Another issue might be the age of our participants. The original Stap-voor-Stap protocol was designed for adult parolees, with a considerably longer history of substance use. This means more opportunity for use behavior to tie in with offending behavior, and for both behaviors to exacerbate each other. This makes the overlapping graphs more impactful. For young offenders this relation might not yet have had time to develop. This would diminish one of the main driving factors of the MI protocol.

Finally, there is the workbook that guides the Stap-voor-Stap process. While it was adequately adapted for use with young offenders, there are aspects that could be improved.

For example, there are several points in the protocol where participants have to read a block of text, or list of options. It is an unfortunate reality that a proportionally large number of young offenders function academically at a level well below average intelligence (Segeren et al., 2018). Larger text blocks may have been poorly understood or simply glossed over. Similarly, most workbooks were not engaged with outside of the MI sessions. The majority of participants declined to take them to their cells. Unlike adult parolees, for whom therapy engagement can be a requirement, for our participants it was entirely voluntary.

That said, one of the positive findings from this pilot is that even though participation was entirely voluntary and without extrinsic rewards, 65% of eligible youth (i.e., youth that used substances) chose to participate. Anecdotal feedback suggests that the youth did enjoy the Stap-voor-Stap format, and having the workbook made engagement tangible. The graphing, while (as mentioned) perhaps less impactful for most, did prove to be an eye-opener for at least some. It is also worth noting that the indicated levels of motivation for engagement with the CBM treatment were not as low as one might expect. This is at least suggestive of young offenders being reasonably well motivated for treatment, which we are perhaps not optimally acting upon.

Future research should employ a better operationalization of motivation in its evaluation. Motivation is a nebulous concept (Drieschner et al., 2004) and this may impact adequate evaluation. Attempts to enhance motivation for substance use treatment would also benefit from focussing on young offenders with a longer history of substance use, or those that evince high (clinical) levels of use. Examining the standard errors of the Reduction Motivation scores (table 1) shows that there was an enormous spread, with some being highly motivated and some not at all. It would not be surprising if a recreational user would not see any need for usage reduction. Yet, with the selection criteria for this study being what they are, they would be invited to do the CBM training. It is not surprising to find no treatment effects if there is no problem to treat. In fact, recent research suggests that motivational enhancement with recreational users might actually decrease motivation, while increasing it for heavy users (Tennity & Grassetti, 2022).

In summary, while our pilot study failed to show effects on motivation, it did show the feasibility of a short MI protocol, and provided several avenues for improvement. If nothing else, the pilot has also failed to show a significant decrease in motivation over time, despite the lack of reward or, perhaps, appropriateness to the subjects' usage levels. It suggests that the state of young offenders' motivation may not be as bleak as often portrayed in the literature. There is something there, and we have to keep improving on our ability to nurture it.

Chapter 5:

Practical Recommendations for Performing Research in Closed Youth Care Settings

Hans S. van der Baan, Esther L. de Ruigh, Arne Popma, Robert Vermeiren, Reinout W. Wiers, Annematt L. Collot D'Escury-Koenigs, & Lucres M. C. Jansen

This chapter is published as:

van der Baan, H. S., de Ruigh, E. L., Popma, A., Vermeiren, R., Wiers, R. W., Collot D'Escury-Koenigs, A. L., & Jansen, L. M. C. (2024). Praktische aanbevelingen voor het uitvoeren van onderzoek in gesloten jeugdzorginstellingen. *Tijdschrift voor Forensische Psychiatrie en Psychologie, 1(1), p.73-88*.

Abstract

Performing research in a forensic setting poses certain challenges, especially when it pertains to complex or sensitive research designs. As a result, studies often end up with small sample sizes which limits reliability and generalizability of the results, and consequently narrows their potential for new insights. This article provides several practical recommendations for successful scientific research in youth forensic settings, organized into five steps: study design, setting up, recruiting participants, collecting data, and rounding off the project and communicating results. These tips help researchers carry out their protocols, collect sufficient amounts of good-quality data, and maintain good relations with the institutions. The recommendations are based on experiences from the Study Consortium for Reattributional E-training Effectiveness and Neuroprediction (SCREEN) study, a longitudinal multi-center project in the juvenile forensic setting in the Netherlands that involved 400+ detained youth. This paper intends to aid researchers in setting up and performing research in different closed youth care settings.

Keywords: Forensic setting, juvenile delinquency, neurobiology, longitudinal, RCT, substance (ab)use

The main goal of treatment for young offenders is to reduce antisocial behavior. However, treatment is not always successful. Delinquent youth are at high risk of delinquent recidivism and, as adults, often have problems with mental and physical health, as well as economic and social functioning (Odgers et al., 2008). As a result, they represent a significant social cost (Knapp et al., 2011). Finding underlying mechanisms of antisocial behavior and investigating new treatment approaches is therefore vital. However, conducting research within the confines of a closed (forensic) setting presents certain challenges (Lane et al., 2012; Schenk et al., 2018).

Historically, not much research has been conducted on young offenders within a forensic setting. Researchers generally prefer strictly homogeneous samples selected for a specific clinically or theoretically relevant condition (e.g., separation anxiety) rather than a more heterogeneous group based on circumstances (e.g., incarceration). Personal characteristics of the youth, such as distrust or resistance to authority, the closed nature of the institutions, and the involuntary nature of the placement complicate research in a forensic setting. Compared to general population adolescents, these participants are rarer, harder to reach, and may also be less motivated to participate. Moreover, complex or sensitive research designs, such as randomized controlled trials (RCTs) or studies involving neurobiological measurements, may encounter additional resistance. For example, RCTs (and other research with strictly controlled parameters or protocols) often do not fit within the structure of a closed setting, or suffer from high dropout rates. Neurobiological research (and research with other biological measures) may encounter resistance, due to participants' unwillingness to donate DNA or other identifiable material, or concerns about deterministic use of these measures. Research on neurobiological factors - particularly in the context of antisocial or criminal behavior - has led to fierce ethical debates internationally in the past (Singh et al., 2014).

These inherent challenges mean that studies with incarcerated youth often have small sample sizes and/or missing data. This limits the reliability and generalizability of

results (e.g., Aghajani et al., 2018; Ford et al., 2018). Because of these difficulties, researchers may choose to rely on data already available through third parties such as police records. Using existing data seems like an efficient and practical solution. However, researchers may still encounter similar problems due to institutional policies or organizational changes within umbrella organizations (Ford et al., 2018) while having only a limited number of variables available. Thus, this type of research is not substantially more feasible and limits the potential for new insights given the limited information available. For example, arrest data do not provide insight into crimes committed where there was no police contact, or insight into the youth's network. There is a strong need to explore underlying mechanisms of antisocial behavior that are not currently part of standard assessments (such as neurobiological factors). Furthermore, there is a need for new interventions to break the trend toward delinquent recidivism. We prefer to evaluate these in an ecologically valid research setting, or in closed juvenile care, in order to evaluate effectiveness. This requires independent research on new assessment and intervention methods in a forensic setting.

The current article aims to assist researchers who wish to conduct large and/or multifaceted studies, or investigate (new) constructs that may elicit resistance from participants or staff, by outlining practical recommendations for successful scientific research with juvenile offenders within the forensic juvenile care setting. Researchers can apply these recommendations when planning and conducting their studies to recruit a representative sample and collect sufficient amounts of high-quality data within their protocols while creating and maintaining good working relationships with the institutions. The recommendations are divided into five steps: study design, preparation in the institution, recruiting participants, collecting data, and completing the project and communicating the results. The methods and recommendations are based on shared research experience, and their implementation is illustrated using examples from the SCREEN (Study Consortium for Reattributional E-training Effectiveness and Neuroprediction) project. The SCREEN project was a four-year longitudinal research project that ran in several forensic juvenile care

centers in the Netherlands and included both an RCT and an evaluation of neurobiological predictors of treatment outcomes (see Box 1).

Step 1: Designing a feasible study

Because young offenders are a rare and hard-to-reach population, forensic juvenile care institutions often receive more requests from researchers than they can accommodate. Furthermore, there are obstacles and limitations that must be taken into account that are specific to a (forensic) juvenile care institution. Often these are not adequately taken into account, resulting in requests to conduct research being rejected. In addition to all scientific considerations, the researchers must consider the institution and its staff. The study must interfere with the daily operations of the institution as little as possible, otherwise it will disrupt ongoing treatments. The better the research fits, and can be conducted, within an institution, the easier it is for the institutions to allow the researchers to do their research. Finally, to ensure data quality, participant-oriented factors such as anonymity must be maximized to reduce distrust. Again, this is more difficult in closed juvenile care. To get ahead of these problems, researchers should consider the following.

Step 1.1 Combine and collaborate whenever possible

Combining multiple projects lowers the demands on institutions and has a number of other benefits: it reduces competition for locations, participants and resources, while pooling expertise and man-hours spent on the project from multiple studies and/or research groups.

Step 1.2 Maximize practical independence

Accommodating research is easier for institutions if little additional work is required of them. It is advisable to have the various research tasks (recruitment, data collection, etc.) be performed by external researchers. Confidentiality may be in question if the data is collected by someone the youth know as an employee of the forensic juvenile care center. The freedom to work independently in the institution minimizes the demands placed on the institutions (e.g., there is no need to assign employees to accompany the researchers to the

living groups). However, it also entails greater responsibility in terms of safety and security. Clear and explicit agreements must be made in advance about what the researchers can and cannot do, and certain institutional requirements must be met, such as a minimum age for the researchers.

Being able to function independently within the institution prevents a lot of extra work for the staff and makes it easier for the researchers to present themselves to the youth as separate from the institution (and the justice department, police, etc.). This prevents many of the problems researchers may encounter. The recommendations in this article will often illustrate this.

Step 1.3 Design a test battery and a procedure that fit within the daily schedule

Given the strict daily routine within these institutions, the amount of time available for testing participants is limited. When designing the test battery, consider that some data are already available in the institution's records. These files may contain (relatively) objective information that may be of interest to researchers (such as DSM diagnoses or IQ measurements), which otherwise take quite a lot of time to assess. This saves time for both researchers and participants. It also prevents data being invalidated as a result of administering the same instrument twice within a short period of time.

Institutions are unlikely to allow data collection to occur at the expense of scheduled rehabilitative activities, such as school or therapy sessions, while the participants, on their part, are unlikely to be willing to miss visiting hours, meal times and similar occurrences. Therefore, researchers should familiarize themselves with the daily programs and plan data collection around them.

Step 1.4 Ensure that the procedure does not disclose anything about your participants to third parties

If your participants do not trust you, they will not give you honest data. Participants may think that the data will be used against them in court, or otherwise harm their case in

the police investigation. Researchers should also keep in mind that, unlike most research settings, youth in forensic juvenile care institutions are under almost constant observation. If a study uses sensitive information (e.g., sexuality) or inappropriate behavior (e.g., frequent or problematic substance use) as inclusion criteria, that information could be inferred by other participants or the institution staff, from the participation itself. Not only is this unethical, but if a third party acts on this information (e.g., a staff member addressing a participant about their substance use) it will quickly become known among the youth and trust will be lost. Discuss this explicitly with staff and adjust inclusion criteria where possible (see Box 2 for an example).

Step 1.5 Discuss your design with the institution staff

Communication and clear expectations are crucial, both before and during the study. A good working relationship between researchers and institutions is one of the most recommended requirements for successful research in this setting (Hirschinger-Blank et al., 2014; Lane et al., 2012). Presenting the design to the staff, both at the executive and at the caregiving level, will give them a clear understanding of the research, inform them of its relevance, and provides the opportunity for them to offer opinions and practical insights that can benefit the study.

Box 1. The SCREEN project

The SCREEN project - also referred to by participants as the 'fishies' study or the 'gobbing in a tube' study - was an integration of two separate longitudinal research projects. The first study examined the added value of neurobiology in predicting antisocial behavior (for which the youth loooked at a soothing underwater world as a baseline measurement - hence the 'fishies'). The second study was an RCT that examined the effectiveness of Cognitive Bias Modification (CBM) in reducing substance use. The project was led by independent researchers with no professional ties to the institutions, the Department of

Justice or law enforcement. However, the project was fully supported and funded by the Dutch Ministry of Justice and Security.

The study used a step-by-step approach in which participants were first asked to complete a series of questionnaires and tasks on a laptop computer. This test battery included questionnaires to screen for substance-use and the taking of neurobiological measures. Using the VU Ambulatory monitoring system (VU-AMS), autonomic nervous system (CNS) (re)activity was measured. In addition, participants were asked to collect saliva in a plastic tube (free flow through a straw) for determination of hormone levels (hence the "gobbing in a tube").

If the substance-use screening indicated that the adolescents had used cannabis or alcohol in the past year, they were invited to participate in the RCT. The RCT consisted of a CBM computer training focused on alcohol and cannabis use. The training consisted of six 30-minute sessions. The training sessions were conducted by the participants during their detention with 1–7-day intervals between sessions. The intent was to assess its effectiveness as an adjunct to standard care. To achieve this, the training was conducted without any further modifications to the regular care and/or treatment the participants were receiving.

Finally, the project had three follow-up measurements, which took place after one and a half months, three months and 12 months, respectively. Needless to say, the mention of "fish" or "spit" helped significantly in reminding the youth of what study they had participated in.

Step 2: Preparation in the institution

Much needs to be taken care of before you even speak to your first potential participant. Research materials and personnel must be carefully prepared before entering the institution. Staff may assume that researchers need a lot of supervision, which would create a lot of extra work. Researchers, in turn, may be happy to take advantage of this, but

will then be seen by the youth as part of the institution. This in turn may hinder participation and reliability of the data. Independence and autonomy are therefore important for the study to run smoothly. This requires clear agreements and preparations to ensure.

Step 2.1 Arrange a regular contact person within the institution

Navigating a forensic care institution can be complicated for an outsider. Gaining access to the institution, being able to move freely within and making initial contact with the staff and participants often happens through interactions with different departments. Establishing a direct line of communication between the research team and the institution in the form of a permanent contact person within the institution can help new researchers get accustomed and find their way around more efficiently.

Step 2.2 Establish a set testing room/research area within the institution

Keeping the institution reminded of the presence of the study can be a challenge. Even if the researchers are present every day, most individuals there (employees or youth) will probably only encounter them once or twice a week. It helps if your presence is frequent and well-integrated. As researchers, make time to get to know the staff within the institution and, where possible, participate in the daily practices. Attempt to work from a fixed location within the institution, with an internal e-mail address and phone number where you can be reached, and make sure both the study and the researchers are adequately (and repeatedly) introduced. One factor that greatly affects flexibility and the ability to be "seen" within the institution is your mobility. The more you can move freely within the institution, the better.

Step 2.3 Provide training for the research team

Dealing with transgressive behavior, safety protocols and codes of conduct are important topics to discuss. If your team members have no previous experience within a forensic setting, they are likely to encounter situations and/or stories that they may find confrontational or shocking. Furthermore, team members should not interfere when the institution's staff carry out their work, such as intervening in an incident. Once the team is

assembled, prepare team members for the specifics of working in a forensic care institution. It is advisable for them to participate in violence-and-aggression-management, and other relevant trainings the institutions might offer internally. Provide clear lines of communication and support for the team members so that they can express their doubts or frustrations during their tenure.

Step 2.4 Collect online data on your own, imported hardware and manage hardware and/or software security yourself

Forensic care institution's networks are heavily secured and regulated, and IT management often takes place (at least partially) off-site. Obtaining permissions to run online test programs through existing firewalls can be a time-consuming process. In addition, new security protocols and firewall settings can be introduced with each system update and then permissions will have to be obtained anew. It is recommended that you import your own hardware (e.g., mobile broadband modems) as needed for the study. Manage and maintain this hardware yourself. This speeds up IT support (after all, you can take care of it yourself) and ensures that you remain independent. It further limits the efforts required of the institution, guarantees availability when the hardware is needed, and gives you control over hardware and software specifications. All hardware should be password protected, kept under lock and key when not in use, and access should be restricted to research team members only. Firewalls should be programmed to allow access only to IP addresses required for data collection. However, if a remote site is used for data collection (e.g., Qualtrics), system or server updates at either end may invalidate the current firewall settings, interrupting data collection until access is restored. Researchers should therefore prepare protocols to address this problem if it occurs.

Box 2. Practical independence and data confidentiality.

The members of the SCREEN research team were not affiliated with the institutions and presented themselves as such. Extra attention was paid to the confidential nature of the

project and to the fact that all data were processed anonymously. It was emphasized that individual information from the SCREEN project would not be disclosed to the judiciary, police, institution staff or the youths' parents.

The SCREEN project involved an RCT related to cannabis and alcohol use, and from a scientific perspective, it would likely focus on juvenile offenders with evidence of current substance abuse/dependence (as determined by the SCREEN screening instruments). However, because the young offenders are not allowed to use these substances during their stay in the institution, there is a risk of the staff drawing conclusions about substance use based on participation in the RCT. Therefore, in the SCREEN study, the inclusion criteria for the RCT were set to "has used the substance at any time in the past 12 months" and this was clearly communicated to the institutions and to the participants. This way, no conclusions could be drawn about participants' substance use based on participation. Even if a participant had been detained for more than 12 months at the time of testing, it was emphasized to the staff that this still said nothing about the quantity or frequency of use.

Step 3: Recruiting participants

Several challenges may arise during participant recruitment. Ethical issues are of course important in any setting (Guideline for Good Clinical Practice, 2016), but in youth forensic care, or in any judicial context, concepts such as voluntary participation, anonymity and data confidentiality are particularly salient. How the study and the researchers come across to the participants is of paramount importance. Parents/caregivers must often be approached to obtain their informed consent as well. Since they do not reside in the institution, a good strategy for approaching them must be devised in advance.

Step 3.1 Engage participants by emphasizing the benefits

Rewards for participation are tricky with incarcerated youth because there are additional concerns regarding voluntariness and the validity of their right to refuse. Rewards are therefore often not allowed or, when they are, restricted to token rewards of limited value. Scientific advances or clinical improvements are not always of interest to young people, which means a more personalized approach is needed to motivate them to participate. Still, young offenders can be motivated by highlighting the personal benefits of participation. Sometimes aspects inherent to your specific study may interest them (for example, many of the SCREEN participants were very curious about seeing their own heart rate), but more often it is interpersonal factors that are decisive in participant motivations: if they like the researchers, they are more willing to participate. In addition, participation in the study may be seen by the youth as a distraction or break from routine. Participation is most likely when potential participants view the researchers and/or the project positively. To achieve this, participants must first view the researchers as trustworthy.

This places additional demands on the recruitment of team members because they must be individuals to whom the youth respond well. Ideally, candidates have good social skills, empathy for the youth, an interest in forensic work, confidence, are punctual and accurate in their work, and above all, are flexible. Shy or anxious individuals do not work well as they find it difficult to communicate with the youth or the institution's staff. Moreover, they are more likely to be intimidated by the youth and possibly anxious to approach potential participants. At the same time, overconfidence or a cocky attitude may evoke antagonism from potential participants, especially when these characteristics are exhibited by male researchers (most of the youth in the institution are male, and will view this competitively).

Step 3.2 Maximize perceptual independence; ensure that the research team is visibly unaffiliated with the institutions

Ethical concerns primarily relate to voluntary participation, as this is difficult to ensure. Young offenders are placed involuntarily in these institutions, where they are expected to recognize and respect the authority of the staff. The issue becomes even more complicated if the youth expect that participation will be seen as positive by the authorities. Perceptual independence applies to both the participants and the staff at the institution. Participants must be certain that the information they provide will not be used against them, and researchers must ensure that the institution has no expectations in that regard. Participant anonymity and the guarantee that individual data will not be disclosed to third parties without consent should be a given in scientific studies, but in a forensic care setting (or any other closed treatment setting) this requires extra attention. To ensure that participation is truly voluntary, it is better if recruitment is not done by the institution's staff or anyone else involved with the youth in a judicial or authority context.

Researchers should convey information about the study and participation to the youth in-person. Ideally, this should be done in one-on-one interviews, to avoid group processes as much as possible. If that is not feasible, it is best to provide information to as small a group at a time as possible (two- or three-person groups; preferably not through a presentation to the entire living group, or via a flyer handed out by group leaders). A consultation room or a quieter corner of the group's general living room, or the outside area during a fresh-air moment, lend themselves best for this. Through one-on-one conversations, you can give the youth your full attention, minimize peer pressure (which would in turn raise more ethical concerns) and you can better guarantee that the youth has time and space to ask questions.

It is not advisable to have the facility staff provide the information to the youth. They may not have all the facts at the ready, which would result in you, as a researcher, being

unable to guarantee that the youth are fully and correctly informed regarding participation. On top of that, this may cause the youth to see participation as less voluntary.

Step 3.3 Maintain transparency and trustworthiness

Participants must be convinced during recruitment that the researcher is trustworthy and this trust must be maintained throughout the study. Participants are likely to remain in the institution for some time after their data collection has completed and will be in contact with other potential participants. Experience shows that one of the most important factors in recruiting participants is what their peers (i.e., the other incarcerated youth) think of the study. If a participant has reason (real or imagined) to doubt the independence claims of a study, this will spread and significantly reduce the number of inclusions. Conversely, if their peers speak well of the project, others will also be more likely to participate.

It is important that researchers honor their agreements, not only regarding data confidentiality, but also, for example, never cancelling an appointment, or failing to show up when an appointment with a youth is scheduled. Make sure that researchers can fill in for each other. However, never let an institution employee take over.

Step 3.4 Contact parents/guardians yourself during the institution's visiting hours

It may be necessary to obtain informed consent from the youth's parents or guardians. This can be particularly difficult in these settings as parents/guardians are usually not on site. It is advisable to ask potential participants if the researchers may briefly join them during visiting hours. Depending on the setting, there may also be programs in place that encourage more intensive family involvement, such as Family Centered Care (FCC; Simons et al., 2016). This provides additional opportunities to contact parents regarding the study.

Box 3. Recruitment and consent in the SCREEN study

Participation in the SCREEN project was completely voluntary and participants always had the right to refuse, which was clearly emphasized. Researchers were often present in the living groups to answer questions, but also to eat together, chat or play games with the youth. Both youth and staff indicated that they enjoyed this and it often increased their willingness to participate in the study. It was not only enjoyable, but also made the researchers easily approachable for youth who needed clarification or had concerns. With underage participants, researchers first explained to the youth that parental consent was required, inquired whether parents could be contacted, and whether this could take place during visiting hours. A researcher joined briefly at the beginning or end of the visit, introduced the study and gave the information leaflet and informed consent form, which they would go through with the parents and which the parents could take home. If parental visits were not possible, parents/caregivers were contacted by telephone. The confidentiality of the study, the anonymity of their child and the right of refusal were emphasized to them as well. In one of the institutions participating in the SCREEN study, the presence of FCC meant that parents/guardians were on site more often, making it significantly easier to establish contact.

Step 4: Data collection

Data quality is always an important factor in scientific research. With youth in a closed setting, however, you are not only dealing with the potential of socially desirable answering, but also with the fact that youth may genuinely feel that they will benefit from providing false information. Consider, for example, behaviors such as substance use, which may land them in trouble while in detention. In addition, data collection may be disrupted due to specific circumstances within the institution, such as a participant being in isolation or visitors dropping by unexpectedly (which the youth obviously considers to be more important

than your data collection). Researchers need to make extra efforts to protect data quality and be prepared for the peculiarities of data collection within this setting.

Step 4.1 Maintain maximum flexibility

It can frequently happen that appointments made for data collection are not kept. Giving a reminder, even through just stopping by the living group beforehand, helps. It is therefore advisable to have a team member continuously present in the institution to provide reminders or to quickly reschedule. For their part, researchers should never cancel appointments and should always be reliable. Studies with repeated measures will need to incorporate a lot of flexibility into their basic design. It is advisable to plan measurement moments within a specific time frame, rather than at a fixed time.

Step 4.2 Consider the participants' experience

As word-of-mouth spreads quickly within living groups, it is especially important to ensure that participants have as positive an experience as possible during data collection. In addition, be aware of the overrepresentation of language difficulties and mild intellectual disabilities within the young offender population. Keep questionnaire and task instructions short, simple and unambiguous. Because questionnaire items often cannot be worded differently, it is advisable to use instruments aimed at populations with mild intellectual disabilities. The wording used in those instruments is more likely to be understood by all. This not only ensures that the answers given are more accurate (and thus, better data), but the young people will also experience testing more positively if they can follow the survey properly.

Pay attention to the order in which the instruments are administered. For example, alternate questionnaires with tasks so that participants can do something more action-oriented in between the more word-focussed instruments. This will better suit the character of most detained youth.

Step 4.3 Consider the research staff's experience

During project implementation, communication and familiarity among research team members is a necessity, and familiarity with the institution's staff is encouraged (with the understanding that team members may not reveal any information about participants that was obtained during data collection). Team members work long days within the thick walls and closed doors of the forensic institution. Much of what they experience there is confidential and cannot be shared with the outside world, and the independent nature of the project puts them somewhat at a distance from the regular staff. It is therefore important that team members have regular contact and good communication with each other.

Step 4.4 Keep the research current with the institution

There are some additional elements that help keep the ball rolling. First, it is advisable that staff at the institution know how to reach the researchers if they have questions or pertinent information (e.g., letting the researchers know that an appointment cannot go ahead because of unexpected visitors). Make sure the researchers have an internal e-mail account, a pager and a fixed workstation with access to a phone. Direct communication facilitates collaboration; having to wait until you happen to run into someone in the hallways is awkward.

Second, it is a good idea to have new data collectors be trained and introduced to the institution by the current data collectors. This will maintain research continuity when data collectors (often students, as part of an internship) change.

Third, because institution staff is only minimally involved in the study, they may quickly forget the details of the project. It is advisable to keep them informed and reiterate the objectives of the study when introducing a new team member. In addition, try to ensure a sense of team spirit among the team members (within and between the participating institutions, if applicable). Monthly pizza dinners and get-togethers to meet and exchange ideas and experiences are a good way to keep morale high.

Box 4. Addressing the participant experience of the SCREEN participants

Make your study fun: easier said than done. But you can already do a lot by alternating questionnaires with tasks, which is what we did for SCREEN. We also let the youth get accustomed to the VU-AMS device first, let those who were curious see their own heart rate, and only then began the actual data collection. We further tried to minimize potentially less-pleasant experiences. For example, saliva collection is often done by having the participant chew on a cotton ball, which most people find unpleasant. Participants in the SCREEN study filled a tube with saliva through a straw, which made it very memorable for them. At times, getting a seemingly small amount of saliva into the tube proved to be a real challenge, allowing researchers to become rather peculiar cheerleaders: "Think of the most delicious food you can think of," "Can you smell it in your mind?" and "Hang in there, you can do it!", to encourage the flow of saliva

Another fun factor was the ability to see the immediately response in skin conductance after an unexpected loud noise (such as hand clapping next to the participants' ear). The clear response on the screen often surprised participants, as they thought of themselves as "not easily startled".

Step 5: Finalize the project and communicate the results

When a researcher can move through an institution autonomously, reaching out to the youth for participation is readily achievable and feasible. A greater challenge is contacting them once they have left the institution. Furthermore, one thing that we have heard from institutions repeatedly is that there is very close contact with the researchers during the study, but once data-collection comes to an end, they disappear and very little outcome information is shared. Good information gathering for follow-up, as well as thorough completion and feedback of the results is therefore extremely important to make participation in scientific research seem worthwhile, both for the youth and the institutions.

Step 5.1 Follow-up measurements

After your participants have been released, it can be very difficult to contract them for follow-up measurements or participation in future research. It is therefore advisable to collect as much contact information as possible while they are in the institution, ideally for various communication mediums (such as phone numbers, email addresses, Facebook, Twitter, Instagram, YouTube channel, third-party contacts, etc.). Of course, this can only be done on a voluntary basis and contact information obtained in this way should never be made available outside the research team.

Box 5. Follow-up measurements

In the SCREEN project, a dedicated team was employed for follow-up measurements with participants who had been released; the team members within the institutions were too busy with new inclusions and the follow-up measurements of youth who were still detained. The follow-up measurements were designed to be short (10-15 minutes maximum) and easily administered (via telephone). Potentially incriminating information was not said aloud (e.g., "have you smoked marijuana yes/no" rather than "what drugs have you used"). When all other means of communication failed, home visits were made (as a team). It is useful to include something memorable in the (initial) survey so that participants remember the survey a year later, even if they do not personally know the researcher calling them. For example, the SCREEN project was often remembered as "that time I had to gob in a tube".

Our team turned out to be veritable detectives, who tracked down the youth through YouTube channels, Instagram, Facebook, friends' phone numbers (all provided by the youth themselves, of course). Sometimes the youths themselves were surprised that we managed to track them down.

Step 5.2 Communicate results

Don't forget to communicate the results of your study back to the institutions and to the scientific community. From the institutions' perspective, researchers come in with much fanfare and enthusiasm, collect their data (which often requires no small amount of effort on the part of the institutions) and then abruptly disappear. It typically takes time to get results published in scientific journals, and these will not always be accessible to most professionals working with these youth. We recommend that institutions be kept informed of your progress after data collection has completed, and that the results and their practical implications be presented to staff and, where possible, the youth themselves.

Step 5.3 Practice, implementation and subsequent research

When you report your results back to the institutions, you will find that their interest is mostly practical: what can they do now, given your findings? It is very helpful when scientific results are translated into practice and you can offer something concrete that they can apply in their work (or, conversely, something they should avoid). Talking with professionals about the relevance of research to clinical practice often reveals opportunities for follow-up research. If you can involve institutions and their staff in planning your next study, you increase the likelihood of their cooperation. Institutions can often only accommodate a limited number of studies at a time, and if working with you has been a pleasant experience for them, they are more likely to grant your next data collection request.

Conclusion

The recommendations presented in this article are intended to assist researchers from a variety of disciplines who wish to conduct a study within a forensic juvenile care facility, particularly large and/or multifaceted studies, or studies examining constructs expected to elicit hesitancy among participants or institutions. The identified challenges and recommendations arising from our combined experiences share similarities with, and complement, previous recommendations based on the U.S. situation (Lane et al., 2012).

Moreover, these recommendations extend beyond juvenile detention centers. In the Netherlands, there are different types of forensic care settings where juveniles reside. In addition to correctional facilities, there are, for example, closed youth care institutions and small-scale facilities in residential areas. Our recommendations are also applicable for research in these other forms of closed and semi-open settings.

In conclusion, conducting research in a closed (forensic) juvenile care institution is feasible, provided the challenges inherent in this setting are properly anticipated and addressed. In each step of designing and conducting research, a number of concerns of specific importance emerged, which we have attempted to outline above. We argue that conducting successful research in this setting can be achieved primarily by being independent as a research team, being well embedded and findable, and most importantly, by always pursuing flexibility and reliability. More study with this complex population is needed to reduce antisocial behavior in the long term and thereby improve the quality of life of these young people. Researchers should thus not shun entering the forensic environment, but rather see it as a valuable challenge.

Chapter 6

General Discussion

Young offenders show higher levels of substance use compared to their non-offending peers, and are at an increased risk of developing substance use disorders. Heavy substance use is related to negative consequences for the individual, such as increased recidivism, loss of education and job, broken relationships and increased risk of physical injury, and inflicts a significant burden on society in the form of healthcare costs, criminal activity and loss of employment (T. Miller & Hendrie, 2008). Professionals and organizations involved with young offenders are eager for effective treatment options. Cognitive Bias Modification (CBM) is a low-threshold method that has been shown to be effective in the treatment of alcoholism in adults. Its accessibility and ease of execution would make it eminently suitable for application within a juvenile detention context. This dissertation attempted to improve the treatment of substance use in young offenders by developing and testing a training program based on CBM paradigms, which could be implemented adjunct to regular treatment offered in a detention setting. To this end we have implemented a multi-site randomized controlled trial (RCT) where we (*a*) tested the effectiveness of CBM-training in reducing alcohol and cannabis use, (*b*) examined secondary effects on delinquent recidivism, (*c*) tested potential moderators such as working memory, and (*d*) tested the impact of Motivational Interviewing (MI) on their motivation to engage with the training and to reduce their substance use. Our target population was both detained (short-stay) and incarcerated (long-stay) young offenders, but not youth involved in parole or diversionary programs.

Summary of the Main Findings

In the first study (***chapter 2***) a CBM-training program was implemented in a multi-site RCT in a double-blind, 2x2 design. Participants performed tasks targeting approach and attentional biases in alcohol or cannabis use, received either an active training- or sham-version of either task. This CBM-training program was compared with Treatment As Usual, which would be whatever form of substance use treatment the youth would receive (if any) during their detention according to standard procedures. We examined changes in bias

scores post-training, and changes in substance use and delinquent recidivism at a one-year follow-up, as well as testing promising moderators to identify potential differentially benefiting subgroups.

Attentional biases were present for both substances prior to the training, but no approach biases were found. Attentional biases decreased over time for both substances, but for the cannabis-trained participants, attentional biases decreased in the sham-trained group as well as in the active-trained group. Participants did not show a significant reduction in alcohol use at follow-up. Cannabis use did decrease, but did so regardless of condition. No significant reduction in delinquent recidivism was found. Finally, some moderation interactions were found, but none were adequately conclusive. In short, biases were found and CBM was able to modify them, but this did not result in the desired behavioral change.

The next article (***chapter 3***) reviewed the use of motivation in the current scientific literature with detained young offenders. This review reemphasized the importance of motivation for successful clinical practice, but also found that there is a large amount of heterogeneity in the operationalization of the construct “motivation” between the many studies that employ the concept. It further showed that studies frequently call on the term motivation, or claim that their methodology focused on improving motivation, without measuring motivation as an outcome of the study (i.e., showing an actual effect of or on motivation), and sometimes, without measuring it at all. Finally, it showed that detained young offenders are not necessarily poorly motivated, as is often assumed. Motivational issues within the detention context likely arise from issues with treatment salience; if the youth see treatment as relevant and beneficial to them personally, they can be as motivated as any other teenager.

The next empirical study (***chapter 4***) replicated the CBM-training RCT (***chapter 2***), supplemented with a Motivational Interviewing module. This module was designed to increase their motivation to change their behavior, to help them arrive at the decision to reduce their substance use. The hypothesis was that increased motivation to reduce

substance use would support the change in behavior that we tried to achieve with the CBM-training, leading to a significant reduction in substance use in actively-trained participants.

The study did not find a significant improvement in motivation over time, nor any different effects on substance use than those found before (***chapter 2***). However, reported motivation to engage with the training was notably higher than the motivation to change their substance use. This fits with the overall picture of young offenders being reasonably motivated in general, but if they do not see the personal relevance of the treatment, there is no incentive to apply what they might have gained from the treatment to their behavior.

Finally, the last article presented in this dissertation (***chapter 5***) outlines the lessons the researchers have learned in the execution of these and other complex studies within a juvenile detention setting. It provides numerous suggestions for what we consider to be best-practices to ensure a goodly amount of high-quality data while maintaining ethical and scientific integrity, without being needlessly disruptive to the day-to-day practices of the participating facilities.

The studies presented in this dissertation have demonstrated the feasibility of a computerized CBM training program applied with detained young offenders. We have delved into the importance and idiosyncrasy of motivation in this challenging population, and provided pertinent advice for the execution of extensive empirical and clinical research in the detention setting. We did not find support for a clinical effect of CBM in reducing substance use in detained youth. While this result is disappointing, it is perhaps not surprising given the developments in the field since the start of this project, 10 years ago.

Cognitive Bias Modification: What We Have Learned

CBM paradigms were originally developed as the practical application of Dual Process models of cognition (Wiers et al., 2006). From a Dual Process perspective, treatment could target either explicit cognition (through, e.g., Cognitive Behavioral methods) or implicit cognitions (through CBM). However, Dual Process models have since been

criticized as they were difficult to reconcile with the results that have been found over the years (Hommel & Wiers, 2017; Keren & Schul, 2009). In particular, the notion that there are two separate cognitive pathways for either controlled or automated responses has been challenged. More recent conceptualizations posit that that (non-reflexive) behavior is the result of a dynamic and recursive decision-making process in response to a cue, whereby a known action pattern is selected based on cue-evaluation and the predicted outcome. This is a weighted decision where multiple applicable action patterns are evaluated on various parameters such as the relative speed and ease with which the action can be executed, as well as the desirability and likelihood of the predicted outcome. These action patterns are formed based on previous experience with the cues and the resulting outcome, while the relative weight assigned to each action pattern with regards to its alternatives is updated every time the action is performed, based on how successful that action was, i.e., how closely the experienced outcome matched the goal of the individual. Cognitive capacity and resources to evaluate the short-term gains vs long-term consequences can modulate this decision.

Whereas the original Dual Process perspective posits that CBM functions by replacing an ingrained automatic cue-behavior action pattern (e.g., see the beer = approach the beer) with a different one (e.g., see the beer = avoid the beer), more recent studies have found that successful bias modification does not necessarily lead to changes in behavior, and that cognitive biases can also be altered through verbal instruction and explicit awareness, rather than repeated action (Van Dessel et al., 2015, 2016, 2020). Integrating these results, an inferential model has been proposed where the cue-behavior action pattern is instead linked with goal directedness, where CBM functions by targeting novel, sobriety-oriented goals, and the inferred benefits from achieving these new goals (Van Dessel et al., 2019).

What this boils down to is that the development of so-called “automated” action-patterns (which are typically implicated in substance use behavior) is not solely contingent

on implicit, near-subconscious cognitive processes like approach and avoidance tendencies, as is suggested by dual-process systems. Instead, value-based assessment of contextual factors in which cues are presented, and the salience of specific cues and associated outcomes to the individual, provide a differential amount of weight to a pool of potential action-patterns, from which a selection is made. This is reflected in more recent clinical research as well, where clinical effects of CBM are mostly found with patients undergoing treatment for substance dependency (Boffo et al., 2019; Manning et al., 2022), i.e., participants who had a clear goal (sobriety) associated with desistance from substance use.

Based on the more inferential model of cognitive biases presented above, a new CBM paradigm has been suggested, ABC-training (Van Dessel et al., 2023; Wiers et al., 2020). This method proposes that classic CBM paradigms should be enhanced with real-life (A)ntecedent cues, goal-relevant (B)ehavioral choices, and action (C)onsequences to better place the training into context. The real-life antecedents should reflect common situations where the participant encounters the substance (e.g., a fridge, favorite bar, friend's house, etc.), the alternative behavioral choices should be relevant to the goal that they are training towards (e.g., grabbing some water instead), and the choices should be tied to relevant real-life consequences of those actions (e.g., a personally-relevant beneficial consequence of sobriety vs. a negative consequence of alcohol use). Ideally, the antecedents and consequences in particular should be tailored to the individual's situation, and the behavioral choices relevant for a goal they themselves have set. This puts the CBM-training in a more personally relevant context for each participant.

The "context" factor was notably flawed in our CBM-training design. Specifically, we note issues relating to three areas: Cue context, cue salience, and behavior context.

Cue Context: The CBM-training (***chapters 2 and 4***) used visual stimuli (pictures) as cues. For the alcohol-oriented training, the pictures came from the Amsterdam Beverage Picture Set (Pronk et al., 2015). These pictures were designed for the measurement of cognitive bias. As such, the layout of the images minimizes inclusions in the pictures that

could draw attention or otherwise influence responses in bias measurement tasks, thereby evoking responses that are solely influenced by the fact that the image displayed an alcoholic or non-alcoholic beverage. For the cannabis-oriented training, a set of pictures was created using the same design parameters. Whilst sensible from a theoretical/scientific perspective (for the purposes of measuring bias), these pictures do not reflect the context in which youth encounter the substances in real life, as the pictures are entirely devoid of context. Thus, it makes sense that the images used would support a successful reduction in cognitive bias, but this reduction would be unlikely to transfer to real life behavior and thus not lead to a reduction in actual use, which is what we found (***chapter 2***).

Cue Salience: The Amsterdam Beverage Picture Set provides numerous matched pairs, where each picture of an alcoholic beverage is matched with a picture of a soft drink. The idea was that a soft drink would be a salient alternative to alcohol, both being beverages that one might select for characteristics beyond merely quenching thirst, such as taste. Each matched pair would visually be as identical as possible. For example, a green beer can would be matched with a green soft drink can, or a hand holding an alcoholic drink would be matched with a hand holding a soft drink in the exact same position. The intent was to control for any variability in the stimuli beyond alcoholic vs. non-alcoholic. When creating the cannabis stimuli, however, we ran into the issue that there is no alternative that would match cannabis as closely as soft drinks would match alcohol. Tabacco is very close in terms of visuals and application, but for obvious reasons we could not design a CBM-task that would train cognitive biases towards tobacco use. Instead, we created a set of “matching” control pictures showing stationery in roughly comparable lay-outs as the cannabis pictures. For example, someone with a joint in their mouth matched with someone with a pen in their mouth, or an image of someone licking the edge of their rolling paper matched with someone licking an envelope, a solution that has been used in several other studies (e.g., (Cousijn et al., 2011).

Clearly, stationery does not appeal to the same appetites as cannabis does, and as such is not as close an alternative as a soft drink is to an alcoholic beverage. Furthermore, it is not unreasonable to assume that to most of our participants the sight of stationery is actually far more unusual/infrequent in their lives than the sight of cannabis and cannabis-related items. Finally, to match the layout of the cannabis pictures, the stationery configurations sometimes became very contrived, such as a roll of duct-tape filled with paperclips and a pen sticking out, to match a picture of a joint in an ashtray. Thus, for the cannabis-oriented training, the alternatives offered to cannabis held little to no salience to our participants, and may even have been distracting during the training, thereby skewing initial bias measurements as the oddly configured stationery drew too much attention. This might explain why attentional bias decreased in both conditions for the cannabis training (***chapter 2***), as the discrepancies in reaction times decreased with reassessment as the participants had become familiar with the control pictures.

A final issue with cue salience arises from the fact that the same picture set was used for each participant. As the substances displayed were not tailored to personal preferences, the stimuli may not have been accurately representative of individual usage experiences. The alcohol pictures, for example, featured wine and major beer brands, as these are the most commonly consumed alcoholic beverages. However, it is entirely possible that some of our participants would've been better served with images of liquor or mix-drinks, if these were more reflective of their own go-to drink choices. The cannabis pictures in particular have drawn commentary from the participants regarding their ecological validity. Many expressed a decided preference for hashish over marijuana (or hash over weed; drug-related colloquialisms vary) and several criticized the joints in our pictures for not having been rolled inside-out. This lack of stimulus-salience may well have influenced our results.

However, it is worth noting that the youth were able to discern a surprising amount of detail in the pictures, being able to identify both rolling-technique and specifics of the substance contained inside the rolling paper. This at least suggests that the basic mechanics

behind the visual stimuli work; the youth correctly and quickly process pertinent characteristics of each category of stimulus on sight. Presumably, if we can get the salience of the stimuli right, CBM would work more effectively.

Behavior Context: Aside from the contents of the stimuli, the activity shown (if any activity was shown at all, which was not the case in 50% of the stimuli) was not put into context. For example, a stimulus would show a close-up photo of a hand holding a joint and the lower half of someone's face blowing out smoke, but this would be framed against an entirely white background. Stimuli were not presented in the context of a bar, a social gathering, a living room, or any ecologically valid setting where the youth might be presented with similar stimuli in real life. Our CBM training attempted to enhance their ability to disengage from substance-related cues, but without putting those cues in a context where the youth is likely to encounter them, there would be very little transference of this "learned" disengagement from the clinical setting.

We should perhaps also factor in that disengagement from substance-related cues, and by extension, desistance from substance using behaviors, is something that detained youth may already exercise to a greater extent than they would outside of the detention setting. Availability of substances, and opportunity for use, is far more limited (but, admittedly, often not entirely absent) for detained youth. Throughout any given day, they likely have to suppress the desire to engage in use-behavior far more often than they would at home. This may reduce the impact of active disengagement training and as such, the changes in bias that we've seen (***chapter 2***) may simply reflect familiarity with the training tasks.

However, similar restrictions apply to a population where CBM has been shown to be effective, namely in-patient adults in substance use treatment (Eberl et al., 2013; Manning et al., 2016, 2019, 2021, 2022; Wiers et al., 2023). Patients in an abstinence-oriented treatment program experience a similar abstinence-imposing treatment context as do detained youth. Differences between these two populations are likely due to goal-orientation, and what goals

are achieved with desistance from substance use behavior. The in-patient adults mentioned were all in voluntary treatment; they had abstinence as a long-term goal, both inside and outside the treatment context. For the detained youth, however, abstinence goals were likely tied to the detention context, such as staying out of trouble, or earning the right to go on leave on the weekends. Outside of the detention context, the youth's goals no longer align with abstinence. Behavior is goal driven (Hommel & Wiers, 2017), and when engagement in use-behavior does not conflict with the individual's goals, there is far less imperative to engage in non-use behavior regardless of how well CBM has reduced their cognitive biases.

A Final Note on Context:

One of the most striking findings from this dissertation is that cannabis use, while remaining relatively high for an adolescent population, decreased over time across all CBM conditions (***chapter 2***). One year after completion of the CBM-training, participants reported lower levels of cannabis use than they did during the year preceding the training. Many of our participants were no longer detained at the time of the follow-up (or had at least been released at some point between our training and the follow-up), and as such, it is possible that the lower reported levels of use are due to social-desirable answering. However, as we put a significant amount of time and effort into establishing ourselves as separate from the institutions and the judicial system (***chapter 5***), there is no reason to think that they would be more careful in revealing their substance use to us then, than they were during their detention. There are, however, two alternative explanations.

The first is practical. Cannabis use may actually increase during detention as cannabis is (anecdotally) easier to smuggle into the detention center than most other substances. It is less expensive than hard drugs, meaning there is less risk/debt involved in asking someone to obtain some for you, and it is less voluminous and rigid than, say, a bottle of liquor, and thus easier to hide. Cannabis may thus become the de facto substance of choice during detention because of its availability. Outside detention, other options become more widely available, thus leading to less cannabis use.

The second explanation is similar, but revolves around the function of cannabis during detention, rather than availability. Research has shown that young prisoners use cannabis as a way to pass the time (Cope, 2003). Whether it is from boredom or a desire to be released more quickly, cannabis helps youth to sit-out their time during detention. Outside of detention, this need is less prevalent and thus less cannabis is consumed as there are other activities with which to fill their day. This would suggest that, much like a surgery patient is given a morphine drip in the hospital and does not develop a substance dependency after discharge, the contextual difference between inside the detention center and outside is sufficiently big to have a significant impact on the progression of young offender substance use. If substance use behavior inside the detention center is concretely different from substance use behavior outside, it would further reduce the ecological validity of treatment programs inside the detention center as they would not target behavior as the youth engage in it in normal life.

Motivation: What We Have Learned

We have reviewed motivation and treatment in detained youth and how it is currently represented in the scientific literature (***chapter 3***), and conducted a pilot study where we added a Motivational Interviewing (MI) module to our CBM training (***chapter 4***). While the review provided a number of valuable insights into motivation as it pertains to treatment, probably the most important one is the extent to which adolescent treatment motivation is dependent on the perceived salience of the offered treatment. This ties in with the importance of salience and goal-orientation that we discussed in regards to the CBM results. Young offenders (like adolescents in general) need to feel that the treatment is relevant to them, they need to recognize that its form and content is applicable to them, and the intended outcomes of the treatment need to align with their goals.

This can be very challenging to achieve in the forensic context. Very broadly speaking, the intended outcomes of treatment that the youth receive in a detention context is in direct opposition to their goals. Many of them perceive engaging in illegal activity as the

only method by which they can generate sufficient funds to purchase or otherwise obtain the things they desire, often status symbols such as expensive designer clothes or the most up to date technological gadgets. Yet the programs in a juvenile detention center are typically focussed on desistance from illegal behavior, as that is the goal society has stated for these institutions. This is a clear conflict that makes it easy to see why youth would not be particularly motivated for these treatment programs.

Substance use treatment struggles with much the same issue. At its core, substance use is motivated by a desire for the effects of intoxication. Whether it is to get high, or to avoid withdrawal effects, the goal of substance use is, basically, to have the altered brain chemistry that comes with being under the influence. In addiction this goal is so imperative that people typically only seek help once all the downsides that come with intoxication and substance-seeking behavior have reached a critical point (colloquially known as “hitting rock-bottom”). The issue is further complicated if the substance is used as a form of self-medication. Sobriety, in these cases, comes with a very real downside (at least in the short run), which intoxication resolves. In the long run, however, this is a vicious cycle as the downsides of sobriety will be exacerbated as withdrawal-symptoms are added to the pre-existing issues, which leads to more substance use, and so on. Self-medication is common in young offender populations (Esposito-Smythers et al., 2008), and they are typically too young to have hit rock-bottom. It is therefore not difficult to see that they would not be greatly motivated to reduce their substance use behavior.

Treatment options for young offenders would thus be greatly improved if we could convince them of the relevance of treatment, i.e., have them come to the conclusion that they would benefit, and have them form goals comparable to the treatment outcomes. MI, as a therapeutic communication style, focuses on ambivalence in an individual towards their behavior and aids in exploring ambivalence and form a conclusion regarding the need for behavioral change. The module we adapted, “Stap-voor-Stap”, does so specifically for substance use behavior. Designed for adult parolees, it guides participants through the initial

stages of change, with the intent being that they form goals in line with behavior change, i.e., reduced substance use behavior. Unfortunately, the adapted MI protocol did not significantly increase motivation for either behavior change or treatment engagement in our participants.

One way in which our MI module might not have been adequate for effecting motivation change in young offenders is in the way it tries to illuminate the relevance of behavioral change to the individual. It asks participants to reflect on difficulties/problems they had in their live during the years in which they used substances. While substance use is relatively high in young offender populations, they are still teenagers; they have relatively few years of heavy substance use behind them, compared to older populations. Subsequently, there has not been that much time for problems to develop. A possible confound in this situation could be that, being (mostly) teenagers, they may feel that a lot of the problems that they face in life arise from a relative lack of autonomy that they experience in their lives (i.e., are attributable to the adults around them), rather than a consequence of their own habits.

Another problem may have been timing. As stated, the MI module guides participants through the early stages of developmental change, at the end of which they (ideally) come to adopt behavior change as a goal. Due to time constraints, we ran the MI module alongside CBM-training. As such, if our participants came to the conclusion that they had to change their substance use behavior, they would likely do so right as the training concluded. It is therefore possible that they did end up motivated, but only started to do so at the last session.

Finally, while we adapted the module as best we could from adult parolees to detained youth, we overlooked the fact that after running through our MI-module, the youth would still be detained, as opposed to the adult parolees. A big problem here are the fifth and sixth step in our module. In the fifth step, the client sets goals for themselves regarding their substance use and delinquent behavior, such as “I only drink at parties”, and “I don’t steal from the elderly”. Great goals to set, but as the youth were detained, they could not

attend parties and encountered very few elderly people. A lot of the other goals were similarly not achievable, or not applicable, while detained. This is markedly different from the adult parolees, who could immediately act on the goals that they set and encounter relevant reinforcement of that behavior. Similarly, in the sixth step the participants identified external sources of support that could help them achieve their goals, such as detox clinics or self-help groups. Again, this included several options that would not be available to them until they were released from detention. This meant that they may have decided to change their behavior, only to realize that most of their plans could not be put into action.

In summary, motivating young offenders for forensic treatment is very challenging, as the (typically extrinsically set) goals do not align with their own goals. They are often too young to have "hit rock bottom" and are driven more by teenage inquisitiveness regarding substances. Their substance use is goal-oriented (Kopetz & Orehek, 2015), but these goals are shaped by the short-term benefits, more so than the long-term consequences. This is not surprising, given that the prefrontal cortex, the area of the brain associated with long-term thinking and responsible decision making, is not yet fully developed at this age (Arain et al., 2013). Studies have found that, compared to adults, adolescents show less activity in the prefrontal cortex during the decision-making process, relying instead on emotional cues or "gut feeling". This makes rational argumentation less suitable for convincing teenagers. We can tell them that we have their best interests at heart, but they need to feel it, not hear it.

Takeaways

Young Offenders Are Adolescents

CBM has predominantly been successful with adult patient populations (Eberl et al., 2013; Manning et al., 2016, 2019, 2021, 2022). Yet, when this project began there was no reason to think that CBM would not be effective with adolescents. In fact, there was reason to think that CBM might be particularly well-suited to adolescents. Adolescents' neural

development makes them more prone to impulsive decision making (Arain et al., 2013) and based on dual-process models, this impulsivity is exactly what CBM targeted. Our findings are that, while cognitive biases are present and CBM can effectively modify them, there were no clinical effects (***chapter 2***). CBM may influence their biases, but it doesn't lead to them making different decisions when prompted with substance use cues. The adolescent prefrontal cortex is still in the process of fully maturing, and subsequently might simply not be able to drive the decision-making any more than it already does, despite changes in cue-reactivity, which might explain why neural processes do not significantly change post-CBM (Karoly et al., 2019).

The MI protocol that was employed (***chapter 4***) was similarly affected by the age of our participants. As mentioned above, the protocol was adapted from a protocol used with adult parolees, and included a central exercise where each participant linked the progress of their substance use to the events that took place in their lives, over time. For most adults with substance use issues, this would result in a clear correlation where, as substance use increases over time, so do negative life-events and personal problems. For the young offenders, this relationship may simply not have had enough time to develop. Furthermore, it ties back to the neural immaturity mentioned above, where even if they saw a clear-cut relation, the long-term downsides of continued substance use would not be given the same weight in the decision-making process as the short-term benefits.

Now, all of this is not to say that adolescents cannot make the decision to abstain from substance use when presented with substance use cues. Adolescents are fully capable of understanding long-term consequences and will take them into consideration during the decision-making process. However, long-term consequences are abstract, and adolescents understand them on an intellectual level, whereas shot-term benefits are immediate and emotional, and are thus more likely to be assigned greater weight when making decisions. Both CBM and the MI protocol are methods that have been tested with adults, and were then

extended down to an adolescent population. Both have not given the results that one would expect, based on their performance with adults.

This highlights how important it is that treatment methods aimed at adolescents should be developed for adolescents, not simply adapted from adult treatment options. The adolescent brain is still in the process of maturing, and adolescent goals are not the same as those of adults. One important goal, for example, is social status. As children enter adolescence, social status amongst their peers becomes increasingly important (Crone & Dahl, 2012), and the peer-context is precisely where most of their substance use happens. An adolescent may well understand why their parent (or their counsellor, therapist, or any other adult authority) wants them to abstain from substance use, but when substance use is encouraged in the peer-context, long-term consequences are simply not that important to the adolescent in the moment when they're with a friend and they need to choose to use or abstain. This ties in with the importance of personal salience in the context of treatment motivation. Effective treatment options for young offenders are likely those that focus on what's important to the youth, and align with their goals and perspectives (Dahl et al., 2018; Yeager etal., 2018). We need to recognize that reasoning, with adolescents, only goes so far; they need to want the behavioral change that we're trying to help them achieve.

While it is clear that we should not simply extend downward from adulthood to adolescence, it is also worth pointing out that extending horizontally, from general population adolescents to young offenders, can run into similar issues. Young offenders are adolescents, yes, but they are not average adolescents. For example, young offender populations typically include proportionally more ethnic minorities compared to the general population, with higher occurrences of psychopathology, comorbidity, trauma and (mild) intellectual disability. They are very much their own population, not an extension of general population adolescents. One clear example of this is found in academic motivation (***chapter 3***). Positive teacher-related factors, such as student-teacher bond, did not improve academic motivation in young offenders. This is a stark contrast with general population adolescents,

where positive teacher-related factors are often a strong motivator (Banerjee & Halder, 2021; Stroet et al., 2013; Zee & Koomen, 2016).

Focussing on Motivation Rather Than Treatment May Be More Optimal

It is clear that motivation is a key factor in any treatment plan. It is also easy to see why detained young offenders are likely not optimally motivated at the start of treatment. They did not choose to enter the treatment setting (i.e., the detention center), nor did they come seeking treatment for the targeted issues (i.e., their delinquent behavior). This sets them apart from (most) other clinical populations who have typically come to the decision to engage in treatment when they enter a treatment context. They are ready to be treated; young offenders often are not. This begs the question if the main focus during detention should still be treatment, or whether it should shift to motivation enhancement for behavioral change. There are several complications that make treatment inside a detention center suboptimal.

One thing that complicates treatment, compared to treatment outside detention, is that treatment duration in the detention center is determined by sentence, not by treatment protocol. When a young offender's sentence has run, they are released, regardless of treatment progress. This means that young offenders need to catch-up on their motivation, and (often) have a very limited time in which to complete treatment. Running motivation enhancement parallel to treatment is seemingly not as effective (***chapter 4***), as the initial part of the treatment will still suffer due to a lack of motivation.

Treatment is also likely to suffer due to the fact that detained young offenders can't put what they learn in treatment into practice. Most of the time, treatment is focussed on the youth's behavior outside of the detention center. Certain tools or plans that develop during their treatment (e.g., contingency management in risky situations) cannot be put into action until much later, leaving little room for the youth to reflect on their progress with their therapist. Granted, this is certainly not always true; contingencies to avoid aggression during

interpersonal conflict, for example, can be practiced within the detention setting. For substance use treatment in particular, the case can be made that the circumstances in a detention setting are not that different from those in an in-patient detoxification clinic. However, detoxification clinics compose treatment plans based on treatment protocol, not sentence, and there are more options for continued treatment post-detoxification. Another important difference is that a detoxification clinic imposes sobriety as a goal, whereas the detention center does not. Sobriety in the detention center is simply mandated.

This creates an unusual situation where a juvenile detention center is a clinical setting, yet much of the context is derived from non-clinical considerations. Entry into the setting, length of stay, what the youth see around them, security measures, sobriety, etc., are all derived from the fact that it is a detention facility. This makes it difficult for the youth to experience their detention as anything other than punitive. They sit out their sentence, and once released, are unlikely to have any desire to bring any of that into their daily lives. Subsequently, much of what they learn in treatment is likely to have very little, if any, impact on their behavior once they are no longer detained. The behavioral goals set by the treatment were not their goals, nor is there anyone to whom they are accountable.

Finally, there is the issue of peer influence. Group therapy is common in the detention setting, yet research suggests that this can have iatrogenic effects (Dishion et al., 1999; Macgowan & Wagner, 2005). The peers that the youth find themselves placed with, can be disruptive to their progress. Once released, the youth is back amongst his old peer group, who will likely expect and want them to continue on as they did before their detention. Under regular clinical conditions, what one gains from treatment is implemented gradually in daily life, as there is time between session in which life goes on. For detained young offenders, all of the treatment effects need to be implemented at once, which would likely be such a shift in attitude on the part of the formerly detained youth that it would encounter resistance and dismissal from their peers. This is hard to deal with for any adolescent.

Instead of trying to make treatment fit within the detention setting, we may be better off focusing on improving intrinsic motivation for behavioral change within the youth. As mentioned, they unlikely to start off motivated, particularly concerning their behavior post-detention. If, during their detention, they can develop a personal sense of relevance with regards to behavioral change (be it sobriety or prosocial behavior), we can hope to enhance the likelihood of them seeking out treatment after their detention. This would counter another issue that the detention setting brings, even for motivated youth: Treatment is unlikely to continue once the youth has been released. Unless the youth was treated by an external practitioner, they will not be able to see the same practitioner they may have connected with during their detention. Ideally, detention centers would have contacts with external practitioners who they could recommend to the youth. This would ensure horizontal continuity to the care-process; the detention centers help them see the personal relevance of behavioral change, then helps them on their way to achieve that change.

CBM for Substance Use in Young Offenders

Regardless of the suitability of a detention context as a treatment setting, we think that CBM could still be effective in reducing substance use in young offenders, provided it is administered in the form in which we currently think it to be effective: as a tool to help motivated individuals with sobriety goals. If a young offender sees the relevance of sobriety (possibly after successful motivation enhancement during their detention) and wants treatment for their substance use, there is no reason to think that CBM would not work as it seems to work with adults. As per ABC-methodology (Wiers et al., 2020), relevant alternatives can be compiled to increase the personal relevance for each individual, further increasing the salience of the treatment.

That said, we do have to acknowledge a potential complication that was suggested by our data (***chapter 2***). Detained young offenders who received the standard substance

use treatment in Dutch detention centers (*Brains4Use*, 2015) AND active CBM training showed higher levels of alcohol use at follow-up. This effect was only found for alcohol, which is a small group, so the results might not have been reliable. However, it is also possible that there is a conflict in the two methodologies' approach to substances; CBM actively seeks to divert the attention away from the substance, whilst the therapy heavily focusses on it. Nevertheless, the current view on CBM is that it is effective adjunct to a more involved treatment, not as a stand-alone option (Boffo et al., 2019). Perhaps other treatment options would make for better a pairing, for instance Multidimensional Family Therapy (MDFT; Liddle, 1999). MDFT seems to be an effective treatment option for substance use in youth and improves treatment retention (Filges et al., 2015). Whilst family involvement in treatment within a detention center can be difficult to achieve, an advantage of MDFT is that treatment length does not seem to impact its effectiveness, meaning a few sessions would already be beneficial (van der Pol et al., 2017).

Future Research

For future studies looking into the application of CBM with young offenders, we do think it would be prudent to focus on heavy users. Out of ethical considerations, the studies presented here focussed on all users (see ***chapters 2 and 5*** for more details), which included recreational users, especially in the alcohol group. However, targeting heavy users while they are in the detention center, particularly if said use took place in the detention center, can lead to ethical complications and unreliable data. For this reason (as well as the issues with treatment within a detention context; see above) initial studies into the effectiveness with CBM in, say, young offenders with substance-dependencies, might best be done outside of the detention setting (and in tandem with another form of treatment).

Motivation should absolutely be taken into account. Ideally, participants should be well motivated before they start CBM-training. The training format should also be tailored to

individual participants, using cues and contexts that are relevant to their situation, targeting behaviors and goals that they have set for themselves. This will further increase the personal relevance of the treatment as a whole for the youth, which is an important factor in motivating adolescents for treatment and behavioral change.

Conclusion

The studies presented in this dissertation provide a solid contribution to the field of young offender substance use treatment. While we have not managed to create an effective CBM-training program, the studies provide a wealth of insight into substance use treatment within the context of a juvenile detention center. This is important, as the detention setting gives us unparalleled access to young offenders and is thus one of the main avenues for providing the youth with aid and mental health care. Turning a young offender off the path to becoming a career criminal pays large dividends, both for the youth themselves and society as a whole. What's more, successful desistance from crime is frequently paid forwards, as the youth pass their new pro-social values on to their environment and the next generation. In detention, we have a very concrete opportunity to engage them, and thus any insights that increase the chances of success are valuable.

There is a strong need for more evidence-based treatment options, which requires more empirical studies to be done in the actual treatment contexts. However, research in juvenile detention centers is often difficult as the daily schedules and practices are highly regimented, and any disruption thereof is poorly received by both the youth and staff, not to mention unethical if it disrupts rehabilitation processes. Difficult, but as this dissertation shows, far from impossible. The methods presented here along with concrete advice for the implementation of complex research designs will hopefully enable more ecologically-valid research into motivation and treatment within the detention setting.

This dissertation re-emphasizes that every population group should be considered in its own individual light, not simply as an extension from (seemingly) very similar groups (i.e.,

non-offending substance users and adult offenders). While not a new insight, and perhaps obvious in hindsight, it illustrates how easily this is overlooked. At the time, there was no reason to think that CBM might function differently for different populations; in fact, identifying subgroups was one of the research questions in our first study (***chapter 2***). Similarly, the MI-protocol that was adapted seemed equally well-suited to the young offender population, as the imagery used in the original (i.e., the version for adult parolees) typically showed young individuals, relatable to the adolescents as well. In both cases, applying the established methodology to the young offender population seemed a good idea, and in both cases, we found several characteristics inherent to the young offender population that differentiated them. This is something that researchers should always keep in mind when extending existing methods.

If this dissertation has managed to show anything, we hope it is that the young offender population is very capable of receiving effective aid and mental health treatment. A significant number of the youth approached for participation agreed to participate, and finished all sessions of our CBM-training. Similarly, many completed the MI-protocol, and engaged enthusiastically. Motivating young offenders seems very feasible, even for adjudicated treatment, so long as they can see the relevance for themselves. In the end, what most young offenders want is a better life for themselves, but often feel that delinquency is their best bet to achieving that. They cannot be forced to take the steps that (we think) will improve their lives in the long run, but the tools and competencies that they need to do so can be provided. If the right way can be found to give them what they need, they are willing to take it.

References

Abrahams, T. P., & van Dooren, J. C. (2018). Musical Attention Control Training (MACT) in secure residential youth care: A randomised controlled pilot study. *Arts in Psychotherapy*, *57*, 80–87. https://doi.org/10.1016/j.aip.2017.10.008

Abrams, L. S. (2006). Listening to juvenile offenders: Can residential treatment prevent recidivism? *Child & Adolescent Social Work Journal*, *23*(1), 61–85.

Adams, Z. W., McCart, M. R., Zajac, K., Danielson, C. K., Sawyer, G. K., Saunders, B. E., & Kilpatrick, D. G. (2013). Psychiatric problems and trauma exposure in nondetained delinquent and nondelinquent adolescents. *Journal of Clinical Child and Adolescent Psychology*, *42*(3), 323–331. https://doi.org/10.1080/15374416.2012.749786

Adamson, S. J., Kay-Lambkin, F. J., Baker, A. L., Lewin, T. J., Thornton, L., Kelly, B. J., & Sellman, J. D. (2010). An improved brief measure of cannabis misuse: The Cannabis Use Disorders Identification Test-Revised (CUDIT-R). *Drug and Alcohol Dependence*, *110*(1–2), 137–143. https://doi.org/10.1016/j.drugalcdep.2010.02.017

Aghajani, M., Klapwijk, E. T., Colins, O. F., Ziegler, C., Domschke, K., Vermeiren, R. R. J. M., & van der Wee, N. J. A. (2018). Interactions between oxytocin receptor gene methylation and callous-unemotional traits impact socioaffective brain systems in conduct-disordered offenders. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, *3*(4), 379–391. https://doi.org/10.1016/j.bpsc.2017.12.010

Ames, S. L., Sussman, S., Dent, C. W., & Stacy, A. W. (2005). Implicit cognition and dissocative experiences as predictors of adolescent substance use. *The American Journal of Drug and Alcohol Abuse*, *31*(1), 129–162. https://doi.org/10.1081/ada-47908

Andretta, I., & Oliveira, M. D. (2011). Motivational interview with adolescent drug users who have an infringement. *Psicologia – Reflexao e Critica*, *24*(2), 218–226.

Andretta, L., & Oliveira, M. D. (2008). Efeitos da entrevista motivacional em 141ounselling infratores [A study of the effects of motivational interviewing on adolescent offenders]. *Estudos de Psicologia*, *25*(1), 45–53.

Ang, X., Salekin, R. T., Sellbom, M., & Coffey, C. A. (2018). Risk-Sophistication-Treatment Inventory-Self Report (RSTI-SR): A confirmatory factor analysis and exploration of factor relations. *Psychological Assessment*, *30*(1), 130–142. https://doi.org/10.1037/pas0000462

Arain, M., Haque, M., Johal, L., Mathur, P., Nel, W., Rais, A., Sandhu, R., & Sharma, S. (2013). Maturation of the adolescent brain. In *Neuropsychiatric Disease and Treatment* (Vol. 9, pp. 449–461). Dove Medical Press Ltd. https://doi.org/10.2147/NDT.S39776

Armelius, B. A., & Andreassen, T. H. (2007). Cognitive-behavioral treatment for antisocial behavior in youth in residential treatment. *Cochrane Database of Systematic Reviews*, *4*.

Arseneault, L., Moffitt, T. E., Caspi, A., & Taylor, A. (2002). The targets of violence committed by young offenders with alcohol dependence, marijuana dependence and schizophrenia-spectrum disorders: Findings from a birth cohort. *Criminal Behaviour and Mental Health*, *12*(2), 155–168. https://doi.org/10.1002/cbm.493

Banerjee, R., & Halder, S. (2021). Effect of parent and teacher relatedness support on academic motivation of middle school children. *World Futures*. https://doi.org/10.1080/02604027.2021.2014770

Barnes, G. M., Welte, J. W., & Hoffman, J. H. (2002). Relationship of alcohol use to delinquency and illicit drug use in adolescents: Gender, age, and racial/ethnic differences. *Journal of Drug Issues*, *32*, 153–178.

Beard, C. (2011). Cognitive bias modification for anxiety: Current evidence and future directions. In *Expert Review of Neurotherapeutics* (Vol. 11, Issue 2, pp. 299–311). https://doi.org/10.1586/ern.10.194

Becker, S. J., Jones, R. N., Hernandez, L., Graves, H. R., & Spirito, A. (2016). Moderators of brief motivation-enhancing treatments for alcohol-positive adolescents presenting to the emergency department. *Journal of Substance Abuse Treatment*, *69*, 28–34. https://doi.org/10.1016/j.jsat.2016.06.014

Benjamin, C. L., Puleo, C. M., Settipani, C. A., Brodman, D. M., Edmunds, J. M., Cummings, C. M., & Kendall, P. C. (2011). History of Cognitive-Behavioral Therapy in Youth. In *Child and Adolescent Psychiatric Clinics of North America* (Vol. 20, Issue 2, pp. 179–189). https://doi.org/10.1016/j.chc.2011.01.011

Beraha, E. M., Cousijn, J., Hermanides, E., Goudriaan, A. E., & Wiers, R. W. (2015). Implicit associations and explicit expectancies toward cannabis in heavy cannabis users and controls. *Frontiers in Psychiatry*, *4*(59). https://doi.org/10.3389/fpsyt.2015.00059

Bewley, R. J. (1999). The use of multimedia and hypermedia presentation for instruction of juvenile offenders. *Journal of Correctional Education*, *50*(4), 130–139. https://search.ebscohost.com/login.aspx?direct=true&db=snh&AN=13669628&site=ehost-live&scope=site

Biener, L., & Abrams, D. B. (1991). The Contemplation Ladder: Validation of a measure of readiness to consider smoking cessation. *Health Psychology*, *10*(5), 360–365.

Bisback, A., Reculé, C., & Colins, O. F. (2022). Psychopathic traits, treatment engagement, and their interrelation in criminal justice-involved boys: A cross-sectional network analysis. *Research on Child and Adolescent Psychopathology*, 1589–1604. https://doi.org/10.1007/s10802-022-00974-6

Bjork, J. M., Smith, A. R., Chen, G., & Hommer, D. W. (2010). Adolescents, adults and rewards: Comparing motivational neurocircuitry recruitment using fMRI. *PloS ONE*, *5*(7). https://doi.org/10.1371/journal.pone.0011440

Boffo, M., Zerhouni, O., Gronau, Q. F., van Beek, R. J. J., Nikolaou, K., Marsman, M., & Wiers, R. W. (2019). Cognitive Bias Modification for Behavior Change in Alcohol and Smoking Addiction: Bayesian Meta-Analysis of Individual Participant Data. *Neuropsychology Review*, *29*(1), 52–78. https://doi.org/10.1007/s11065-018-9386-4

Bradley, B. P., Mogg, K., Falla, S. J., & Hamilton, L. R. (1998). Attentional bias for threatening facial expressions in anxiety: Manipulation of stimulus duration. *Cognition and Emotion*, *12*(6), 737–753. https://doi.org/10.1080/026999398379411

Brains4Use. (2015). Nederlands Jeugdinstituut. https://www.nji.nl/nl/Databank/Effectieve-Jeugdinterventies/Interventies/Erkend/Brains4use

Brauers, M., Kroneman, L., Otten, R., Lindauer, R., & Popma, A. (2016). Enhancing adolescents' motivation for treatment in compulsory residential care: A clinical review. *Children and Youth Services Review*, *61*, 117–125. https://doi.org/10.1016/j.childyouth.2015.12.011

Breda, C. S., & Riemer, M. (2012). Motivation for youth's treatment scale (MYTS): A new tool for measuring motivation among youths and their caregivers. *Administration and Policy in Mental Health and Mental Health Services Research*, *39*(1–2), 118–132. https://doi.org/10.1007/s10488-012-0408-x

Bryan, A. D., Magnan, R. E., Gillman, A. S., Yeater, E. A., Feldstein Ewing, S. W., Kong, A. S., & Schmiege, S. J. (2018). Effect of including alcohol and cannabis content in a sexual risk-reduction intervention on the incidence of sexually transmitted infections in adolescents: A cluster randomized clinical trial. *JAMA Pediatrics*, *172*(4). https://www.scopus.com/inward/record.uri?eid=2-s2.0-85044977949&doi=10.1001%2Fjamapediatrics.2017.5621&partnerID=40&md5=e0cd1934d97cc2323d409d24a53366a9

Bryan, A. D., Schmiege, S. J., & Broaddus, M. R. (2009). HIV risk reduction among detained adolescents: A randomized, controlled trial. *Pediatrics*, *124*(6), e1180–e1188.

Carl, L. C., Schmucker, M., & Losel, F. (2020). Predicting attrition and engagement in the treatment of young offenders. *Journal of Offender Therapy and Comparative Criminology*, *64*(4), 355–374.

Carroll, A., Hemingway, F., Bower, J., Ashman, A., Houghton, S., & Durkin, K. (2006). Impulsivity in juvenile delinquency: Differences among early-onset, late-onset, and non-offenders. *Journal of Youth and Adolescence*, *35*(4), 519–529. https://doi.org/10.1007/s10964-006-9053-6

Casey, B. J., Getz, S., & Galvan, A. (2008). The adolescent brain. *Developmental Review*, *28*(1), 62–77. https://doi.org/10.1016/j.dr.2007.08.003

Chassin, L., Knight, G., Vargas-Chanes, D., Losoya, S. H., & Naranjo, D. (2009). Substance use treatment outcomes in a sample of male serious juvenile offenders. *Journal of Substance Abuse Treatment*, *36*(2), 183–194. https://doi.org/10.1016/j.jsat.2008.06.001

Chen, C. Y., & Lin, K. M. (2009). Health consequences of illegal drug use. *Current Opinion in Psychiatry*, *22*(3), 287–292. https://doi.org/10.1097/YCO.0b013e32832a2349

Clair, M., Martin, R., Stein, L. A. R., Lebeau, R., & Golembeske, C. (2011). The impact of motivational interviewing on general and alcohol-related predatory misbehaviors in incarcerated adolescents. *Alcoholism – Clinical and Experimental Research*, *35*(6), 141A-141A.

Clair, M., Stein, L. A. R., Soenksen, S., Martin, R. A., Lebeau, R., & Golembeske, C. (2013). Ethnicity as a moderator of motivational interviewing for incarcerated adolescents after release. *Journal of Substance Abuse Treatment*, *45*(4), 370–375. https://doi.org/10.1016/j.jsat.2013.05.006

Clair-Michaud, M., Martin, R. A., Stein, L. A. R., Bassett, S., Lebeau, R., & Golembeske, C. (2016). The impact of motivational interviewing on delinquent behaviors in incarcerated adolescents. *Journal of Substance Abuse Treatment*, 13–19.

Clark, M. D. (1999). Strength-based practice: The ABCs of increasing motivation with juvenile offenders. *Juvenile and Family Court Journal*, *50*(1), 33–42.

Clausen, L., Lübeck, M., & Jones, A. (2013). Motivation to change in the eating disorders: A systematic review. In *International Journal of Eating Disorders* (Vol. 46, Issue 8, pp. 755–763). https://doi.org/10.1002/eat.22156

Clinkinbeard, S. S., & Murray, C. I. (2012). Perceived support, belonging, and possible selves strategies among incarcerated juvenile offenders. *Journal of Applied Social Psychology*, *42*(5), 1218–1240.

Clinkinbeard, S. S., & Zohra, T. (2012). Expectations, fears, and strategies: Juvenile offender thoughts on a future outside of incarceration. *Youth & Society*, *44*(2), 236–257.

Cohen, J. (1992). Statistical Power Analysis. *Current Directions in Psychological Science*, *1*(3), 98–101. https://doi.org/10.1111/1467-8721.ep10768783

Colins, O. F., Van Damme, L., Fanti, K. A., & Andershed, H. (2017). The prospective usefulness of callous–unemotional traits and conduct disorder in predicting treatment engagement among detained girls. *European Child and Adolescent Psychiatry*, *26*(1), 75–85. https://doi.org/10.1007/s00787-016-0869-7

Colins, O., Hermans, M., & Vermeijren, R. (2012). *Neuropsychologische factoren in relatie tot 144ounsel van behandeling van jongeren met een maatregel plaatsing in een inrichting voor jeugdigen (PIJ) en jongeren met een machtiging gesloten jeugdzorg (GJZ)*. http://refhub.elsevier.com/S0190-7409(15)30080-3/rf0080

Collier, C. R., Czuchry, M., Dansereau, D. F., & Pitre, U. (2001). The use of Node-Link Mapping in the chemical dependency treatment of adolescents. In *Journal of Drug Education* (Vol. 31, Issue 3).

Colom, R., Flores-Mendoza, C., & Rebollo, I. (2003). Working memory and intelligence. *Personality and Individual Differences*, *34*, 33–39.

Contreras-Rodríguez, O., Albein-Urios, N., Martinez-Gonzalez, J. M., Menchón, J. M., Soriano-Mas, C., & Verdejo-García, A. (2020). The neural interface between negative emotion regulation and motivation for change in cocaine dependent individuals under treatment. *Drug and Alcohol Dependence*, *208*. https://doi.org/10.1016/j.drugalcdep.2020.107854

Cope, N. (2003). 'It's No Time or High Time': Young offenders' experiences of time and drug use in prison. *The Howard Journal of Criminal Justice*, *42*(2), 158–175. https://doi.org/10.1111/1468-2311.t01-1-00273

Cornelius, J. R., Douaihy, A., Bukstein, O. G., Daley, D. C., Wood, S. D., Kelly, T. M., & Salloum, I. M. (2011). Evaluation of cognitive behavioral therapy/motivational enhancement therapy (CBT/MET) in a treatment trial of comorbid MDD/AUD adolescents. *Addictive Behaviors*, *36*(8), 843–848. https://doi.org/10.1016/j.addbeh.2011.03.016

Cousijn, J., Goudriaan, A. E., & Wiers, R. W. (2011). Reaching out towards cannabis: Approach-bias in heavy cannabis users predicts changes in cannabis use. *Addiction*, *106*(9), 1667–1674. https://doi.org/10.1111/j.1360-0443.2011.03475.x

Couwenbergh, C., Van Den Brink, W., Zwart, K., Vreugdenhil, C., Van Wijngaarden-Cremers, P., & Van Der Gaag, R. J. (2006). Comorbid psychopathology in adolescents and young adults treated for substance use disorders: A review. In *European Child and Adolescent Psychiatry* (Vol. 15, Issue 6, pp. 319–328). https://doi.org/10.1007/s00787-006-0535-6

Cristea, I. A., Kok, R. N., & Cuijpers, P. (2016). The effectiveness of Cognitive Bias Modification interventions for substance addictions: A meta-analysis. *Plos One*, *11*(9), e0162226. https://doi.org/10.1371/journal.pone.0162226

Crone, E. A., & Dahl, R. E. (2012). Understanding adolescence as a period of social-affective engagement and goal flexibility. *Nature*, *13*(9), 636–650. https://doi.org/10.1038/nrn3313

Dahl, R. E., Allen, N. B., Wilbrecht, L., & Suleiman, A. B. (2018). Importance of investing in adolescence from a developmental science perspective. In *Nature* (Vol. 554, Issue 7693, pp. 441–450). Nature Publishing Group. https://doi.org/10.1038/nature25770

Dansereau, D. F., Joe, G. W., & Simpson, D. D. (1993). Node-link mapping: A visual representation strategy for enhancing drug abuse 145ounselling. *Journal of Counseling Psychology*, *40*(4), 385–395. https://doi.org/10.1037//0022-0167.40.4.385

de Ruigh, E. L., Popma, A., Twisk, J. W. R., Wiers, R. W., van der Baan, H. S., Vermeiren, R. R. J. M., & Jansen, L. M. C. (2019). Predicting quality of life during and post detention in incarcerated juveniles. *Journal of Quality of Life Aspects of Treatment*, *28*(7), 1813–1823.

DeepL SE. (n.d.). *DeepL Translator*. DeepL SE. https://www.deepl.com/translator

Degue, S., Scalora, M., Ullman, D., & Gallavan, D. (2008). In-home or out-of-home?: Predicting long-term placement recommendations for juvenile offenders. *International Journal of Forensic Mental Health*, *7*(1), 15–27. https://doi.org/10.1080/14999013.2008.9914400

DiClemente, C. C., Schlundt, D., & Gemmell, L. (2004). Readiness and stages of change in addiction treatment. *American Journal on Addictions*, *13*(2), 103–119. https://doi.org/10.1080/10550490490435777

DiClemente, R. J., Wingood, G. M., Crosby, R., Sionean, C., Cobb, B. K., Harrington, K., Davies, S., Hook III, E. W., & Kim Oh, M. (2001). Parental monitoring: Association with adolescents' risk behaviors. *Pediatrics*, *107*(6), 1363–1368. http://publications.aap.org/pediatrics/article-pdf/107/6/1363/895249/1363.pdf

DiPierro-Sutton, M., Fite, P. J., & Gudino, O. (2021). Assessing the links between internalizing symptoms and treatment motivation in incarcerated juveniles. *Children and Youth Services Review*.

Dishion, T. J., McCord, J., & Poulin, F. (1999). When interventions harm. *American Psychologist*, *54*(9), 755–764.

Dishion, T. J., & Tipsord, J. M. (2011). Peer contagion in child and adolescent social and emotional development. *Annual Review of Psychology*, *62*, 189–214. https://doi.org/10.1146/annurev.psych.093008.100412

Doran, N., Luczak, S. E., Bekman, N., Koutsenok, I., & Brown, S. A. (2012). Adolescent substance use and aggression: A review. *Criminal Justice and Behavior*, *39*(6), 748–769. https://doi.org/10.1177/0093854812437022

Dray, J., & Wade, T. D. (2012). Is the transtheoretical model and motivational interviewing approach applicable to the treatment of eating disorders? A review. In *Clinical Psychology Review* (Vol. 32, Issue 6, pp. 558–565). https://doi.org/10.1016/j.cpr.2012.06.005

Drieschner, K. H., Lammers, S. M. M., & Van Der Staak, C. P. F. (2004). Treatment motivation: An attempt for clarification of an ambiguous concept. *Clinical Psychology Review*, *23*(8), 1115–1137. https://doi.org/10.1016/j.cpr.2003.09.003

Drieschner, K. H., & Verschuur, J. (2010). Treatment engagement as a predictor of premature treatment termination and treatment outcome in a correctional outpatient sample. *Criminal Behaviour and Mental Health*, *20*(2), 86–99. https://www.scopus.com/inward/record.uri?eid=2-s2.0-77953472718&doi=10.1002%2Fcbm.757&partnerID=40&md5=74a3c165c25d450bdee70fb35252417c

Duindam, H. M., Creemers, H. E., Hoeve, M., & Asscher, J. J. (2021). A quasi-experimental study on the effectiveness of Dutch Cell Dogs in incarcerated youth. *International Journal of Offender Therapy and Comparative Criminology*, *65*(5), 644–666. https://doi.org/10.1177/0306624X20983748

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review*, *95*(2), 256–273.

Eberl, C., Wiers, R. W., Pawelczack, S., Rinck, M., Becker, E. S., & Lindenmeyer, J. (2013). Approach bias modification in alcohol dependence: Do clinical effects replicate and for whom does it work best? *Developmental Cognitive Neuroscience*, *4*, 38–51. https://doi.org/10.1016/j.dcn.2012.11.002

Eberl, C., Wiers, R. W., Pawelczack, S., Rinck, M., Becker, E. S., & Lindenmeyer, J. (2014). Implementation of approach bias re-training in alcoholism – How many sessions are needed? *Alcoholism: Clinical and Experimental Research*, *38*(2), 587–594. https://doi.org/10.1111/acer.12281

Eeren, H. V., Goossens, L. M. A., Scholte, R. H. J., Busschbach, J. J. V., & van der Rijken, R. E. A. (2018). Multisystemic Therapy and Functional Family Therapy compared on their rffectiveness using the propensity score method. *Journal of Abnormal Child Psychology*, *46*(5), 1037–1050. https://doi.org/10.1007/s10802-017-0392-4

Elliott, D. S., Buckley, P. R., Gottfredson, D. C., Hawkins, J. D., & Tolan, P. H. (2020). Evidence-based juvenile justice programs and practices: A critical review. *Criminology and Public Policy*, *19*(4), 1305–1328. https://doi.org/10.1111/1745-9133.12520

Englebrecht, C., Peterson, D., Scherer, A., & Naccarato, T. (2008). "It's not my fault": Acceptance of responsibility as a component of engagement in juvenile residential treatment. *Children and Youth Services Review*, *30*(4), 466–484. https://doi.org/10.1016/j.childyouth.2007.11.005

Enzmann, D., Marshall, I. H., Killias, M., Junger-Tas, J., Steketee, M., & Gruszczynska, B. (2010). Self-reported youth delinquency in Europe and beyond: First results of the second international self-report delinquency study in the context of police and victimization data. *European Journal of Criminology*, *7*(2), 159–183. https://doi.org/10.1177/1477370809358018

Ernst, M., Daniele, T., & Frantz, K. (2011). New perspectives on adolescent motivated behavior: Attention and conditioning. In *Developmental Cognitive Neuroscience* (Vol. 1, Issue 4, pp. 377–389). https://doi.org/10.1016/j.dcn.2011.07.013

Esposito-Smythers, C., Penn, J. V., Stein, L. A. R., Lacher-Katz, M., & Spirito, A. (2008). A test of problem behavior and self-medication theories in incarcerated adolescent males. *Journal of*

Child and Adolescent Substance Abuse, *17*(4), 41–56. https://doi.org/10.1080/15470650802292731

Fadus, M. C., Squeglia, L. M., Valadez, E. A., Tomko, R. L., Bryant, B. E., & Gray, K. M. (2019). Adolescent substance use disorder treatment: An update on evidence-based strategies. *Current Psychiatry Reports*, *21*(10). https://doi.org/10.1007/s11920-019-1086-0

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*(2), 175–191. https://doi.org/10.3758/BF03193146

Feldstein, S. W., & Ginsburg, J. I. D. (2006). Motivational interviewing with dually diagnosed adolescents in juvenile justice settings. *Brief Treatment and Crisis Intervention*, *6*(3), 218–233.

Field, M., Caren, R., Fernie, G., & De Houwer, J. (2011). Alcohol approach tendencies in heavy drinkers: Comparison of effects in a relevant stimulus-response compatibility task and an approach/avoidance Simon Task. *Psychology of Addictive Behaviors*, *25*(4), 697–701. https://doi.org/10.1037/a0023285

Field, M., Marhe, R., & Franken, I. H. A. (2014). The clinical relevance of attentional bias in substance use disorders. *CNS Spectrums*, *19*(3), 225–230. https://doi.org/10.1017/S1092852913000321

Filges, T., Rasmussen, P. S., Andersen, D., & Jørgensen, A. K. (2015). Multidimensional Family Therapy (MDFT) for young people in treatment for non-opioid drug abuse: A systematic review. *Campbell Systematic Reviews*, *11*(1), 1–124. https://doi.org/10.4073/csr.2015.8

Fisher, J. D., & Fisher, W. A. (1992). Changing AIDS-risk behavior. *Psychological Bulletin*, *111*(3), 455–474.

Fisher, P. A., Lester, B. M., DeGarmo, D. S., Lagasse, L. L., Lin, H., Shankaran, S., Bada, H. S., Bauer, C. R., Hammond, J., Whitaker, T., & Higgins, R. (2011). The combined effects of prenatal drug exposure and early adversity on neurobehavioral disinhibition in childhood and adolescence. *Development and Psychopathology*, *23*(3), 777–788. https://doi.org/10.1017/S0954579411000290

Flores, J., & Barahona-Lopez, K. (2020). "I am in a constant struggle:" The challenges of providing instruction to incarcerated youth in southern California. *International Journal of Educational Development*, *76*. https://doi.org/10.1016/j.ijedudev.2020.102192

Ford, J. D., Cruise, K. R., Grasso, D. J., & Holloway, E. (2018). A study of the impact of screening for poly-victimization in juvenile justice: The rocky road to a successful investigation in the real world. *Journal of Interpersonal Violence*, *33*(5), 810–831. https://doi.org/10.1177/0886260517744844

Fortune, C.-A. (2018). The Good Lives Model: A strength-based approach for youth offenders. *Aggression and Violent Behavior*, *38*, 21–30.

Fox, K. C., Connor, P., McCullers, E., & Waters, T. (2008). Effect of a behavioural health and specialty care telemedicine programme on goal attainment for youths in juvenile detention. *Journal of Telemedicine and Telecare*, *14*(5), 227–230.

French, M. T., Popovici, I., & Tapsell, L. (2008). The economic costs of substance abuse treatment: Updated estimates and cost bands for program assessment and reimbursement. *Journal of Substance Abuse Treatment*, *35*(4), 462–469. https://doi.org/10.1016/j.jsat.2007.12.008

Fuligni, A. J. (2019). The need to contribute during adolescence. *Perspectives on Psychological Science*, *14*(3), 331–343.

Gannon, T. A., King, T., Miles, H., Lockerbie, L., & Willis, G. W. (2011). Good Lives sexual offender treatment for mentally disordered offenders. *British Journal of Forensic Practice*, *13*, 153–168.

Gendreau, P., Listwan, S. J., & Paparozzi, M. (2018). Contingency Management programs in corrections: Another panacea? *Journal of Contemporary Criminal Justice*, *34*(1), 35–46.

Gerdner, A., & Holmberg, A. (2000). Factors affecting motivation to treatment in severely dependent alcoholics. *Journal of Studies on Alcohol*, *61*(4), 548–560. https://doi.org/10.15288/jsa.2000.61.548

Gibbons, F. X., Gerrard, M., Vande Lune, L. S., Wills, T. A., Brody, G., & Conger, R. D. (2004). Context and cognitions: Environmental risk, social influence, and adolescent substance use. *Personality and Social Psychology Bulletin*, *30*(8), 1048–1061. https://doi.org/10.1177/0146167204264788

Gibbs, J. C., Potter, G. B., & Goldstein, A. P. (1995). *The EQUIP program: Teaching youth to think and act responsibly through a peer-helping approach.* Research Press.

Gibson, S., & Duncan, K. (2008). A multifaceted approach from intake to discharge. *Corrections Today*, *70*(1), 58–59. https://search.ebscohost.com/login.aspx?direct=true&db=snh&AN=31199687&site=ehost-live&scope=site

Gideon, L. (2010). Drug offenders' perceptions of motivation: The role of motivation in rehabilitation and reintegration. *International Journal of Offender Therapy and Comparative Criminology*, *54*(4), 597–610. https://doi.org/10.1177/0306624X09333377

Gilbert, P. (2017). Exploring compassion focused therapy in forensic settings: An evolutionary and social-contextual approach. In J. Davies & C. Nagi (Eds.), *Individual psychological therapies in forensic settings: Research and practice* (pp. 59–84). Routledge. https://doi.org/10.4324/9781315666136-5

Godley, M. D., Godley, S. H., Dennis, M. L., Funk, R. R., Passetti, L. L., & Petry, N. M. (2014). A randomized trial of assertive continuing care and contingency management for adolescents with substance use disorders. *Journal of Consulting and Clinical Psychology*, *82*(1), 40–51. https://doi.org/10.1037/a0035264

Goldman, P. N., Szoko, N., Lynch, L., & Rankine, J. (2022). Vaccination for justice-involved youth. *Pediatrics*, *149*(4).

Gorenstein, E. E., & Newman, J. P. (1980). Disinhibitory psychopathology: A new perspective and a model for research. In *Psychological Review* (Vol. 87, Issue 3).

Grafton, B., Mackintosh, B., Vujic, T., & MacLeod, C. (2014). When ignorance is bliss: Explicit instruction and the efficacy of CBM-A for anxiety. *Cognitive Therapy and Research*, *38*(2), 172–188. https://doi.org/10.1007/s10608-013-9579-3

Greenwald, R. (2009). *Treating Problem Behaviors: A Trauma-Informed Approach.* Taylor & Francis.

Grenard, J. L., Ames, S. L., Wiers, R. W., Thush, C., Sussman, S., & Stacy, A. W. (2008). Working memory capacity moderates the predictive effects of drug-related associations on substance

use. *Psychology of Addictive Behaviors*, *22*(3), 426–432. https://doi.org/10.1037/0893-164X.22.3.426

Grimley, D. M., Williams, C. D., Miree, L. L., Baichoo, S., Greene, S., & Hook, E. W. I. I. I. (2000). Stages of readiness for changing multiple risk behaviors among incarcerated male adolescents. *Journal of Health Behavior*, *24*(5), 361–369.

Gudjonsson, G. H., Sigurdsson, J. F., Sigfusdottir, I. D., & Young, S. (2012). An epidemiological study of ADHD symptoms among young persons and the relationship with cigarette smoking, alcohol consumption and illicit drug use. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *53*(3), 304–312. https://doi.org/10.1111/j.1469-7610.2011.02489.x

Hachtel, H., Vogel, T., & Huber, C. G. (2019). Mandated treatment and its impact on therapeutic process and outcome factors. *Frontiers in Psychiatry*, *10*.

Harder, A. T., Huyghen, A. M. N., Knot-Dickscheit, J., Kalverboer, M. E., Kongeter, S., Zeller, M., & Knorth, E. J. (2014). Education secured? The school performance of adolescents in secure residential youth care. *Child & Youth Care Forum*, *43*(2), 251–268.

Harder, A. T., Knorth, E. J., & Kalverboer, M. E. (2012). Securing the downside up: Client and care factors associated with outcomes of secure residential youth care. *Child & Youth Care Forum*, *41*(3), 259–276.

Hartnett, D., Carr, A., Hamilton, E., & O'Reilly, G. (2017). The effectiveness of Functional Family Therapy for adolescent behavioral and substance misuse problems: A meta-analysis. *Family Process*, *56*(3), 607–619. https://doi.org/10.1111/famp.12256

Henggeler, S. W., McCart, M. R., Cunningham, P. B., & Chapman, J. E. (2012). Enhancing the effectiveness of juvenile drug courts by integrating evidence-based practices. *Journal of Consulting and Clinical Psychology*, *80*(2), 264–275. https://doi.org/10.1037/a0027147

Hillege, S. L., van Domburgh, L., Mulder, E. A., Jansen, L. M. C., & Vermeiren, R. R. J. M. (2018). How do forensic clinicians decide? A Delphi approach to identify domains commonly used in forensic juvenile treatment planning. *Journal of Offender Therapy and Comparative Criminology*, *62*(3), 591–608.

Hirschinger-Blank, N., Forke, C. M., Kenyon, A., Myers, R. K., Zhang, X., & Schwarz, D. F. (2014). Feasibility of conducting child abuse research with girls in juvenile detention using Audio-Computer Assisted Self-Interview (ACASI) technology. *Journal of Criminal Justice Education*, *25*(2), 210–235. https://doi.org/10.1080/10511253.2014.883419

Hommel, B., & Wiers, R. W. (2017). Towards a unitary approach to human action control. *Trends in Cognitive Sciences*, *21*(12), 940–949. https://doi.org/10.1016/j.tics.2017.09.009

Horvath, A. O., & Greenberg, L. S. (1989). Development and validation of the Working Alliance Inventory. In *Journal of Counseling Psychology Psychological Association, Inc* (Vol. 36, Issue 2).

Houben, K., & Wiers, R. W. (2009). Response inhibition moderates the relationship between implicit associations and drinking behavior. *Alcoholism: Clinical and Experimental Research*, *33*(4), 626–633. https://doi.org/10.1111/j.1530-0277.2008.00877.x

Inzlicht, M., & Schmeichel, B. (2012). What is ego depletion? Toward a mechanistic revision of the resource model of self-control. *Perspectives on Psychological Science*, *7*(5), 450–463. https://doi.org/10.1177/1745691612454134

Kahveci, S., van Bockstaele, B., Blechert, J., & Wiers, R. W. (2020). Pulling for pleasure? Erotic approach-bias associated with porn use, not problems. *Learning and Motivation*, *72*(June), 101656. https://doi.org/10.1016/j.lmot.2020.101656

Karoly, H. C., Schacht, J. P., Jacobus, J., Meredith, L. R., Taylor, C. T., Tapert, S. F., Gray, K. M., & Squeglia, L. M. (2019). Preliminary evidence that computerized approach avoidance training is not associated with changes in fMRI cannabis cue reactivity in non-treatment-seeking adolescent cannabis users. *Drug and Alcohol Dependence*, *200*(May), 145–152. https://doi.org/10.1016/j.drugalcdep.2019.04.007

Keijsers, G. P. J., Schaap, C. P. D. R., Hoogduin, C. A. L., Hoogsteyns, B., & de Kemp, E. C. M. (1999). Preliminary results of a new instrument to assess patient motivation for treatment in cognitive-behaviour therapy. *Behavioural and Cognitive Psychotherapy*, *27*(2), 165–179. https://doi.org/10.1017/s1352465899272074

Keller, J. M. (1987). Development and use of the ARCS model of instructional design. *Journal of Instructional Development*, *10*(3), 2–10. https://doi.org/10.1007/BF02905780

Kennedy, K., & Gregoire, T. K. (2009). Theories of motivation in addiction treatment: Testing the relationship of the transtheoretical model of change and self-determination theory. *Journal of Social Work Practice in the Addictions*, *9*(2), 163–183. https://doi.org/10.1080/15332560902852052

Kepper, A., Veen, V., Monshouwer, K., Stevens, G., Drost, W., Vroome, T. De, & Vollebergh, W. (2009). Middelengebruik bij jongens in Justitiële Jeugdinrichtingen. *Universiteit Utrecht, Departement Algemene Sociale Wetenschappen, in Opdracht van Wetenschappelijk Onderzoek- En Documentatiecentrum (WODC), Ministerie van Justitie*. https://www.wodc.nl/images/volledige-tekst_tcm44-274863.pdf

Keren, G., & Schul, Y. (2009). Two is not always better than one: A critical evaluation of two-system theories. *Perspectives on Psychological Science*, *4*(6), 533–550.

Kinner, S. A., Degenhardt, L., Coffey, C., Sawyer, S., Hearps, S., & Patton, G. (2014). Complex health needs in the youth justice system: A survey of community-based and custodial offenders. *Journal of Adolescent Health*, *54*(5), 521–526. https://doi.org/10.1016/j.jadohealth.2013.10.003

Knapp, M., King, D., Healey, A., & Thomas, C. (2011). Economic outcomes in adulthood and their associations with antisocial conduct, attention deficit and anxiety problems in childhood Article (Submitted version) (Pre-refereed). In *Journal of mental health policy and economics* (Vol. 14, Issue 3).

Koehler, J. A., Hamilton, L., & Lösel, F. A. (2013). Correctional treatment programmes for young offenders in Europe: A survey of routine practice. *European Journal on Criminal Policy and Research*, *19*(4), 387–400. https://doi.org/10.1007/s10610-013-9206-6

Koehler, J. A., Lösel, F., Akoensi, T. D., & Humphreys, D. K. (2013). A systematic review and meta-analysis on the effects of young offender treatment programs in Europe. *Journal of Experimental Criminology*, *9*(1), 19–43. https://doi.org/10.1007/s11292-012-9159-7

Kopetz, C., & Orehek, E. (2015). When the end justifies the means: Self-defeating behaviors as "rational" and "successful" self-regulation. *Current Directions in Psychological Science*, *24*(5), 386–391. https://doi.org/10.1177/0963721415589329

Krank, M. D., & Goldstein, A. L. (2005). Adolescent changes in implicit cognitions and prevention of substance abuse. In *Handbook of Implicit Cognition and Addiction* (pp. 439–454). Sage Publincations, Inc. https://doi.org/10.4135/9781412976237.n28

LaGasse, L. L., Hammond, J., Liu, J., Lester, B. M., Shankaran, S., Bada, H., Bauer, C., Higgins, R., & Das, A. (2006). Violence and delinquency, early onset drug use, and psychopathology in drug-exposed youth at 11 years. *Annals of the New York Academy of Sciences*, *1094*, 313–318. https://doi.org/10.1196/annals.1376.041

Lambert, B. L., Bann, C. M., Bauer, C. R., Shankaran, S., Bada, H. S., Lester, B. M., Whitaker, T. M., Lagasse, L. L., Hammond, J., & Higgins, R. D. (2013). Risk-taking behavior among adolescents with prenatal drug exposure and extrauterine environmental adversity. *Journal of Developmental & Behavioral Pediatrics*, *34*(9), 669–679. www.jdbp.org|669

Lane, C., Goldstein, N. E. S., Heilbrun, K., Cruise, K. R., & Pennacchia, D. (2012). Obstacles to research in residential juvenile justice facilities: Recommendations for researchers. *Behavioral Sciences and the Law*, *30*(1), 49–68. https://doi.org/10.1002/bsl.1991

Lautenbacher, J., Jahnke, S., Speer, D., & Beelmann, A. (2021). Evaluation of the web-based training "OHA—Online Hass Abbauen"—submodule offenses and violence. *Forensische Psychiatrie, Psychologie, Kriminologie*, *15*(2), 134–142. https://doi.org/10.1007/s11757-021-00664-x

Lavigne, A. M., Wood, M. D., Janssen, T., & Wiers, R. W. (2017). Implicit and explicit alcohol cognitions: The moderating effect of executive functions. *Alcohol and Alcoholism*, *52*(2), 256–262. https://doi.org/10.1093/alcalc/agw066

Lebowitz, E. R., Child, Y., Center, S., Omer, H., Hermes, H., & Scahill, L. (2013). *Parent training for childhood anxiety disorders: The SPACE program*. www.elsevier.com/locate/cabp

Leeman, R. F., Patock-Peckham, J. A., & Potenza, M. N. (2012). Impaired control over alcohol use: An under-addressed risk factor for problem drinking in young adults? *Experimental and Clinical Psychopharmacology*, *20*(2), 92–106. https://doi.org/10.1037/a0026463

Leenarts, L. E. W., Hoeve, M., van de Ven, P. M., Lodewijks, H. P. B., & Doreleijers, T. A. H. (2013). Childhood maltreatment and motivation for treatment in girls in compulsory residential care. *Children and Youth Services Review*, *35*(7), 1041–1047. https://doi.org/10.1016/j.childyouth.2013.04.001

LeGrand, S., & Martin, R. C. (2001). Juvenile male sexual offenders: The quality of motivation system of assessment and treatment issues. *Journal of Child Sexual Abuse*, *10*(1), 23–49.

Leonardi, R. J., Buchanan-Smith, H. M., McIvor, G., & Vick, S.-J. (2017). "You think you're helping them, but they're helping you too": Experiences of Scottish male young offenders participating in a dog training program. *International Journal of Environmental Research and Public Health*, *14*(8). https://www.scopus.com/inward/record.uri?eid=2-s2.0-85028332612&doi=10.3390%2Fijerph14080945&partnerID=40&md5=a5e58408754714eaca8a79d5c484af0f

Liddle, H. A. (1999). Theory development in a family-based therapy for adolescent drug abuse. *Journal of Clinical Child and Adolescent Psychology*, *28*(4), 521–532. https://doi.org/10.1207/S15374424JCCP2804_12

Lindgren, K. P., Wiers, R. W., Teachman, B. A., Gasser, M. L., Westgate, E. C., Cousijn, J., Enkema, M. C., & Neighbors, C. (2015). Attempted training of alcohol approach and drinking identity associations in us undergraduate drinkers: Null results from two studies. *PloS ONE*, *10*(8), 1–22. https://doi.org/10.1371/journal.pone.0134642

Lipsey, M. W. (2009). The primary factors that characterize effective interventions with juvenile offenders: A meta-analytic overview. *Victims and Offenders*, *4*(2), 124–147. https://doi.org/10.1080/15564880802612573

Loeber, R., & Farrington, D. P. (2000). Young children who commit crime: Epidemiology, developmental origins, risk factors, early interventions, and policy implications. *Development and Psychopathology*, *12*(4), 737–762. https://doi.org/10.1017/S0954579400004107

Lou, Y., Taylor, E. P., & di Folco, S. (2018). Resilience and resilience factors in children in residential care: A systematic review. *Children and Youth Services Review*, *89*, 83–92. https://doi.org/10.1016/j.childyouth.2018.04.010

Luther, L., Firmin, R. L., Lysaker, P. H., Minor, K. S., & Salyers, M. P. (2018). A meta-analytic review of self-reported, clinician-rated, and performance-based motivation measures in schizophrenia: Are we measuring the same "stuff"? In *Clinical Psychology Review* (Vol. 61, pp. 24–37). Elsevier Inc. https://doi.org/10.1016/j.cpr.2018.04.001

Macgowan, M. J., & Wagner, E. F. (2005). Iatrogenic effects of group treatment on adolescents with conduct and substance use problems: A review of the literature and a presentation of a model. *Journal of Evidence-Based Social Work*, *2*(1–2), 79–90. https://doi.org/10.1300/J394v02n01_05

MacLeod, C., Rutherford, E., Campbell, L., Ebsworthy, G., & Holker, L. (2002). Selective attention and emotional vulnerability: Assessing the causal basis of their association through the experimental manipulation of attentional bias. *Journal of Abnormal Psychology*, *111*(1), 107–123. https://doi.org/10.1037/0021-843X.111.1.107

Maddern, X. J., Walker, L. C., Campbell, E. J., Arunogiri, S., Haber, P. S., Morley, K., Manning, V., Millan, E. Z., McNally, G. P., Lubman, D. I., & Lawrence, A. J. (2022). Can we enhance the clinical efficacy of cognitive and psychological approaches to treat substance use disorders through understanding their neurobiological mechanisms? In *Neuroscience and Biobehavioral Reviews* (Vol. 142). Elsevier Ltd. https://doi.org/10.1016/j.neubiorev.2022.104899

Manning, V., Garfield, J. B. B., Mroz, K., Campbell, S. C., Piercy, H., Staiger, P. K., Lum, J. A. G., Lubman, D. I., & Verdejo-Garcia, A. (2019). Feasibility and acceptability of approach bias modification during methamphetamine withdrawal and related methamphetamine use outcomes. *Journal of Substance Abuse Treatment*, *106*, 12–18. https://doi.org/10.1016/j.jsat.2019.07.008

Manning, V., Garfield, J. B. B., Reynolds, J., Staiger, P. K., Piercy, H., Bonomo, Y., Lloyd-Jones, M., Jacka, D., Wiers, R. W., Verdejo-Garcia, A., & Lubman, D. I. (2022). Alcohol use in the year following approach bias modification during inpatient withdrawal: Secondary outcomes from a double-blind, multi-site randomized controlled trial. *Addiction*, *117*(11), 2837–2846. https://doi.org/10.1111/add.15989

Manning, V., Garfield, J. B. B., Staiger, P. K., Lubman, D. I., Lum, J. A. G., Reynolds, J., Hall, K., Bonomo, Y., Lloyd-Jones, M., Wiers, R. W., Piercy, H., Jacka, D., & Verdejo-Garcia, A. (2021). Effect of Cognitive Bias Modification on early relapse among adults undergoing inpatient alcohol

withdrawal treatment: A randomized clinical trial. *JAMA Psychiatry*, *78*(2), 133–140. https://doi.org/10.1001/jamapsychiatry.2020.3446

Manning, V., Garfield, J. B. B., Staiger, P. K., Lubman, D. I., Lum, J. A. G., Reynolds, J., Hall, K., Bonomo, Y., Lloyd-Jones, M., Wiers, R. W., Piercy, H., & Verdejo-Garcia, A. (2020). Adding cognitive bias modification during alcohol withdrawal treatment reduces early relapse: A multi-site double-blind randomised controlled trial. *JAMA Psychiatry*.

Manning, V., Staiger, P. K., Hall, K., Garfield, J. B. B., Flaks, G., Leung, D., Hughes, L. K., Lum, J. A. G., Lubman, D. I., & Verdejo-Garcia, A. (2016). Cognitive Bias Modification training during inpatient alcohol detoxification reduces early relapse: A randomized controlled trial. *Alcoholism: Clinical and Experimental Research*, *40*(9), 2011–2019. https://doi.org/10.1111/acer.13163

Marker, I., & Norton, P. J. (2018). The efficacy of incorporating motivational interviewing to cognitive behavior therapy for anxiety disorders: A review and meta-analysis. In *Clinical Psychology Review* (Vol. 62, pp. 1–10). Elsevier Inc. https://doi.org/10.1016/j.cpr.2018.04.004

Marshall, E. J. (2014). Adolescent alcohol use: Risks and consequences. *Alcohol and Alcoholism*, *49*(2), 160–164. https://doi.org/10.1093/alcalc/agt180

Martin, R. C. (1989). *The Quality of Motivation Questionnaire*. RCM Enterprises, Inc.

Mason, W. A., & Windle, M. (2002). Reciprocal relations between adolescent substance use and delinquency: A longitudinal latent variable analysis. *Journal of Abnormal Psychology*, *111*(1), 63–76. https://doi.org/10.1037/0021-843X.111.1.63

Mathys, C. (2017). Effective components of interventions in juvenile justice facilities: How to take care of delinquent youths? *Children and Youth Services Review*, *73*, 319–327. https://doi.org/10.1016/j.childyouth.2017.01.007

McConnaughy, E. A., Prochaska, J. O., & Velicer, W. F. (1983). Stages of change in psychotherapy: Measurement and sample profiles. *Psychotherapy: Theory, Research and Practice*, *20*, 368–375.

McCray, E. D., Ribuffo, C., Lane, H., Murphy, K. M., Gagnon, J. C., Houchins, D. E., & Lambert, R. G. (2018). "As real as it gets": A grounded theory study of a reading intervention in a juvenile correctional school. *Child & Youth Care Forum*, *47*(2), 259–281.

McHugh, R. K., Hearon, B. A., & Otto, M. W. (2010). Cognitive behavioral therapy for substance use disorders. In *Psychiatric Clinics of North America* (Vol. 33, Issue 3, pp. 511–525). W.B. Saunders. https://doi.org/10.1016/j.psc.2010.04.012

Miller, T., & Hendrie, D. (2008). *Substance abuse prevention dollars and cents: A cost-benefit analysis*. www.samhsa.gov

Miller, W. R., & Rollnick, S. (2002). *Motivational interviewing: Preparing people for change.* (2nd ed.). The Guilford Press.

Miller, W. R., & Sanchez, V. C. (1994). Motivating young adults for treatment and lifestyle change. In G. Howard & P. E. Nathan (Eds.), *Alcohol use and misuse by young adults* (pp. 55–81). University of Notre Dame Press.

Moffitt, T. E., & Caspi, A. (2001). Childhood predictors differentiate life-course persistent and adolescence-limited antisocial pathways among males and females. *Development and Psychopathology*, *13*(2), 355–372. https://doi.org/10.1017/S0954579401002097

Mulvey, E. P., Schubert, C. A., & Chassin, L. (2011). Substance use and delinquent behavior among serious adolescent offenders. *Criminal Justice Research Review*, *12*(4), 58–66. http://search.ebscohost.com/login.aspx?direct=true&db=i3h&AN=60003864&site=ehost-live

Odgers, C. L., Moffitt, T. E., Broadbent, J. M., Dickson, N., Hancox, R. J., Harrington, H., Poulton, R., Sears, M. R., Thomson, W. M., & Caspi, A. (2008). Female and male antisocial trajectories: From childhood origins to adult outcomes. *Development and Psychopathology*, *20*(2), 673–716. https://doi.org/10.1017/S0954579408000333

Offermans, J. E., Duindam, H. M., Asscher, J. J., Stams, G. J. J. M., & Creemers, H. E. (2020). Brief report: The effectiveness of Dutch Cell Dogs: A multiple case experimental study. *Clinical Child Psychology and Psychiatry*, *25*(4), 1015–1021. https://www.scopus.com/inward/record.uri?eid=2-s2.0-85087761729&doi=10.1177%2F1359104520940744&partnerID=40&md5=e5fafc59dfec16a99cc3cd5f225e6fa1

Office of Juvenile Justice and Delinquency Prevention. (2021, May 21). *OJJDP Statistical Briefing Book*. Online. www.ojjdp.gov/ojstatbb/corrections/qa08405.asp?qaDate=2019

Office of Juvenile Justice and Delinquency Prevention. (2023, September 14). *Median days in placement since admission*. Https://Www.Ojjdp.Gov/Ojstatbb/Corrections/Qa08405.Asp?QaDate=2021.

Ogunwale, A., Ogunlesi, A. O., & Akinhanmi, A. O. (2012). Psychoactive substance use among young offenders in a Nigerian correctional facility: A comparative analysis. *International Journal of Forensic Mental Health*, *11*(2), 91–101. https://doi.org/10.1080/14999013.2012.688090

Padyab, M., Grahn, R., & Lundgren, L. (2015). Drop-out from the Swedish addiction compulsory care system. *Evaluation and Program Planning*, *49*, 178–184. https://doi.org/10.1016/j.evalprogplan.2014.12.016

Palesch, Y. Y. (2014). Some common misperceptions about P values. *Stroke*, *45*(12), e244–e246. https://doi.org/10.1161/STROKEAHA.114.006138

Parhar, K. K., Wormith, J. S., Derkzen, D. M., & Beauregard, A. M. (2008). Offender coercion in treatment: A meta-analysis of effectiveness. *Criminal Justice and Behavior*, *35*(9), 1109–1135. https://doi.org/10.1177/0093854808320169

Patel, S. H., Lambie, G. W., & Glover, M. M. (2008). Motivational 154ounselling: Implications for 154ounselling male juvenile sex offenders. *Journal of Addictions*, *28*(2), 86–100.

Paulsamy, P., Periannan, K., Easwaran, V., Khan, N. A., Manoharan, V., Venkatesan, K., Qureshi, A. A., Prabahar, K., Kandasamy, G., Vasudevan, R., Chidambaram, K., Pappiya, E. M., Venkatesan, K., & Sethuraj, P. (2021). School-based exercise and life style motivation intervention (SEAL.MI) on adolescent's cardiovascular risk factors and academic performance: catch them young. *Healthcare (Switzerland)*, *9*(11). https://doi.org/10.3390/healthcare9111549

Peeters, M., Wiers, R. W., Monshouwer, K., van de Schoot, R., Janssen, T., & Vollebergh, W. A. M. (2012). Automatic processes in at-risk adolescents: The role of alcohol-approach tendencies and response inhibition in drinking behavior. *Addiction*, *107*(11), 1939–1946. https://doi.org/10.1111/j.1360-0443.2012.03948.x

Petry, N. M. (2011). Contingency management: What it is and why psychiatrists should want to use it. In *Psychiatrist* (Vol. 35, Issue 5, pp. 161–163). https://doi.org/10.1192/pb.bp.110.031831

Pickrel, S. G., & Henggeler, S. W. (1996). Multisystemic therapy for adolescent substance abuse and dependence. *Child and Adolescent Psychiatric Clinics of North America*, *5*(1), 201–211.

Plattner, B., Giger, J., Bachmann, F., Brühwiler, K., Steiner, H., Steinhausen, H. C., Bessler, C., & Aebi, M. (2012). Psychopathology and offense types in detained male juveniles. *Psychiatry Research*, *198*(2), 285–290. https://doi.org/10.1016/j.psychres.2012.02.006

Pniewski, B., Elsner, K., & König, A. (2019). Behandlungsevaluation im Jugendmaßregelvollzug: Ergebnisse zu Veränderungsprozessen und zum Stationsklima aus unterschiedlichen Perspektiven [Treatment evaluation in adolescent forensic psychiatry: Results on processes of change and ward climate from diff. *Forensische Psychiatrie, Psychologie, Kriminologie*, *13*(3), 282–291. https://www.scopus.com/inward/record.uri?eid=2-s2.0-85068740412&doi=10.1007%2Fs11757-019-00551-6&partnerID=40&md5=d4476e68160bef184249de8a6c555c1b

Prendergast, M., Podus, D., Finney, J., Greenwell, L., & Roll, J. (2006). Contingency management for treatment of substance use disorders: A meta-analysis. In *Addiction* (Vol. 101, Issue 11, pp. 1546–1560). https://doi.org/10.1111/j.1360-0443.2006.01581.x

Prochaska, J. O., & Velicer, W. F. (1997). The transtheoretical model of health behavior change. *American Journal of Health Promotion*, *12*(1), 38–48. https://doi.org/10.4278/0890-1171-12.1.38

Pronk, T., van Deursen, D. S., Beraha, E. M., Larsen, H., & Wiers, R. W. (2015). Validation of the Amsterdam Beverage Picture Set: A controlled picture set for cognitive bias measurement and modification paradigms. *Alcoholism: Clinical and Experimental Research*, *39*(10), 2047–2055. https://doi.org/10.1111/acer.12853

Putniņš, A. L. (2001). *Substance use by south Australian young offenders*. *19*, 1–17. http://www.ocsar.sa.gov.au/docs/information_bulletins/IB19.pdf

Putniņš, A. L. (2003). Substance use and the prediction of young offender recidivism. *Drug and Alcohol Review*, *22*(4), 401–408. https://doi.org/10.1080/09595230310001613912

Randall, J., Cunningham, P. B., & Henggeler, S. W. (2018). The development and transportability of Multisystemic Therapy-Substance Abuse: A treatment for adolescents with substance use disorders. *Journal of Child and Adolescent Substance Abuse*, *27*(2), 59–66. https://doi.org/10.1080/1067828X.2017.1411301

Reich, R. R., Below, M. C., & Goldman, M. S. (2010). Explicit and implicit measures of expectancy and related alcohol cognitions: A meta-analytic comparison. *Psychology of Addictive Behaviors*, *24*(1), 13–25. https://doi.org/10.1037/a0016556

Richey, J. A., Brewer, J. A., Sullivan-Toole, H., Strege, M. V., Kim-Spoon, J., White, S. W., & Ollendick, T. H. (2019). Sensitivity shift theory: A developmental model of positive affect and motivational deficits in social anxiety disorder. *Clinical Psychology Review*, *72*, 101756. https://doi.org/10.1016/j.cpr.2019.101756

Rijo, D., Ribeiro da Silva, D., Brazão, N., Paulo, M., Ramos Miguel, R., Castilho, P., Vagos, P., & Gilbert, P. (2022). Promoting a compassionate motivation in detained youth: A secondary analysis of a

controlled trial with the PSYCHOPATHY.COMP program. *Personality Disorders: Theory, Research, and Treatment*.

Rinck, M., W. Wiers, R., S. Becker, E., Lindenmeyer, J., Stice, E., Davila, J., & Jansen, A. (2018). Relapse prevention in abstinent alcoholics by Cognitive Bias Modification: Clinical effects of combining approach bias modification and attention bias modification. *Journal of Consulting and Clinical Psychology*, *86*(12), 1005–1016.

Robertson, A. A., Stein, J. A., & Baird-Thomas, C. (2006). Gender differences in the prediction of condom use among incarcerated juvenile offenders: testing the information-motivation-behavior skills (IMB) model. *Journal of Adolescent Health*, *38*(1), 18–25.

Robinson, T. E., & Berridge, K. C. (2003). Addiction. *Annual Review of Psychology*, *54*, 25–53. https://doi.org/10.1146/annurev.psych.54.101601.145237

Robinson, T. E., & Berridge, K. C. (2008). The incentive sensitization theory of addiction: Some current issues. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *363*(1507), 3137–3146. https://doi.org/10.1098/rstb.2008.0093

Rodriguez, S., Munoz, M. C., & Garcia, M. D. (2018). Movilizar el cambio en menores con medidas judiciales: De la atribución al vínculo [Promoting change in young offenders by means of judicial measures: From attribution to bond]. *Anuario de Psicologia Juridica*, *28*(1), 8–14.

Roest, J. J., van der Helm, G. H. P., & Stams, G. J. J. M. (2016). The relation between therapeutic alliance and treatment motivation in residential youth care: A cross-lagged panel analysis. *Child and Adolescent Social Work Journal*, *33*(5), 455–468. https://doi.org/10.1007/s10560-016-0438-4

Rooke, S. E., Hine, D. W., & Thorsteinsson, E. B. (2008). Implicit cognition and substance use: A meta-analysis. *Addictive Behaviors*, *33*(10), 1314–1328. https://doi.org/10.1016/j.addbeh.2008.06.009

Rosengard, C., Stein, L. A. R., Barnett, N. P., Monti, P. M., Golembeske, C., Lebeau-Craven, R., & Miranda, R. (2007). Randomized clinical trial of motivational enhancement of substance use treatment among incarcerated adolescents. *Journal of HIV/AIDS Prevention in Children & Youth*, *8*(2), 45–64. https://search.ebscohost.com/login.aspx?direct=true&db=snh&AN=44873445&site=ehost-live&scope=site

Ross, T. P., Hanouskova, E., Giarla, K., Calhoun, E., & Tucker, M. (2007). The reliability and validity of the self-ordered pointing task. *Archives of Clinical Neuropsychology*, *22*(4), 449–458. https://doi.org/10.1016/j.acn.2007.01.023

Ryan, R. M., & Deci, E. L. (2000a). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, *25*(1), 54–67. https://doi.org/10.1006/ceps.1999.1020

Ryan, R. M., & Deci, E. L. (2000b). Self-Determination Theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68–78.

Sainsbury, L., Krishnan, G., & Evans, C. (2004). Motivating factors for male forensic patients with personality disorder. *Criminal Behaviour and Mental Health*, *14*(1), 29–38. https://doi.org/10.1002/cbm.558

Salekin, R. T. (2004). *Risk-Sophistication-Treatment-Inventory (RST—i): Professional manual*. Psychological Assessment Resources. http://criminal-justice.iresearchnet.com/forensic-psychology/risk-sophistication-treatment-inventory-rsti/

Salekin, R. T., Lee, Z., Schrum Dillard, C. L., & Kubak, F. A. (2010). Child psychopathy and protective factors: IQ and motivation to change. *Psychology, Public Policy, and Law*, *16*(2), 158–176.

Salekin, R. T., Tippey, J. G., & Allen, A. D. (2012). Treatment of conduct problem youth with interpersonal callous traits using mental models: Measurement of risk and change. *Behavioral Sciences & the Law*, *30*(4), 470–486.

Salemink, E., Rinck, M., Becker, E., Wiers, R. W., & Lindenmeyer, J. (2022). Does comorbid anxiety or depression moderate effects of approach bias modification in the treatment of alcohol use disorders? *Psychology of Addictive Behaviors*, *36*(5), 547–554. https://doi.org/10.1037/adb0000642

Saunders, J. B., Aasland, O. G., Babor, T. F., De La Fuente, J. R., & Grant, M. (1993). Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO Collaborative Project on Early Detection of Persons with Harmful Alcohol Consumption-II. *Addiction*, *88*(6), 791–804. https://doi.org/10.1111/j.1360-0443.1993.tb02093.x

Schenk, G., Duindam, H. M., Creemers, H. E., Hoeve, M., Stams, G. J. J. M., & Asscher, J. J. (2018). The effectiveness of Dutch Cell Dogs in correctional facilities in the Netherlands: A study protocol of a quasi-experimental trial. *BMC Psychiatry*, *18*(1). https://doi.org/10.1186/s12888-018-1797-5

Scheuffgen, K., Pniewski, B., & König, A. (2016). Evaluation der Psychodramatherapie in einer Einrichtung für traumatisierte Jungen mit sexuell übergriffigem Verhalten. In C. Stadler, M. Wieser, & K. Kirk (Eds.), *Psychodrama. Empirical Research and Science 2.* Springer. https://doi.org/10.1007/978-3-658-13015-2_14

Schmiege, S. J., Broaddus, M. R., Levin, M., & Bryan, A. D. (2009). Randomized trial of group interventions to reduce HIV/STD risk and change theoretical mediators among detained adolescents. *Journal of Consulting and Clinical Psychology*, *77*(1), 38–50. https://www.scopus.com/inward/record.uri?eid=2-s2.0-61349151145&doi=10.1037%2Fa0014513&partnerID=40&md5=b7ed7b35fd45c398a460daa4e704d755

Schmiege, S. J., Magnan, R. E., Yeater, E. A., Feldstein Ewing, S. W., & Bryan, A. D. (2021). Randomized trial to reduce risky sexual behavior among justice-involved adolescents. *Journal of Preventive Medicine*, *60*(1), 47–56.

Schmits, E., Maurage, P., Thirion, R., & Quertemont, E. (2014). Dissociation between implicit and explicit expectancies of cannabis use in adolescence. *Psychiatry Research*, *230*(3), 783–791. https://doi.org/10.1016/j.psychres.2015.11.005

Schoenmakers, T. M., de Bruin, M., Lux, I. F. M., Goertz, A. G., Van Kerkhof, D. H. A. T., & Wiers, R. W. (2010). Clinical effectiveness of attentional bias modification training in abstinent alcoholic patients. *Drug and Alcohol Dependence*, *109*(1–3), 30–36. https://doi.org/10.1016/j.drugalcdep.2009.11.022

Schubert, C. A., Mulvey, E. P., & Glasheen, C. (2011). Influence of mental health and substance use problems and criminogenic risk on outcomes in serious juvenile offenders. *Journal of the American Academy of Child & Adolescent Psychiatry*, *50*(9), 925–937. www.jaacap.org

Segeren, M. W., Fassaert, T. J. L., Kea, R., de Wit, M. A. S., & Popma, A. (2018). Exploring differences in criminogenic risk factors and criminal behavior between young adult violent offenders with and without mild to borderline intellectual disability. *International Journal of Offender Therapy and Comparative Criminology*, *62*(4), 978–999. https://doi.org/10.1177/0306624X16674009

Serie, C. M. B., De Ruiter, C., Pleysier, S., & Put, J. (2023). Self-perceived views on offender rehabilitation in detained adolescent boys: A qualitative analysis in the context of the Good Lives Model. *Frontiers in Psychology*, *14*. https://doi.org/10.3389/fpsyg.2023.1153093

Shannon, S., & Abrams, L. (2006). Changing diapers, changing lives? Paternal identities as motivators for desistence among incarcerated teen fathers. *Conference Papers – American Society of Criminology*, 1. https://search.ebscohost.com/login.aspx?direct=true&db=snh&AN=26954513&site=ehost-live&scope=site

Shefler, G., Canetti, L., & Wiseman, H. (2001). Psychometric properties of Goal-Attainment Scaling in the assessment of Mann's Time-Limited Psychotherapy. *Journal of Clinical Psychology*, *57*(7), 971–979. https://doi.org/10.1002/jclp.1063

Sherman, B. J., Baker, N. L., Squeglia, L. M., & McRae-Clark, A. L. (2018). Approach bias modification for cannabis use disorder: A proof-of-principle study. *Journal of Substance Abuse Treatment*, *87*, 16–22. https://doi.org/10.1016/j.jsat.2018.01.012

Simoneau, H., & Bergeron, J. (2003). Factors affecting motivation during the first six weeks of treatment. *Addictive Behaviors*, *28*(7), 1219–1241. https://doi.org/10.1016/S0306-4603(02)00257-5

Simons, I., Mulder, E., Rigter, H., Breuk, R., van der Vaart, W., & Vermeiren, R. (2016). Family-centered care in juvenile justice institutions: A mixed methods study protocol. *JMIR Research Protocols*, *5*(3), e177. https://doi.org/10.2196/resprot.5938

Simpson, T. P., Frick, P. J., Kahn, R. E., & Evans, L. J. (2013). Therapeutic alliance in justice-involved adolescents undergoing mental health treatment: The role of Callous-Unemotional traits. In *International Journal of Forensic Mental Health* (Vol. 12, Issue 2, pp. 83–92). https://doi.org/10.1080/14999013.2013.787559

Singh, I., Sinnott-Armstrong, W., & Savulescu, J. (Eds.). (2014). *Bioprediction, biomarkers and bad behavior: Scientific, legal and ethical challenges.* . Oxford University Press.

Slavet, J. D., Stein, L. A. R., Klein, J. L., Colby, S. M., Barnett, N. P., & Monti, P. M. (2005). Piloting the Family Check-Up with incarcerated adolescents and their parents. *Psychological Services*, *2*(2), 123–132.

Snyder, C. M. J., & Anderson, S. A. (2009). An examination of mandated versus voluntary referral as a determinant of clinical outcome. *Journal of Marital and Family Therapy*, *35*(3), 278–292. https://doi.org/10.1111/j.1752-0606.2009.00118.x

Sroka, I. M., Isemann, S. D., & Walther, E. (2017). With or without them: Improving self-control in juvenile offenders. *Basic and Applied Social Psychology*, *39*(5), 277–286.

Stacy, A. W., & Wiers, R. W. (2010). Implicit cognition and addiction: A tool for explaining paradoxical behavior. In *Annual Review of Clinical Psychology* (Vol. 6, pp. 551–575). https://doi.org/10.1146/annurev.clinpsy.121208.131444

Stein, L. A. R., Clair, M., Lebeau, R., Colby, S. M., Barnett, N. P., Golembeske, C., & Monti, P. M. (2011). Motivational interviewing to reduce substance-related consequences: Effects for incarcerated adolescents with depressed mood. *Drug and Alcohol Dependence*, *118*(2), 475–478.

Stein, L. A. R., Colby, S. M., Barnett, N. P., Monti, P. M., Golembeske, C., & Lebeau-Craven, R. (2006). Effects of Motivational Interviewing for incarcerated adolescents on driving under the influence after release. *Journal on Addictions*, 50–57.

Stein, L. A. R., Colby, S. M., Barnett, N. P., Monti, P. M., Golembeske, C., Lebeau-Craven, R., & Miranda, R. (2006). Enhancing substance abuse treatment engagement in incarcerated adolescents. *Psychological Services*, *3*(1), 25–34.

Stein, L. A. R., Lebeau, R., Colby, U. M., Barnett, N. P., Golembeske, C., & Monti, P. M. (2011). Motivational interviewing for incarcerated adolescents: Effects of depressive symptoms on reducing alcohol and marijuana use after release. *Journal of Studies on Alcohol and Drugs*, *72*(3), 497–506.

Stein, L. A. R., Martin, R., Clair-Michaud, M., Lebeau, R., Hurlbut, W., Kahler, C. W., Monti, P. M., & Rohsenow, D. (2020). A randomized clinical trial of motivational interviewing plus skills training vs. Relaxation plus education and 12-steps for substance using incarcerated youth: Effects on alcohol, Marijuana and crimes of aggression. *Drug and Alcohol Dependence*.

Stichting Verslavingsreclassering GGZ. (2019). *Stap voor Stap*. Https://Www.Svg.Nl/Wat-Doenwij/Stap-Voor-Stap.

Storr, C. L., Pacek, L. R., & Martins, S. S. (2012). Substance use disorders and adolescent psychopathology. *Public Health Reviews*, *34*(2).

Stroet, K., Opdenakker, M. C., & Minnaert, A. (2013). Effects of need supportive teaching on early adolescents' motivation and engagement: A review of the literature. In *Educational Research Review* (Vol. 9, pp. 65–87). https://doi.org/10.1016/j.edurev.2012.11.003

Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality*, *2*(April 2004), 54.

Tennity, C. L., & Grassetti, S. N. (2022). Feasibility and preliminary outcomes from a non-randomized trial of the free talk program in a short-term juvenile detention facility. *Children and Youth Services Review*, *137*. https://doi.org/10.1016/j.childyouth.2022.106470

ter Beek, E., van der Rijken, R. E. A., Kuiper, C. H. Z., Hendriks, J., & Stams, G. J. J. M. (2018). The allocation of sexually transgressive juveniles to intensive specialized treatment: An assessment of the application of RNR principles. *Journal of Offender Therapy and Comparative Criminology*, *62*(5), 1179–1200.

Thush, C., Wiers, R. W., Ames, S. L., Grenard, J. L., Sussman, S., & Stacy, A. W. (2008). Interactions between implicit and explicit cognition and working memory capacity in the prediction of alcohol use in at-risk adolescents. *Drug and Alcohol Dependence*, *94*(1–3), 116–124. https://doi.org/10.1016/j.drugalcdep.2007.10.019

Tighe, A., Pistrang, N., Casdagli, L., Baruch, G., & Butler, S. (2012). Multisystemic therapy for young offenders: Families' experiences of therapeutic processes and outcomes. *Journal of Family Psychology*, *26*(2), 187–197. https://doi.org/10.1037/a0027120

Toplak, M. E., West, R. F., & Stanovich, K. E. (2011). The Cognitive Reflection Test as a predictor of performance on heuristics-and-biases tasks. *Memory and Cognition*, *39*(7), 1275–1289. https://doi.org/10.3758/s13421-011-0104-1

Underwood, L. A., Phillips, A., von Dresner, K., & Knight, P. D. (2006). Critical factors in mental health programming for juveniles in corrections facilities. *Journal of Behavioral Consultation and Therapy*, *2*(1), 107–140.

Van Binsbergen, M. H. (2003). *Motivation for treatment: Development of motivation for treatment in a secure residential facility (Doctoral dissertation)*. University of Leiden.

Van Damme, L., Hoeve, M., Vanderplasschen, W., Vermeiren, R., Grisso, T., & Colins, O. F. (2015). Detained girls' treatment engagement over time: The role of psychopathology and quality of life. *Children and Youth Services Review*, 47–56.

Van der Baan, H. S., Collot D'Escury-Koenigs, dr A. L., & Wiers, dr R. W. (2024). The effectiveness of cognitive bias modification in reducing substance use in detained juveniles: An RCT. *Journal of Behavior Therapy and Experimental Psychiatry*, *82*, 101916. https://doi.org/10.1016/j.jbtep.2023.101916

van der Helm, G. H. P., Beunk, L., Stams, G. J. J. M., & van der Laan, P. (2014). The relationship between detention length, living group climate, coping, and treatment motivation among juvenile delinquents in a youth correctional facility. *The Prison Journal*, *94*(2), 260–275.

Van der Helm, G. H. P., Klapwijk, M., Stams, G. J. J. M., & van der Laan, P. (2009). "What works" for juvenile prisoners: The role of group climate in a youth prison. *Journal of Children's Services*, *4*(2), 36–48. https://www.scopus.com/inward/record.uri?eid=2-s2.0-77952156738&doi=10.1108%2F17466660200900011&partnerID=40&md5=779ab17a1bf75155032020d6638b9ad1

van der Helm, G. H. P., Kuiper, C. H. Z., & Stams, G. J. J. M. (2018). Group climate and treatment motivation in secure residential and forensic youth care from the perspective of self determination theory. *Children and Youth Services Review*, *93*, 339–344.

Van Der Helm, G. H. P., Wissink, I. B., De Jongh, T., & Stams, G. J. J. M. (2013). Measuring treatment motivation in secure juvenile facilities. *International Journal of Offender Therapy and Comparative Criminology*, *57*(8), 996–1008. https://doi.org/10.1177/0306624X12443798

van der Helm, G. H. P., Wissink, I. B., de Jongh, T., & Stams, G. J. J. M. (2013). Measuring treatment motivation in secure juvenile facilities. *International Journal of Offender Therapy and Comparative Criminology*, *57*(8), 996–1008. https://www.scopus.com/inward/record.uri?eid=2-s2.0-84880314317&doi=10.1177%2F0306624X12443798&partnerID=40&md5=a3e82c7e0f3a76ead59ef6587fdf0a1c

van der Laan, A., & Eichelsheim, V. (2013). Juvenile adaptation to imprisonment: Feelings of safety, autonomy and well-being, and behaviour in prison. *Journal of Criminology*, *10*(4), 424–443.

Van der Pol, T. M., Hoeve, M., Noom, M. J., Stams, G. J. J. M., Doreleijers, T. A. H., van Domburgh, L., & Vermeiren, R. R. J. M. (2017). Research Review: The effectiveness of multidimensional family therapy in treating adolescents with multiple behavior problems – a meta-analysis. In *Journal of Child Psychology and Psychiatry and Allied Disciplines* (Vol. 58, Issue 5, pp. 532–545). Blackwell Publishing Ltd. https://doi.org/10.1111/jcpp.12685

Van Dessel, P., Cummins, J., & Wiers, R. W. (2023). ABC-training as a new intervention for hazardous alcohol drinking: Two proof-of-principle randomized pilot studies. *Addiction*. https://doi.org/10.1111/add.16271

Van Dessel, P., De Houwer, J., & Gast, A. (2016). Approach–avoidance training effects are moderated by awareness of stimulus–action contingencies. *Personality and Social Psychology Bulletin*, *42*(1), 81–93. https://doi.org/10.1177/0146167215615335

Van Dessel, P., De Houwer, J., Gast, A., Roets, A., & Smith, C. T. (2020). On the effectiveness of approach-avoidance instructions and training for changing evaluations of social groups. *Journal of Personality and Social Psychology*, *119*(2), e1–e14. https://doi.org/10.1037/pspa0000189

Van Dessel, P., De Houwer, J., Gast, A., & Smith, C. T. (2015). Instruction-based approach-avoidance effects: Changing stimulus evaluation via the mere instruction to approach or avoid stimuli. *Experimental Psychology*, *62*(3), 161–169. https://doi.org/10.1027/1618-3169/a000282

Van Dessel, P., Hughes, S., & De Houwer, J. (2019). How do actions influence attitudes? An inferential account of the impact of action performance on stimulus evaluation. *Personality and Social Psychology Review*, *23*(3), 267–284. https://doi.org/10.1177/1088868318795730

van Deursen, D. S. (2019). *Where is the bias? Measuring and retraining cognitive biases in problem drinkers*. Psychology Research Institute, University of Amsterdam.

Van Deursen, D. S., Salemink, E., Smit, F., Kramer, J., & Wiers, R. W. (2013). Web-based cognitive bias modification for problem drinkers: Protocol of a randomised controlled trial with a 2x2x2 factorial design. *BMC Public Health*, *13*(1). https://doi.org/10.1186/1471-2458-13-674

van Hemel-Ruiter, M. E., Wiers, R. W., Brook, F. G., & de Jong, P. J. (2016). Attentional bias and executive control in treatment-seeking substance-dependent adolescents: A cross-sectional and follow-up study. *Drug and Alcohol Dependence*, *159*, 133–141. https://doi.org/10.1016/j.drugalcdep.2015.12.005

Verhulst, F. C., van der Ende, J., & Koot, H. M. (1997). *Manual for the teacher's report form (TRF).* Erasmus MC/Sophia children's hospital.

Vermeiren, R. (2003). Psychopathology and delinquency in adolescents: A descriptive and developmental perspective. In *Clinical Psychology Review* (Vol. 23, Issue 2). https://doi.org/10.1016/S0272-7358(02)00227-1

Vitousek, K., Watson, S., & Wilson, G. T. (1998). Enhancing motivation for change in treatment-resistant eating disorders. In *Clinical Psychology Review* (Vol. 18, Issue 4).

Vreugdenhil, C., Doreleijers, T. A. H., Vermeiren, R., Wouters, L. F. J. M., & Van Den Brink, W. (2004). Psychiatric disorders in a representative sample of incarcerated boys in The Netherlands. *Journal of the American Academy of Child and Adolescent Psychiatry*, *43*(1), 97–104. https://doi.org/10.1097/00004583-200401000-00019

Vreugdenhil, C., Van Den Brink, W. V., Wouters, L. F. J. M., & Doreleijers, T. A. H. (2003). Substance use, substance use disorders, and comorbidity patterns in a representative sample of incarcerated male Dutch adolescents. *Journal of Nervous and Mental Disease*, *191*(6), 372–378. https://doi.org/10.1097/00005053-200306000-00004

Vu, T. Van, Magis-Weinberg, L., Jansen, B. R. J., van Atteveldt, N., Janssen, T. W. P., Lee, N. C., van der Maas, H. L. J., Raijmakers, M. E. J., Sachisthal, M. S. M., & Meeter, M. (2022). Motivation-

achievement cycles in learning: A literature review and research agenda. In *Educational Psychology Review* (Vol. 34, Issue 1, pp. 39–71). Springer. https://doi.org/10.1007/s10648-021-09616-7

Waldron, H. B., & Kaminer, Y. (2004). On the learning curve: The emerging evidence supporting cognitive-behavioral therapies for adolescent substance abuse. In *Addiction* (Vol. 99, Issue SUPPL. 2, pp. 93–105). Blackwell Publishing Ltd. https://doi.org/10.1111/j.1360-0443.2004.00857.x

Ward, T., & Gannon, T. A. (2006). Rehabilitation, etiology, and self-regulation: The comprehensive Good Lives Model of treatment for sexual offenders. In *Aggression and Violent Behavior* (Vol. 11, Issue 1, pp. 77–94). https://doi.org/10.1016/j.avb.2005.06.001

Wardell, J. D., Quilty, L. C., & Hendershot, C. S. (2016). Impulsivity, working memory, and impaired control over alcohol: A latent variable analysis. *Psychology of Addictive Behaviors*, *30*(5), 544–554. https://doi.org/10.1037/adb0000186

Watson, D. W., Bisesi, L., Tanamly, S., & Mai, N. (2003). Comprehensive Residential Education, Arts, and Substance Abuse Treatment (Creasat): A model treatment program for juvenile offenders. *Youth Violence and Juvenile Justice*, *1*(4), 388–401. https://doi.org/10.1177/1541204003256312

Weckler, H., Kong, G., Larsen, H., Cousijn, J., Wiers, R. W., & Krishnan-Sarin, S. (2017). Impulsivity and approach tendencies towards cigarette stimuli: Implications for cigarette smoking and cessation behaviors among youth. *Experimental and Clinical Psychopharmacology*, *25*(5), 363–372. https://doi.org/10.1037/pha0000139

Weinrath, M., Carrington, J., & Tess, C. (2019). Pretrial detainees, sentenced prisoners, and treatment motivation. *International Journal of Offender Therapy and Comparative Criminology*, *63*(15–16), 2693–2712. https://doi.org/10.1177/0306624X19857665

West, R. (2005). Time for a change: Putting the Transtheoretical (Stages of Change) Model to rest. *Addiction*, *100*(8), 1036–1039. https://doi.org/10.1111/j.1360-0443.2005.01139.x

Wiers, R. W., Ames, S. L., Hofmann, W., Krank, M., & Stacy, A. W. (2010). Impulsivity, impulsive and reflective processes and the development of alcohol use and misuse in adolescents and young adults. *Frontiers in Psychology*, *1*(SEP), 1–12. https://doi.org/10.3389/fpsyg.2010.00144

Wiers, R. W., Bartholow, B. D., van den Wildenberg, E., Thush, C., Engels, R. C. M. E., Sher, K. J., Grenard, J., Ames, S. L., & Stacy, A. W. (2007). Automatic and controlled processes and the development of addictive behaviors in adolescents: A review and a model. In *Pharmacology Biochemistry and Behavior* (Vol. 86, Issue 2, pp. 263–283). https://doi.org/10.1016/j.pbb.2006.09.021

Wiers, R. W., Beckers, L., Houben, K., & Hofmann, W. (2009). A short fuse after alcohol: Implicit power associations predict aggressiveness after alcohol consumption in young heavy drinkers with limited executive control. *Pharmacology Biochemistry and Behavior*, *93*(3), 300–305. https://doi.org/10.1016/j.pbb.2009.02.003

Wiers, R. W., Boffo, M., & Field, M. (2018). What's in a trial? On the importance of distinguishing between experimental lab studies and randomized controlled trials: The case of cognitive bias modification and alcohol use disorders. *Journal of Studies on Alcohol and Drugs*, *79*(3), 333–343. https://doi.org/10.15288/jsad.2018.79.333

Wiers, R. W., Cox, W. M., Field, M., Fadardi, J. S., Palfai, T. P., Schoenmakers, T., & Stacy, A. W. (2006). The search for new ways to change implicit alcohol-related cognitions in heavy drinkers. *Alcoholism: Clinical and Experimental Research*, *30*(2), 320–331. https://doi.org/10.1111/j.1530-0277.2006.00037.x

Wiers, R. W., Eberl, C., Rinck, M., Becker, E. S., & Lindenmeyer, J. (2011). Retraining automatic action tendencies changes alcoholic patients' approach bias for alcohol and improves treatment outcome. *Psychological Science*, *22*(4), 490–497. https://doi.org/10.1177/0956797611400615

Wiers, R. W., Gladwin, T. E., Hofmann, W., Salemink, E., & Ridderinkhof, K. R. (2013). Cognitive bias modification and cognitive control training in addiction and related psychopathology: Mechanisms, clinical perspectives, and ways forward. *Clinical Psychological Science*, *1*(2), 192–212. https://doi.org/10.1177/2167702612466547

Wiers, R. W., Houben, K., Fadardi, J. S., van Beek, P., Rhemtulla, M., & Cox, W. M. (2015). Alcohol Cognitive Bias Modification training for problem drinkers over the web. *Addictive Behaviors*, *40*, 21–26. https://doi.org/10.1016/j.addbeh.2014.08.010

Wiers, R. W., Pan, T., van Dessel, P., Rinck, M., & Lindenmeyer, J. (2023). Approach-Bias retraining and other training interventions as add-on in the treatment of AUD patients. In *Current Topics in Behavioral Neurosciences*. Springer. https://doi.org/10.1007/7854_2023_421

Wiers, R. W., Rinck, M., Dictus, M., & Van Den Wildenberg, E. (2009). Relatively strong automatic appetitive action-tendencies in male carriers of the OPRM1 G-allele. *Genes, Brain and Behavior*, *8*(1), 101–106. https://doi.org/10.1111/j.1601-183X.2008.00454.x

Wiers, R. W., & Stacy, A. W. (Eds.). (2006). *Handbook of Implicit Cognition and Addiction*. SAGE Publishers.

Wiers, R. W., Van Dessel, P., & Köpetz, C. (2020). ABC training: A new theory-based form of Cognitive-Bias Modification to foster automatization of alternative choices in the treatment of addiction and related disorders. *Current Directions in Psychological Science*, *29*(5), 499–505. https://doi.org/10.1177/0963721420949500

Willem, L., Vasey, M. W., Beckers, T., Claes, L., & Bijttebier, P. (2013). Cognitive biases and alcohol use in adolescence and young adulthood: The moderating role of gender, attentional control and inhibitory control. *Personality and Individual Differences*, *54*(8), 925–930. https://doi.org/10.1016/j.paid.2013.01.015

Yeager, D. S., Dahl, R. E., & Dweck, C. S. (2018). Why interventions to influence adolescent behavior often fail but could succeed. *Perspectives on Psychological Science*, *13*(1), 101–122. https://doi.org/10.1177/1745691617722620

Young, D. W., Dembo, R., & Henderson, C. E. (2007). A national survey of substance abuse treatment for juvenile offenders. *Journal of Substance Abuse Treatment*, *32*(3), 255–266. https://doi.org/10.1016/j.jsat.2006.12.018

Young, S., Misch, P., Collins, P., & Gudjonsson, G. (2011). Predictors of institutional behavioural disturbance and offending in the community among young offenders. *Journal of Forensic Psychiatry and Psychology*, *22*(1), 72–86. https://doi.org/10.1080/14789949.2010.495991

Zee, M., & Koomen, H. M. Y. (2016). Teacher self-efficacy and its effects on classroom processes, student academic adjustment, and teacher well-being: A synthesis of 40 years of research. *Review of Educational Research*, *86*(4), 981–1015. https://doi.org/10.3102/0034654315626801

Zhang, M., Ying, J., Wing, T., Song, G., Fung, D. S. S., & Smith, H. (2018). A systematic review of attention biases in opioid, cannabis, stimulant use disorders. *International Journal of Environmental Research and Public Health*, *15*(6). https://doi.org/10.3390/ijerph15061138

Supplementary Materials

Appendix A – Appendix K

Appendix A

Abbreviation legenda

AAT: Approach-Avoid Task

ApB: Approach Bias

ApBM: Approach Bias Modification

AtB: Attentional Bias

AtBM: Attentional Bias Modification

AUDIT: Alcohol Use Disorder Identification Test

BSCS: Brief Self-Control Scale

CBM: Cognitive Bias Modification

CBT: Cognitive Behavioral Therapy

CUDIT-R: Cannabis Use Disorder Identification Test – Revised

IC: Informed Consent

ISRD: International Self-Report Delinquency

ITT: Intention To Treat

JDC: Juvenile Detention Center

PP: Per Protocol

SOPT: Self-Ordered Pointing Task

SUD: Substance Use Disorder

TAU: Treatment As Usual

VPT: Visual Probe Task

Appendix B

Technical details AAT and VPT

(for a visual representation of the tasks, see Van Deursen et al., 2013). All tasks used the same set of stimuli, namely the Amsterdam Beverage Picture Set (Pronk et al., 2015) for alcohol, and a custom picture set for cannabis using the same compositional logic (i.e., both active and passive pictures, and control pictures matched substance pictures in terms of lay-out), showing either cannabis imagery or office supplies. Each task used the same response keys, namely the 'u' and the 'n' key on a QWERTY keyboard layout. During measurement moment T1 participants are given an assessment version of the tasks to establish baseline biases. During measurement moments T2 through T6 participants are given either an active training or a sham training version.

CBM Tasks: We employed two tasks, the AAT and the VPT. Both tasks had two versions, an assessment version (to assess base cognitive biases) and a training version. The training version was either an active version (which attempted to retrain the cognitive bias) or a sham version. The sham training tasks were visually identical to the active training tasks and required the same stimulus-response actions from the participants. The difference lay in the relative frequency of the responses required, with the active versions requiring avoidance/disengagement responses from the substance-related stimuli as opposed to the control stimuli.

AAT-assessment: Participants were shown pictures of either the substance, or matched neutral images (sodas or office supplies). They then had to either pull the picture towards them, or push it away from them, in reaction to the shape of the picture, not the content. To simulate the sense of distance, the image would zoom in (become larger) if it was pulled towards the participant and zoom out when pushed away. The idea behind the task is that, if the picture showed something desirable (i.e., the substance), they will be slower to react if they need to push it away, compared to when they need to pull it towards them. Participants

were presented with a black screen with a fixation cross for a random duration between 500 and 1000ms, followed by either a target stimulus or a neutral stimulus. The stimuli were tilted 5 degrees towards the left or the right. Participants were instructed to press a button on the keyboard as quickly as possible that would either pull the picture towards them (zoom in) or away from them (zoom out). Which button they had to press is contingent on the direction in which the stimulus as tilted (e.g., all left-tilted pictures had to be pulled towards them whilst all right-tilted pictures had to be pushed away, or vice-versa). If they made a mistake, a large red X appeared on screen. The stimuli remained on screen for 3000ms, or until a response is given, whichever happens first. The assessment version of the AAT consisted of three blocks. Block 1 was a practice block consisting of 12 trials, where the stimuli were plain gray squares of equal size as the test stimuli. Block 2 and Block 3 both consisted of 40 trials each using the test stimuli, where each type (substance stimulus or neutral stimulus) was pushed or pulled in equal measure (50-50). The test stimuli were presented in two separate blocks to allow a short break in between.

AAT-training: This version consisted of four blocks. Block 1 was a practice block of 8 trials with the practice stimuli. Block 2 was a short assessment block of 64 trials using the test stimuli, pushed and pulled in equal measure (50-50). Block 3 and 4 were the training blocks. Each contained 96 trials using the test stimuli, but the push-pull ratios varied between condition (active or sham training). In the sham training the push-pull ratio for all stimuli was again 50-50, but in the active training the push-pull ratio for substance stimuli was 100-0 (and conversely, 0-100 for neutral stimuli), training the participant to push (or avoid) substance cues.

VPT-assessment: Participants were shown paired pictures, one with the substance relevant for their training and one with a matched neutral image. These pictures were followed by an arrow appearing on one of their locations. Participants indicated which way the arrow pointed. The idea behind the task is that they would be quicker to react when the arrow appears on the location of the more engaging picture (the substance picture). Participants

were shown a black screen with a central fixation cross, followed by two stimuli appearing side by side. The stimuli shown in each trial were a substance and a neutral stimulus and stayed on screen for 500ms. Next, an arrow appeared on screen in the same location as one of the stimuli. In half of the trials the arrow appeared on top of the stimuli, in the other half the stimuli disappeared as the arrow appeared. Participants were instructed to press a button on the keyboard as quickly as possible in response to the arrow. Which button they had to press was contingent on the direction the arrow points (up or down). If the participant gave an incorrect response, a big red X appeared on screen. The probe stayed on screen for 4000ms, or until the participant responded, whichever came first. If the response window ran out, instructions were repeated and the trial was repeated.

The assessment version of the VPT consisted of three blocks. Block 1 was a practice block of 8 trials using grey geometric shapes as stimuli. Block 2 and 3 contained 40 trials each, using substance and neutral stimuli. The probe appeared at the location of both types of stimuli in equal measure (50-50).

VPT-training: This version consisted of four blocks. Block 1 was a practice block identical to that of the measurement version. Block 2 was a short assessment block of 64 trials using the test stimuli, where the probe appeared at the location of both types of stimuli in equal measure (50-50). Blocks 3 and 4 each consisted of 96 trials using the test stimuli. The appearance of the probe was contingent on the condition the participant is in. In the sham training the probe appeared at the location of both types of stimuli in equal measure (50-50). In the active training the probe appeared at the location of the neutral stimulus 100% of the time, training the participant to redirect their attention away from substance cues.

Appendix C

Technical details data collection

At T0, data was collected via digital questionnaires programmed in Qualtrics (Qualtrics, Provo, UT; www.qualtrics.com) on a laptop. The laptop was owned, prepared, and secured by the researchers, using wireless USB modems rather than using the institution's own heavily screened network. Firewalls were in place to limit accessibility; youth could not use the laptops to connect to any website other than those used for data collection. Participants first entered demographic data, followed by a battery of instruments including the AUDIT and CUDIT-R, self-control and a computerized task assessing working memory. Finally, participants were asked to fill out a list of contact information in case we needed to approach them again.

Appendix D

Regression statistics predicting AUDIT & CUDIT-R scores (ITT)

Regression statistics predicting AUDIT scores at T9 (Alcohol; ITT).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.58	.34	.34*
AUDIT T0	.35	1.79*	.08			
Age	.20	1.15	.03			
Gender	.20	1.03	.03			
AAT Substance	.14	.72	.01			
AAT Control	-.21	-1.09	.03			
VPT	-.22	-1.32	.04			
Step 2				.62	.38	.04
Group AAT	.24	.92	.02			
Group VPT	-.05	-.20	.00			
#Sessions	.07	.37	.00			
Group AAT*Group VPT	-.13	-.41	.00			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

Regression statistics predicting CUDIT-R scores at T9 (Cannabis; ITT).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.23	.05	.05
CUDIT-R T0	.20	1.68*	.04			
Age	-.05	-.38	.00			
Gender	.06	.42	.00			
AAT Substance	.01	.07	.00			
AAT Control	.04	.35	.00			
VPT	-.05	-.43	.00			
Step 2				.37	.14	.08
Group AAT	.10	.60	.00			
Group VPT	-.05	-.31	.00			
#Sessions	-.18	-1.55	.03			
Group AAT*Group VPT	.17	.84	.01			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

Appendix E

Dropout analysis

Variables	Wald	O.R.	95% C.I.	χ^2 (df)
Step 1				5.14 (8)
AUDIT T0	2.82*	1.10	.98 – 1.23	
CUDIT_R T0	3.08*	.86	.73 – 1.02	
Age	.97	1.18	.85 – 1.64	
Motivation	1.03	.99	.98 – 1.01	
BSCS	.59	1.04	.95 – 1.13	
AAT Substance	1.29	1.00	.99 – 1.00	
AAT Control	3.69*	1.01	1.00 – 1.01	
VPT	.07	1.00	.98 – 1.02	
Step 2				4.18 (8)
Group AAT	.41	1.88	.27 – 13.14	
Group VPT	.33	.62	.12 – 3.15	
Group AAT*Group VPT	.00	.96	.08 – 11.42	
Step 3				15.11 (8)
AUDIT*GroupAAT	.28	.91	.65 – 1.29	
AUDIT*GroupVPT	.76	1.16	.83 – 1.62	
CUDIT_R*GroupAAT	.59	.91	.70 – 1.17	
CUDIT_R*GroupVPT	1.07	1.15	.88 – 1.49	
Age*GroupAAT	3.58	.38	.14 – 1.04	
Age*GroupVPT	.53	.68	.24 – 1.92	
Motivation*GroupAAT	.10	.99	.95 – 1.04	
Motivation*GroupVPT	1.72	1.03	.99 – 1.08	
BSCS*GroupAAT	.22	.95	.77 – 1.18	
BSCS*GroupVPT	1.31	1.14	.91 – 1.42	
AAT Substance*GroupAAT	.16	1.00	.99 – 1.02	
AAT Control*GroupAAT	.57	1.00	.98 – 1.01	
VPT*GroupVPT	.43	.99	.94 – 1.03	

*p<.20

Appendix F

Regression statistics predicting AUDIT & CUDIT-R scores (PP)

Regression statistics predicting AUDIT scores at T9 (Alcohol; PP).

Variables	**β**	***t***	**sr^2**	***R***	***R^2***	***ΔR^2***
Step 1				.60	.36	.36*
AUDIT T0	.43	1.58	.07			
Age	.17	.95	.03			
Gender	-.07	-.25	.00			
AAT Substance	.10	.50	.01			
AAT Control	-.18	-.91	.02			
VPT	-.22	-1.24	.04			
Step 2				.64	.41	.05
Group AAT	.18	.66	.01			
Group VPT	-.03	-.10	.00			
#Sessions	-.16	-.81	.02			
Group AAT*Group VPT	-.11	-.32	.00			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

Regression statistics predicting CUDIT-R scores at T9 (Cannabis; PP).

Variables	**β**	***t***	**sr^2**	***R***	***R^2***	***ΔR^2***
Step 1				.32	.10	.10
CUDIT-R T0	.27	2.04**	.06			
Age	-.12	-.86	.01			
Gender	.01	.08	.00			
AAT Substance	-.07	-.57	.00			
AAT Control	.01	.06	.00			
VPT	-.15	-1.11	.02			
Step 2				.45	.21	.11
Group AAT	.01	.07	.00			
Group VPT	-.05	-.28	.00			
#Sessions	-.30	-2.31**	.07			
Group AAT*Group VPT	.18	.91	.01			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

Appendix G

Base model & Moderation statistics for the Alcohol participants

Regression statistics predicting AUDIT scores at T9 to establish a base model

Variables	**β**	***t***	**sr^2**	***R***	***R^2***	***ΔR^2***
Step 1				.68	.47	.47
AUDIT T0	.57	1.65†	.08			
Age	.25	1.30†	.05			
Gender	.06	.19	.00			
Brains4Use	-.13	-.66	.01			
Motivation	.21	1.13†	.04			
SOPT	.11	.50	.01			
BSCS	-.10	-.47	.01			
AAT Substance	.02	.11	.00			
AAT Control	-.07	-.31	.00			
VPT	-.28	-1.45†	.06			
Step 2				.73	.53	.06
Group AAT	.27	.79	.02			
Group VPT	-.20	-.62	.01			
#Sessions	.06	.29	.00			
Group AAT*Group VPT	.02	.06	.00			

Notes. †$p < .30$; *$p < .10$, **$p < .05$, ***$p < .01$. #Sessions = number of sessions completed.

Base Model predicting AUDIT scores at T9 .

Variables	**β**	***t***	**sr^2**	***R***	***R^2***	***ΔR^2***
Step 1				.66	.44	.44***
AUDIT T0	.51	3.24***	.24			
Age	.21	1.32	.04			
Motivation	.27	1.73*	.07			
VPT	-.32	-1.95*	.09			

Notes. *$p < .10$, **$p < .05$, ***$p < .01$.

Moderating effect of AUDIT (T0) on AAT training (alcohol).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.66	.44	.44***
AUDIT T0	.51	3.24***	.24			
Age	.21	1.32	.04			
Motivation	.27	1.73*	.07			
VPT	-.32	-1.95*	.09			
Step 2				.71	.50	.06
Group AAT	.27	1.60	.06			
Step 3				.71	.50	.00
AUDIT*GroupAAT	-.25	-.38	.00			

Notes. *p < .10, **p < .05, ***p < .01.

Moderating effect of AUDIT (T0) on VPT training (alcohol).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.66	.44	.44***
AUDIT T0	.51	3.24***	.24			
Age	.21	1.32	.04			
Motivation	.27	1.73*	.07			
VPT	-.32	-1.95*	.09			
Step 2				.67	.45	.01
Group VPT	-.11	-.66	.01			
Step 3				.67	.45	.00
AUDIT*GroupVPT	.08	.17	.00			

Notes. *p < .10, **p < .05, ***p < .01.

Moderating effect of Age on AAT training (alcohol).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.66	.44	.44***
AUDIT T0	.51	3.24***	.24			
Age	.21	1.32	.04			
Motivation	.27	1.73*	.07			
VPT	-.32	-1.95*	.09			
Step 2				.71	.50	.06
Group AAT	.27	1.60	.06			
Step 3				.73	.53	.03
Age*GroupAAT	-.38	-1.15	.03			

Notes. *p < .10, **p < .05, ***p < .01.

Moderating effect of Age on VPT training (alcohol).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.66	.44	.44***
AUDIT T0	.51	3.24***	.24			
Age	.21	1.32	.04			
Motivation	.27	1.73*	.07			
VPT	-.32	-1.95*	.09			
Step 2				.67	.45	.01
Group VPT	-.11	-.66	.01			
Step 3				.68	.47	.02
Age*GroupVPT	-.25	-.81	.02			

Notes. *p < .10, **p < .05, ***p < .01.

Moderating effect of Brains4Use on AAT training (alcohol).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.67	.45	.45**
AUDIT T0	.51	3.20***	.25			
Age	.22	1.35	.04			
Motivation	.27	1.66	.07			
VPT	-.32	-1.92*	.09			
Brains4Use	-.07	-.46	.01			
Step 2				.71	.50	.05
Group AAT	.27	1.54	.05			
Step 3				.77	.59	.09**
Brains4Use*GroupAAT	.45	2.19**	.09			

Notes. *p < .10, **p < .05, ***p < .01.

Moderating effect of Brains4Use on VPT training (alcohol).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.67	.45	.45**
AUDIT T0	.51	3.20***	.25			
Age	.22	1.35	.04			
Motivation	.27	1.66	.07			
VPT	-.32	-1.92*	.09			
Brains4Use	-.07	-.46	.01			
Step 2				.68	.46	.01
Group VPT	-.14	-.83	.02			
Step 3				.74	.54	.08*
Brains4Use*GroupVPT	.35	1.90*	.08			

Notes. *p < .10, **p < .05, ***p < .01.

Moderating effect of Motivation on AAT training (alcohol).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.66	.44	.44***
AUDIT T0	.51	3.24***	.24			
Age	.21	1.32	.04			
Motivation	.27	1.73*	.07			
VPT	-.32	-1.95*	.09			
Step 2				.71	.50	.06
Group AAT	.27	1.60	.06			
Step 3				.71	.50	.00
Motivation*GroupAAT	.10	.45	.00			

Notes. *p < .10, **p < .05, ***p < .01.

Moderating effect of Motivation on VPT training (alcohol).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.66	.44	.44***
AUDIT T0	.51	3.24***	.24			
Age	.21	1.32	.04			
Motivation	.27	1.73*	.07			
VPT	-.32	-1.95*	.09			
Step 2				.67	.45	.01
Group VPT	-.11	-.66	.01			
Step 3				.68	.46	.01
Motivation*GroupVPT	.15	.57	.01			

Notes. *p < .10, **p < .05, ***p < .01.

Moderating effect of SOPT on AAT training (alcohol).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.67	.45	.45**
AUDIT T0	.55	3.14***	.24			
Age	.22	1.36	.04			
Motivation	.25	1.56	.06			
VPT	-.32	-1.93*	.09			
SOPT	.09	.54	.01			
Step 2				.71	.50	.05
Group AAT	.32	1.52	.05			
Step 3				.71	.50	.00
SOPT*GroupAAT	.09	.37	.00			

Notes. *p < .10, **p < .05, ***p < .01.

Moderating effect of SOPT on VPT training (alcohol).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.67	.45	.45**
AUDIT T0	.55	3.14***	.24			
Age	.22	1.36	.04			
Motivation	.25	1.56	.06			
VPT	-.32	-1.93*	.09			
SOPT	.09	.54	.01			
Step 2				.68	.46	.01
Group VPT	-.10	-.63	.01			
Step 3				.74	.55	.09**
SOPT*GroupVPT	.45	2.10**	.09			

Notes. *p < .10, **p < .05, ***p < .01.

Moderating effect of BSCS on AAT training (alcohol).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.67	.44	.44**
AUDIT T0	.49	2.85***	.20			
Age	.21	1.30	.04			
Motivation	.26	1.59	.06			
VPT	-.30	-1.75*	.07			
BSCS	-.07	-.41	.00			
Step 2				.71	.50	.06
Group AAT	.27	1.52	.05			
Step 3				.71	.51	.01
BSCS*GroupAAT	-.20	-.75	.01			

Notes. *p < .10, **p < .05, ***p < .01.

Moderating effect of BSCS on VPT training (alcohol).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.67	.44	.44**
AUDIT T0	.49	2.85***	.20			
Age	.21	1.30	.04			
Motivation	.26	1.59	.06			
VPT	-.30	-1.75*	.07			
BSCS	-.07	-.41	.00			
Step 2				.68	.46	.02
Group VPT	-.13	-.76	.01			
Step 3				.68	.47	.01
BSCS*GroupVPT	-.27	-.60	.01			

Notes. *p < .10, **p < .05, ***p < .01.

Moderating effect of Approach Bias (substance) on AAT training (alcohol).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.66	.44	.44**
AUDIT T0	.51	3.17***	.24			
Age	.21	1.28	.04			
Motivation	.27	1.70	.07			
VPT	-.32	-1.91*	.09			
AAT Substance	-.01	-.07	.00			
Step 2				.71	.50	.06
Group AAT	.28	1.58	.06			
Step 3				.71	.50	.00
AATSubstance*GroupAAT	.10	.43	.00			

Notes. *$p < .10$, **$p < .05$, ***$p < .01$.

Moderating effect of Approach Bias (neutral) on AAT training (alcohol).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.67	.44	.44**
AUDIT T0	.51	3.17***	.24			
Age	.22	1.32	.04			
Motivation	.27	1.64	.07			
VPT	-.31	-1.87*	.08			
AAT Neutral	-.06	-.37	.00			
Step 2				.71	.50	.06
Group AAT	.27	1.53	.05			
Step 3				.73	.53	.03
AATNeutral*GroupAAT	-.26	-1.19	.03			

Notes. *$p < .10$, **$p < .05$, ***$p < .01$.

Moderating effect of Attention Bias (substance) on VPT training (alcohol).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.66	.44	.44***
AUDIT T0	.51	3.24***	.24			
Age	.21	1.32	.04			
Motivation	.27	1.73*	.07			
VPT	-.32	-1.95*	.09			
Step 2				.67	.45	.01
Group VPT	-.11	-.66	.01			
Step 3				.67	.45	.00
VPT*GroupVPT	.02	.11	.00			

Notes. *$p < .10$, **$p < .05$, ***$p < .01$.

Moderating effect of #Sessions on VPT training (alcohol).

Variables	**β**	***t***	**sr^2**	***R***	***R^2***	***ΔR^2***
Step 1				.66	.44	.44***
AUDIT T0	.51	3.24***	.24			
Age	.21	1.32	.04			
Motivation	.27	1.73*	.07			
VPT	-.32	-1.95*	.09			
Step 2				.67	.45	.01
Group VPT	-.10	-.59	.01			
#Sessions	-.05	-.32	.00			
Step 3				.69	.48	.03
#Sessions*GroupVPT	-.34	-1.06	.03			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

Appendix H

Base model & Moderation statistics for the Cannabis participants

Regression statistics predicting CUDIT-R scores at T9 to establish a base model

Variables	**β**	***t***	**sr^2**	***R***	***R^2***	***ΔR^2***
Step 1				.39	.15	.15
CUDIT-R T0	.20	1.31†	.03			
Age	-.07	-.45	.00			
Gender	.03	.16	.00			
Brains4Use	.08	.61	.01			
Motivation	-.13	-1.00	.01			
SOPT	-.16	-1.16†	.02			
BSCS	-.14	-.88	.01			
AAT Substance	-.05	-.40	.00			
AAT Control	-.04	-.27	.00			
VPT	-.16	-1.22†	.02			
Step 2				.51	.26	.11
Group AAT	.08	.42	.00			
Group VPT	-.01	-.03	.00			
#Sessions	-.32	-2.45**	.08			
Group AAT*Group VPT	.09	.43	.00			

Notes. †$p < .30$; *$p < .10$, **$p < .05$, ***$p < .01$. #Sessions = number of sessions completed.

Base Model predicting CUDIT-R scores at T9 .

Variables	**β**	***t***	**sr^2**	***R***	***R^2***	***ΔR^2***
Step 1				.33	.11	.11*
CUDIT-R T0	.30	2.55**	.09			
SOPT	-.14	-1.22	.02			
VPT	-.14	-1.18	.02			
Step 2				.45	.20	.09***
#Sessions	-.32	-2.77***	.09			

Notes. *$p < .10$, **$p < .05$, ***$p < .01$. #Sessions = number of sessions completed.

Moderating effect of CUDITR (T0) on AAT training (cannabis).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.33	.11	.11*
CUDIT-R T0	.30	2.55**	.09			
SOPT	-.14	-1.22	.02			
VPT	-.14	-1.18	.02			
Step 2				.46	.21	.10**
#Sessions	-.32	-2.83***	.10			
Group AAT	.11	.94	.01			
Step 3				.48	.23	.02
CUDIT-R*GroupAAT	.23	1.22	.02			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

Moderating effect of CUDIT-R (T0) on VPT training (cannabis).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.33	.11	.11*
CUDIT-R T0	.30	2.55**	.09			
SOPT	-.14	-1.22	.02			
VPT	-.14	-1.18	.02			
Step 2				.45	.21	.10**
#Sessions	-.32	-2.79***	.10			
Group VPT	.06	.47	.00			
Step 3				.47	.22	.01
CUDIT-R*GroupVPT	.20	1.15	.02			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

Moderating effect of Age on AAT training (cannabis).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.34	.12	.12*
CUDIT-R T0	.29	2.38**	.08			
SOPT	-.15	-1.24	.02			
VPT	-.18	-1.43	.03			
Age	-.14	-1.08	.02			
Step 2				.45	.20	.08**
#Sessions	-.30	-2.54**	.08			
Group AAT	.11	.89	.01			
Step 3				.45	.21	.01
Age*GroupAAT	-.05	-.28	.00			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

Moderating effect of Age on VPT training (cannabis).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.34	.12	.12*
CUDIT-R T0	.29	2.38**	.08			
SOPT	-.15	-1.24	.02			
VPT	-.18	-1.43	.03			
Age	-.14	-1.08	.02			
Step 2				.44	.20	.08*
#Sessions	-.30	-2.49**	.08			
Group VPT	.05	.40	.00			
Step 3				.45	.20	.00
Age*GroupVPT	-.09	-.50	.00			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

Moderating effect of Sex on AAT training (cannabis).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.33	.11	.11
CUDIT-R T0	.28	2.27**	.07			
SOPT	-.15	-1.27	.02			
VPT	-.14	-1.20	.02			
Sex	-.06	-.44	.00			
Step 2				.46	.22	.11**
#Sessions	-.32	-2.81***	.10			
Group AAT	.11	.90	.01			
Step 3				.49	.24	.02
Sex*GroupAAT	-.64	1.46	.03			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

Moderating effect of Sex on VPT training (cannabis).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.33	.11	.11
CUDIT-R T0	.28	2.27**	.07			
SOPT	-.15	-1.27	.02			
VPT	-.14	-1.20	.02			
Sex	-.06	-.44	.00			
Step 2				.46	.21	.10**
#Sessions	-.32	-2.77***	.10			
Group VPT	.06	.49	.00			
Step 3				.46	.21	.00
Sex*GroupVPT	-.21	-.45	.00			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

Moderating effect of Brains4Use on AAT training (cannabis).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.33	.11	.11
CUDIT-R T0	.30	2.53**	.09			
SOPT	-.14	-1.20	.02			
VPT	-.14	-1.17	.02			
Brains4Use	-.01	-.10	.00			
Step 2				.46	.21	.10**
#Sessions	-.32	-2.81***	.10			
Group AAT	.11	.93	.01			
Step 3				.46	.21	.00
Brains4Use*GroupAAT	.00	-.02	.00			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

Moderating effect of Brains4Use on VPT training (cannabis).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.33	.11	.11
CUDIT-R T0	.30	2.53**	.09			
SOPT	-.14	-1.20	.02			
VPT	-.14	-1.17	.02			
Brains4Use	-.01	-.10	.00			
Step 2				.45	.21	.10**
#Sessions	-.32	-2.77***	.10			
Group VPT	.06	.46	.00			
Step 3				.46	.21	.00
Brains4Use*GroupVPT	-.07	-.44	.00			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

Moderating effect of Motivation on AAT training (cannabis).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.36	.13	.13*
CUDIT-R T0	.31	2.62**	.09			
SOPT	-.14	-1.17	.02			
VPT	-.16	-1.32	.02			
Motivation	-.16	-1.34	.02			
Step 2				.48	.23	.10**
#Sessions	-.32	-2.76***	.09			
Group AAT	.10	.83	.01			
Step 3				.48	.23	.00
Motivation*GroupAAT	-.06	-.40	.00			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

Moderating effect of Motivation on VPT training (cannabis).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.36	.13	.13*
CUDIT-R T0	.31	2.62**	.09			
SOPT	-.14	-1.17	.02			
VPT	-.16	-1.32	.02			
Motivation	-.16	-1.34	.02			
Step 2				.48	.23	.10**
#Sessions	-.32	-2.74***	.09			
Group VPT	.06	.52	.00			
Step 3				.48	.23	.00
Motivation*GroupVPT	.04	.24	.00			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

Moderating effect of SOPT on AAT training (cannabis).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.33	.11	.11*
CUDIT-R T0	.30	2.55**	.09			
SOPT	-.14	-1.22	.02			
VPT	-.14	-1.18	.02			
Step 2				.46	.21	.10**
#Sessions	-.32	-2.83***	.10			
Group AAT	.11	.94	.01			
Step 3				.47	.22	.01
SOPT*GroupAAT	-.06	-.41	.00			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

Moderating effect of SOPT on VPT training (cannabis).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.33	.11	.11*
CUDIT-R T0	.30	2.55**	.09			
SOPT	-.14	-1.22	.02			
VPT	-.14	-1.18	.02			
Step 2				.45	.21	.10**
#Sessions	-.32	-2.79***	.10			
Group VPT	.06	.47	.00			
Step 3				.45	.21	.00
SOPT*GroupVPT	-.03	-.19	.00			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

Moderating effect of BSCS on AAT training (cannabis).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.37	.14	.14*
CUDIT-R T0	.18	1.33	.02			
SOPT	-.13	-1.13	.02			
VPT	-.15	-1.25	.02			
BSCS	-.20	-1.46	.03			
Step 2				.49	.24	.10**
#Sessions	-.31	-2.73***	.09			
Group AAT	.14	1.20	.02			
Step 3				.51	.26	.02
BSCS*GroupAAT	-.25	-1.42	.02			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

Moderating effect of BSCS on VPT training (cannabis).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.37	.14	.14*
CUDIT-R T0	.18	1.33	.02			
SOPT	-.13	-1.13	.02			
VPT	-.15	-1.25	.02			
BSCS	-.20	-1.46	.03			
Step 2				.47	.23	.09**
#Sessions	-.31	-2.66**	.09			
Group VPT	.05	.43	.00			
Step 3				.48	.23	.00
BSCS*GroupVPT	-.11	-.58	.00			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

Moderating effect of Approach Bias (substance) on AAT training (cannabis).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.34	.11	.11*
CUDIT-R T0	.29	2.43**	.08			
SOPT	-.15	-1.28	.02			
VPT	-.12	-1.00	.01			
AAT Substance	-.08	-.62	.01			
Step 2				.48	.23	.12**
#Sessions	-.35	-3.02***	.11			
Group AAT	.11	.93	.01			
Step 3				.49	.24	.01
AATSubstance*GroupAAT	-.08	-.62	.00			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

Moderating effect of Approach Bias (neutral) on AAT training (cannabis).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.33	.11	.11
CUDIT-R T0	.30	2.52**	.09			
SOPT	-.15	-1.26	.02			
VPT	-.14	-1.14	.02			
AAT Neutral	-.04	-.35	.00			
Step 2				.46	.21	.10**
#Sessions	-.32	-2.79***	.10			
Group AAT	.11	.94	.01			
Step 3				.51	.26	.05**
AATNeutral*GroupAAT	.29	2.04**	.05			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

Moderating effect of Attention Bias (substance) on VPT training (cannabis).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.33	.11	.11*
CUDIT-R T0	.30	2.55**	.09			
SOPT	-.14	-1.22	.02			
VPT	-.14	-1.18	.02			
Step 2				.45	.21	.10**
#Sessions	-.32	-2.79***	.10			
Group VPT	.06	.47	.00			
Step 3				.45	.21	.00
VPT*GroupVPT	.01	.03	.00			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

Moderating effect of #Sessions on AAT training (cannabis).

Variables	β	*t*	sr^2	*R*	R^2	ΔR^2
Step 1				.33	.11	.11*
CUDIT-R T0	.30	2.55**	.09			
SOPT	-.14	-1.22	.02			
VPT	-.14	-1.18	.02			
Step 2				.46	.21	.10**
#Sessions	-.32	-2.83***	.10			
Group AAT	.11	.94	.01			
Step 3				.47	.22	.01
#Sessions*GroupAAT	-.08	-.54	.00			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

Moderating effect of #Sessions on VPT training (cannabis).

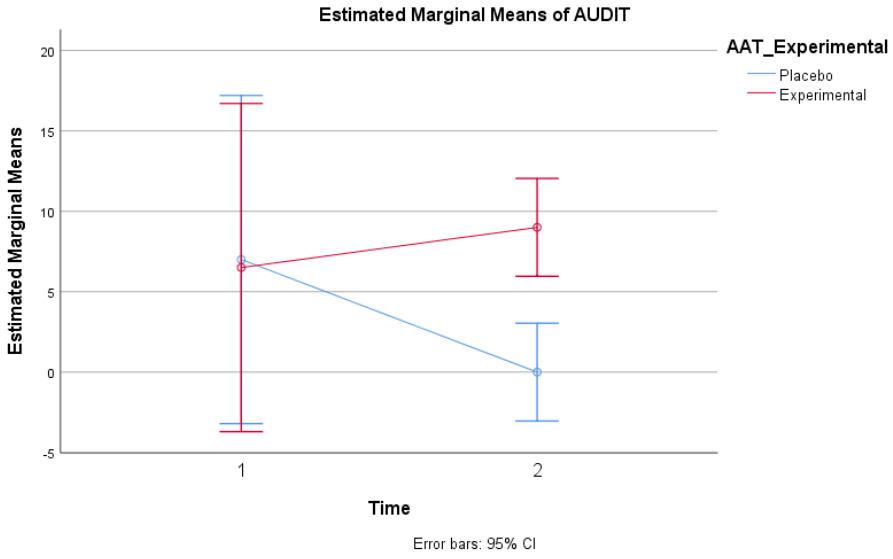
Variables	**β**	***t***	**sr^2**	***R***	***R^2***	***ΔR^2***
Step 1				.33	.11	.11*
CUDIT-R T0	.30	2.55**	.09			
SOPT	-.14	-1.22	.02			
VPT	-.14	-1.18	.02			
Step 2				.45	.21	.10**
#Sessions	-.32	-2.79***	.10			
Group VPT	.06	.47	.00			
Step 3				.46	.21	.00
#Sessions*GroupVPT	.05	.37	.00			

Notes. *p < .10, **p < .05, ***p < .01. #Sessions = number of sessions completed.

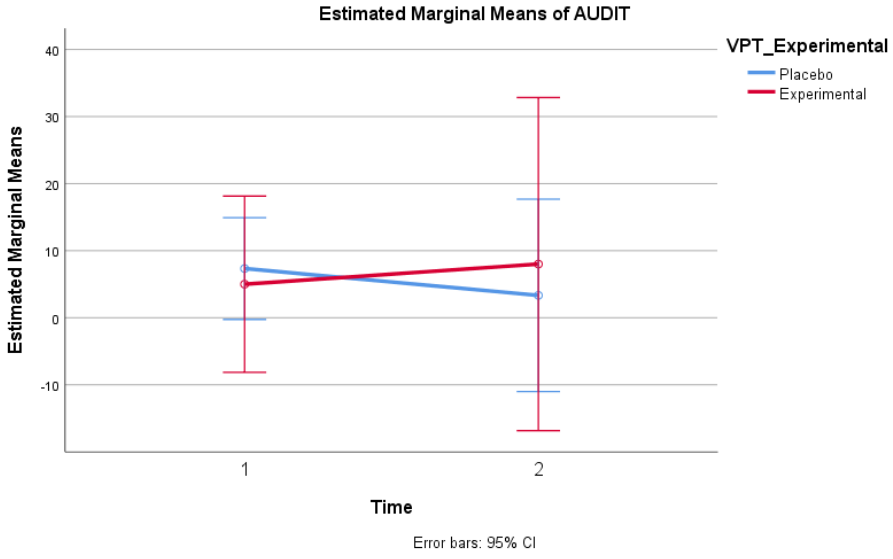
Appendix I

Interaction plots

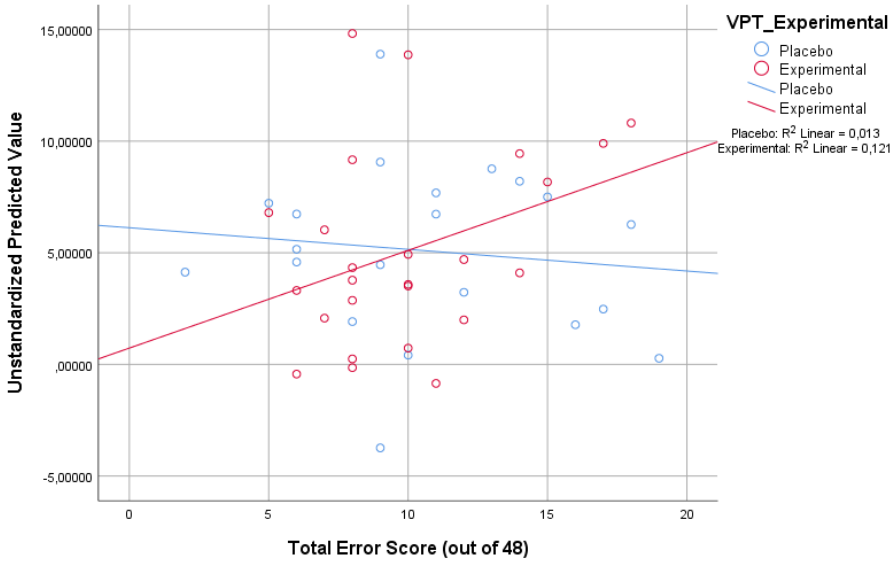
*Brains4Use*CondAAT (Alcohol)*



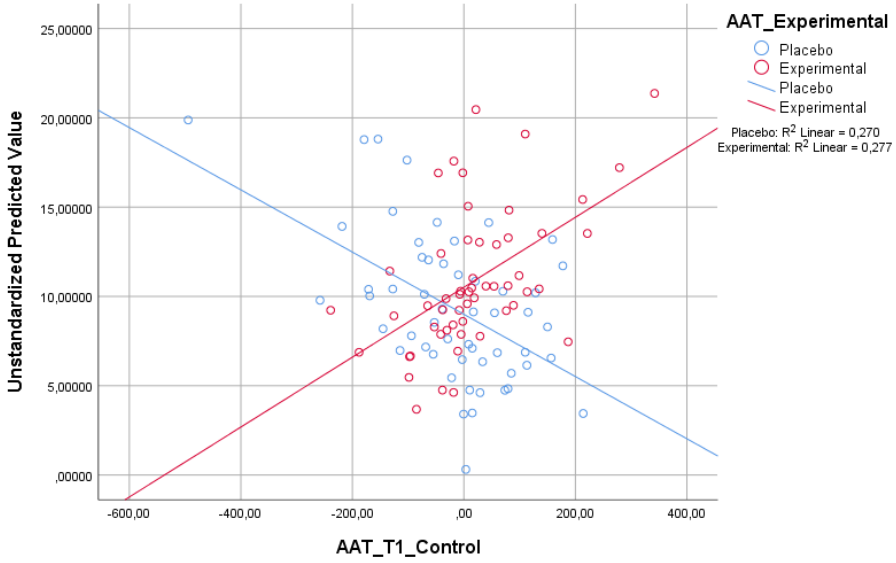
*Brains4Use*CondVPT (Alcohol)*



*SOPT*CondVPT (Alcohol)*



*CondAAT*ApBNeutral (Cannabis)*



Appendix J

Search strategies

The searches below yielded 1.646 results on 28 August, 2023; PsycInfo (406 results), Web of Science Core Collection (304 results), SocINDEX (306 results) and Scopus (630 results).

PsycINFO (Ovid, APA PsycInfo, 1806 to August Week 3 2023)

1. intrinsic motivation/ OR motivation/ OR motivation training/ OR extrinsic motivation/ OR readiness to change/ OR (motivation* OR treatment readiness OR (readiness ADJ2 change)).ti,ab,id.

2. correctional institutions/ OR incarceration/ OR maximum security facilities/ OR prisoners/ OR prisons/ OR residential care institutions/ OR (convicts OR correctional OR detent* OR forensic psychiatric OR incarcerat* OR inmate* OR jail* OR maximum security OR offender* OR penitentiar* OR prison* OR remand cent* OR behind bars OR residential care OR compulsory care OR compulsory residential).ti,ab,id.

3. (adolescence 13 17 yrs).ag. OR juvenile delinquency/ OR (teen* OR youngster* OR young adult* OR young people OR youth* OR minors* OR under ag* OR underag* OR juvenile* OR girl* OR boy* OR preadolesc* OR adolesc*).ti,ab,id.

4. intervention/ OR (therap* OR psychotherap* OR intervent* OR program* OR treatment* OR training OR RCT OR random*).ti,ab,id.

5. motivation training/ OR motivational interviewing/ OR (motivation* ADJ3 (interviewing* OR boost* OR training* OR treatment* OR enhancement OR therapy)).ti,ab,id.

6. 1 AND 2 AND 3 AND (4 OR 5)

Key: / = subject heading, ti = title, ab = abstract, id = key concepts (other keywords added by PsycINFO indexers to supplement the subject headings), ag = age group, ADJn = word distance of maximum n words

Web of Science Core Collection (Web of Science Core Collection Editions: Science Citation Index Expanded (SCI-EXPANDED), 1975 -2023, Social Sciences Citation Index (SSCI), 1975 -2023, Arts & Humanities Citation Index (A&HCI), 1975 -2023, Emerging Sources Citation Index (ESCI), 2005 -2023))

1. TS=("motivation*" OR "treatment readiness" OR ("readiness" NEAR/1 "change"))

2. TS=("convicts" OR "correctional" OR "detent*" OR "forensic psychiatric" OR "incarcerat*" OR "inmate*" OR "jail*" OR "maximum security" OR "offender*" OR "penitentiar*" OR "prison*" OR "remand cent*" OR "behind bars" OR "residential care" OR "compulsory care" OR "compulsory residential")

3. TS=("teen*" OR "youngster*" OR "young adult*" OR "young people" OR "youth*" OR "minors*" OR "under ag*" OR "underag*" OR "juvenile*" OR "girl*" OR "boy*" OR "preadolesc*" OR "adolesc*")

4. TS=("therap*" OR "psychotherap*" OR "intervent*" OR "program*" OR "treatment*" OR "training*" OR "RCT" OR "random*")

5. TS=("motivation*" NEAR/2 ("interviewing*" OR "boost*" OR "training*" OR "treatment*" OR "enhancement" OR "therapy"))

6. #1 AND #2 AND #3 AND (#4 OR #5)

Key: TS = topic, which includes title, abstract, author keywords and Web of Science Keywords Plus, NEAR/n = word distance of maximum n words

SocINDEX (EBSCO, 1895-2023)

1. SU("motivational interviewing" OR "intrinsic motivation" OR "motivation (psychology)") OR TI("motivation*" OR "treatment readiness" OR ("readiness" N1 "change")) OR AB("motivation*" OR "treatment readiness" OR ("readiness" N1 "change")) OR KW("motivation*" OR "treatment readiness" OR ("readiness" N1 "change"))

2. SU("prisoners" OR "prison population" OR "prisons" OR "imprisonment" OR "juvenile prisoners" OR "rehabilitation of criminals" OR "correctional institutions" OR "jails" OR "juvenile detention homes" OR "detention facilities" OR "juvenile detention" OR "male prisoners" OR "women prisoners" OR "maximum security prisons" OR "minimum security prisons" OR "open prisons") OR TI("convicts" OR "correctional" OR "detent*" OR "forensic psychiatric" OR "incarcerat*" OR "inmate*" OR "jail*" OR "maximum security" OR "offender*" OR "penitentiar*" OR "prison*" OR "remand cent*" OR "behind bars" OR "residential care" OR "compulsory care" OR "compulsory residential") OR AB("convicts" OR "correctional" OR "detent*" OR "forensic psychiatric" OR "incarcerat*" OR "inmate*" OR "jail*" OR "maximum security" OR "offender*" OR "penitentiar*" OR "prison*" OR "remand cent*" OR "behind bars" OR "residential care" OR "compulsory care" OR "compulsory residential") OR KW("convicts" OR "correctional" OR "detent*" OR "forensic psychiatric" OR "incarcerat*" OR "inmate*" OR "jail*" OR "maximum security" OR "offender*" OR "penitentiar*" OR "prison*" OR "remand cent*" OR "behind bars" OR "residential care" OR "compulsory care" OR "compulsory residential")

3. SU("minors" OR "youth" OR "at-risk youth" OR "juvenile delinquents" OR "problem youth" OR "teenagers" OR "young adults" OR "adolescence" OR "juvenile delinquency" OR "juvenile prisoners" OR "delinquent youths" OR "female juvenile delinquents" OR "male juvenile delinquents" OR "teenage boys" OR "teenage girls") OR TI("teen*" OR "youngster*" OR "young adult*" OR "young people" OR "youth*" OR "minors*" OR "under ag*" OR "underag*" OR "juvenile*" OR "girl*" OR "boy*" OR "preadolesc*" OR "adolesc*") OR AB("teen*" OR "youngster*" OR "young adult*" OR "young people" OR "youth*" OR

"minors*" OR "under ag*" OR "underag*" OR "juvenile*" OR "girl*" OR "boy*" OR "preadolesc*" OR "adolesc*") OR KW("teen*" OR "youngster*" OR "young adult*" OR "young people" OR "youth*" OR "minors*" OR "under ag*" OR "underag*" OR "juvenile*" OR "girl*" OR "boy*" OR "preadolesc*" OR "adolesc*")

4. TI("therap*" OR "psychotherap*" OR "intervent*" OR "program*" OR "treatment*" OR "training*" OR "RCT" OR "random*") OR AB("therap*" OR "psychotherap*" OR "intervent*" OR "program*" OR "treatment*" OR "training*" OR "RCT" OR "random*") OR KW("therap*" OR "psychotherap*" OR "intervent*" OR "program*" OR "treatment*" OR "training*" OR "RCT" OR "random*")

5. SU("motivational interviewing") OR TI("motivation*" N2 ("interviewing*" OR "boost*" OR "training*" OR "treatment*" OR "enhancement" OR "therapy")) OR AB("motivation*" N2 ("interviewing*" OR "boost*" OR "training*" OR "treatment*" OR "enhancement" OR "therapy")) OR KW("motivation*" N2 ("interviewing*" OR "boost*" OR "training*" OR "treatment*" OR "enhancement" OR "therapy"))

6. S1 AND S2 AND S3 AND (S4 OR S5)

Key: SU = Subject Headings, TI = title, AB = abstract, KW = author supplied keywords, Nn = word distance of maximum n words

Scopus (Elsevier, 1788-2023)

1. TITLE-ABS-KEY(motivation* OR "treatment readiness" OR (readiness W/1 change))

2. TITLE-ABS-KEY({convicts} OR {correctional} OR detent* OR {forensic psychiatric} OR incarcerat* OR inmate* OR jail* OR {maximum security} OR offender* OR penitentiar* OR prison* OR "remand cent*" OR {behind bars} OR {residential care} OR {compulsory care} OR {compulsory residential})

3. TITLE-ABS-KEY(teen* OR youngster* OR "young adult*" OR {young people} OR youth* OR minors* OR "under ag*" OR underag* OR juvenile* OR girl* OR boy* OR preadolesc* OR adolesc*)

4. TITLE-ABS-KEY(therap* OR psychotherap* OR intervent* OR program* OR treatment* OR training* OR {RCT} OR random*)

5. TITLE-ABS-KEY(motivation* W/2 (interviewing* OR boost* OR training* OR treatment* OR enhancement OR therapy))

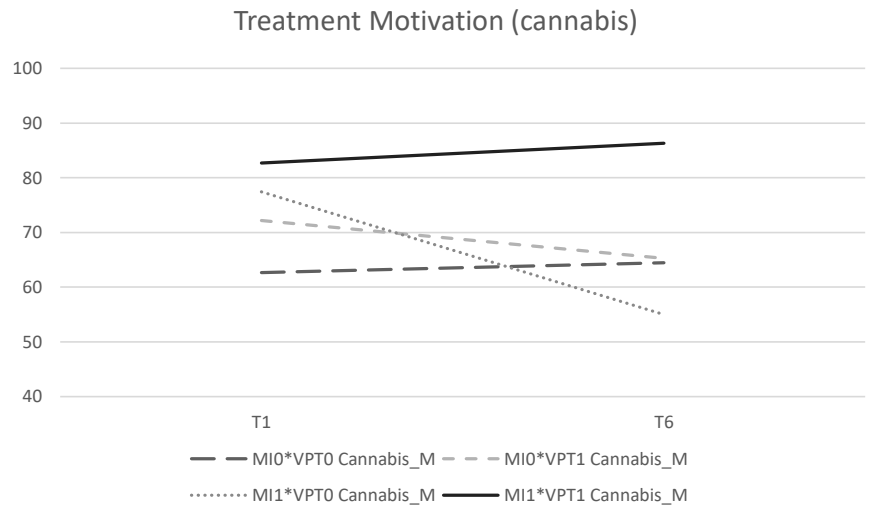
6. #1 AND #2 AND #3 AND (#4 OR #5)

Key: TITLE-ABS: TITLE = title, ABS = abstract, AUTHKEY = author supplied keywords, KEY = a combined field that searches author supplied keywords, EMTREE subject headings, other keywords, trade names and chemical names, W/n = word distance of maximum n words, {} = wildcard for exact searching

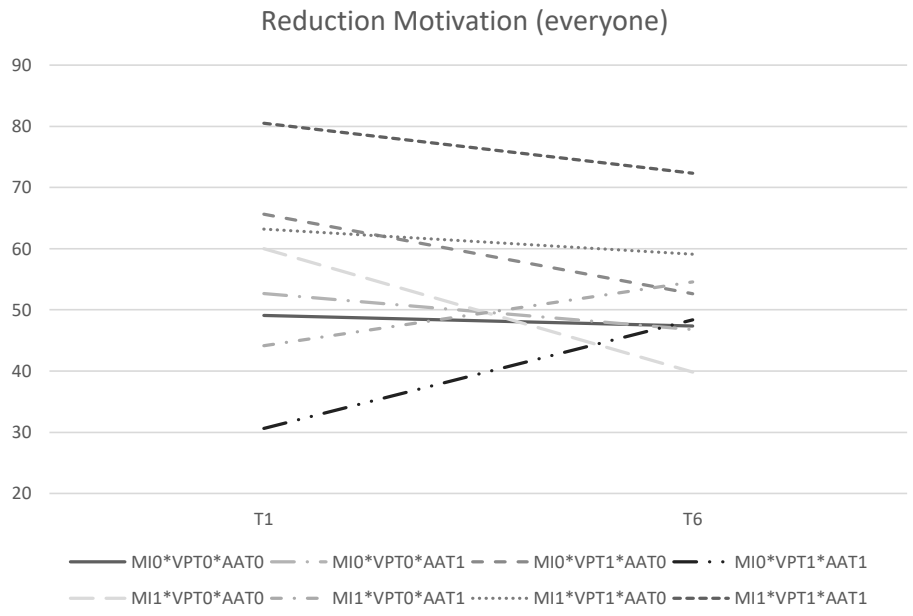
Appendix K

Interaction figures

Treatment Motivation interaction in cannabis-trained participants (Time*MI*VPT)



Reduction Motivation interaction in all participants (Time*MI*VPT*AAT)



Summary

Substance use in young offenders is a matter of significant concern. Young offenders show a high rate of substance use and are at an increased risk of developing substance use disorders, compared with their non-delinquent peers. Frequent substance use significantly impacts rehabilitation efforts and increases the chances of recidivism. Research has shown that the association between substance use and criminal offending is stronger when there is an early onset, increasing the likelihood of chronic criminal offending in later life. Substance use increases the likelihood of delinquent involvement both due to the need to finance drug habits or to the influence of intoxication on aggressive behaviors. Young offenders are also often exposed to environments where substance use is prevalent, further encouraging use.

Treating substance use in young offenders is beneficial for both the individual and society as a whole. Early intervention can prevent escalation of substance use and criminal behavior. While young offenders often do not seek out treatment on their own, the detention setting provides at least an access point where treatment efforts can be initiated. This dissertation aimed to improve available treatment options by 1) developing and testing a short, effective treatment program based on Cognitive Bias Modification (CBM) paradigms for reducing alcohol and cannabis use in detained young offenders, and 2) enhancing motivation as part of the intervention. The dissertation further provides suggestions for the (future) development of effective treatment programs aimed at detained young offenders.

CBM attempts to re-train cognitive biases that maintain substance use habits, such as an approach bias, attentional bias, or evaluative bias. Substance-related cues that one encounters trigger ingrained responses that lead to use behaviors. By re-training these action patterns into disengagement, the hope is to reduce substance use behaviors. While research has shown effects of CBM as add-on to clinical treatment, it had not yet been tested with young offenders, nor in a detention setting. However, young offenders typically have poor impulse control, and since substance use and delinquent behavior can both be considered disinhibitory pathologies, CBM could be extra effective as it weakens the impulse to use.

We evaluated the effectiveness of CBM in reducing substance use in young offenders with an RCT run in several juvenile detention centers (***chapter 2***). Participants who reported substance use in the past year received 6 training sessions with either alcohol- or cannabis-related cues, depending on which substance they used most. Participants received either an active- or a sham-training, which resulted in four groups (alcohol-active, alcohol-sham, cannabis-active, and cannabis-sham). These groups were compared on substance use and delinquent recidivism at a 12-month follow-up. The training program was added to the standard treatment programs during detention.

The RCT showed the presence of attentional biases towards the substances, but no approach biases. Attentional bias for alcohol cues was successfully reduced with active-training, but attentional bias for cannabis cues was reduced in both the active- and the sham-conditions. Contrary to expectations, CBM did not reduce substance use at follow-up, nor delinquent recidivism.

Though the RCT did not prove effective, the study managed to reach acceptable inclusion numbers, demonstrating the feasibility of administering CBM in the detention context. However, new insights into the field of CBM-training emphasize the need for the target behavior (in this case, disengagement from substances) to be seen as desirable by the client. A systematic scoping review into treatment motivation in detained youth (***chapter 3***) underscored this by highlighting the importance of personal relevance for treatment with adolescents, and detained young offenders in particular. Young offenders can be motivated for treatment and behavioral change, as long as they perceive that change as salient and in line with their own goals. Furthermore, treatment motivation in the detention context can effectively be improved with Motivational Enhancement Training paradigms, notably Motivational Interviewing (MI).

In order to enhance the personal relevance of desistance from substance use for the young offenders, an MI module that was originally designed to enhance motivation for substance use treatment in adult parolees, was adapted for detained young offenders

(***chapter 4***), and was tested alongside CBM in a pilot study with a design otherwise identical to the RCT study presented earlier (***chapter 2***). This 7-session MI module guided participants towards a decision on changing their substance use behavior by exploring its effect on their lives, and listing potential avenues for aid should they come to the decision to actively change their substance use. Each CBM session was preceded by an MI session.

Motivation measurements taken before and after administration of the MI module showed that there was no significant change in the participants' motivation to engage with the CBM treatment, nor to change their substance use behavior. The MI module that was employed attempts to illustrate a clear correlation between increased substance use and increased personal problems throughout the participants' lives, including offences and their consequences. It is possible that our young offenders were simply too young for their substance use to have negatively impacted their lives yet, at least to such as extent that they could clearly see a link. It should also be noted that the MI module was administered alongside the CBM training sessions, whilst the conclusion of the module should lead to the decision to initiate treatment. This disparity in timing between the MI and the treatment may have adversely impacted the results.

The MI-pilot again managed to include a reasonable number of participants. The strategies employed in the studies presented in this dissertation have proven effective in obtaining participants and ensuring completion rates for relatively complex study designs within a highly regimented setting, whilst maintaining ethical considerations and data integrity. The key elements of these strategies and the pooled experience from those involved, as well lessons learned from the execution of the project, are presented to aid future research (***chapter 5***).

While the results of the CBM studies were discouraging, they are in line with current perspectives on CBM interventions. For CBM to be effective, it needs to be tailored to the individual, with cues that are put into a context applicable to the youth. Training paradigms need to encourage behavioral alternatives to substance use, and those alternatives need to

be in line with the youth's goals. This is corroborated by the results regarding motivation. In order for treatment to be effective, the youth need to be motivated to engage, and to put that what the treatment offers them into practice. For youth to be motivated, they need to see the personal relevance of the treatment, and its intended outcomes need to align with their goals.

If a CBM protocol, coupled with motivational enhancement, would adhere to up-to-date design parameters and was offered adjunct to more standard substance use treatment options, there is no reason think that it could not be effective in supporting young offenders who wish to tackle their substance use. However, the results of this dissertation lead us to question whether treatment in a detention setting is the best course of action, or whether we wouldn't be better off focussing primarily on motivational enhancement. Detention offers a point of access to young offenders that might be best capitalized on by enhancing motivation for behavioral change, if coupled with access to professional services post-detention.

Nederlandse Samenvatting (Dutch Summary)

Middelengebruik bij jonge delinquenten is een punt van grote zorg. Jonge delinquenten vertonen een hoge mate van middelengebruik en lopen een verhoogd risico op het ontwikkelen van gebruiks- en gerelateerde stoornissen. Frequent middelengebruik heeft een aanzienlijke invloed op rehabilitatie-inspanningen en vergroot de kans op recidive. Uit onderzoek is gebleken dat het verband tussen middelengebruik en crimineel gedrag sterker is als het middelengebruik op jonge leeftijd begint, waardoor de kans op chronisch crimineel gedrag op latere leeftijd groter wordt. Middelengebruik vergroot de kans op criminele betrokkenheid van delinquenten vanwege de noodzaak om drugsgebruik te financieren of door agressief gedrag onder de invloed van intoxicatie. Jonge delinquenten worden vaak blootgesteld aan omgevingen waar middelengebruik veel voorkomt, wat risico op gebruik vergroot en vice versa.

De behandeling van middelengebruik bij jonge delinquenten is gunstig voor zowel het individu als de samenleving als geheel. Vroegtijdig ingrijpen kan escalatie van middelengebruik en crimineel gedrag voorkomen. Hoewel jonge delinquenten niet vaak zelf op zoek gaan naar behandeling, biedt de detentieomgeving op zijn minst een toegangspunt waar een poging tot behandeling kan worden gestart. Dit proefschrift had tot doel de beschikbare behandelopties te verbeteren door 1) een kort, effectief behandelprogramma, gebaseerd op Cognitive Bias Modification (CBM) paradigma's voor het verminderen van alcohol- en cannabisgebruik bij gedetineerde jonge delinquenten te ontwikkelen en te toetsen, en 2) motivatieontwikkeling bij de interventie te betrekken. Tevens bevat het proefschrift relevante adviezen voor de (toekomstige) ontwikkeling van effectieve behandelprogramma’s gericht op gedetineerde jonge delinquenten.

CBM beoogt cognitieve vertekeningen (biasen) die middelengebruik in stand houden, te her-trainen, zoals een aandachtsbias, een toenaderingsbias, of een interpretatiebias. Middelgerelateerde signalen activeren diepgewortelde reacties die kunnen leiden tot gebruiksgedrag. Door deze actiepatronen om te vormen tot verwijderingsgedrag, beogen wij gebruiksgedrag te verminderen. Hoewel onderzoek de positieve effecten van CBM als

aanvulling bij de klinische behandeling van alcoholisme veelvuldig heeft aangetoond, is CBM nog niet getest bij jonge delinquenten, noch in de detentieomgeving. Jonge delinquenten hebben doorgaans echter een zwakkere impulsbeheersing, en aangezien middelengebruik en delinquent gedrag beide als beperkingen in de zelfregulatie kunnen worden beschouwd, zou CBM effectief kunnen zijn omdat het de impuls tot gebruik verzwakt.

Wij evalueerden de effectiviteit van CBM op het verminderen van middelengebruik bij jonge delinquenten met een gerandomiseerde studie (RCT) uitgevoerd in verschillende gesloten jeugdzorginstellingen (***hoofdstuk 2***). Deelnemers die aangaven in het afgelopen jaar middelen te hebben gebruikt kregen zes trainingssessies met alcohol- of cannabis-gerelateerde cues, afhankelijk van het meest gebruikte middel. Deelnemers kregen een actieve- of een placebotraining, waardoor vier groepen vormde (alcohol-actief, alcohol-placebo, cannabis-actief, en cannabis-placebo). Deze groepen werden na twaalf maanden vergeleken op middelengebruik en delict recidive. De training is tijdens de detentie toegevoegd naast de reguliere behandelprogramma's.

De RCT toonde de aanwezigheid van aandachtsbiassen voor de middelen, maar geen toenaderingsbiassen. De aandachtsbiassen voor alcohol-cues werden zoals verwacht verminderd met actieve training, maar tegen de verwachting in werden de aandachtsbiassen voor cannabis-cues zowel in de actieve-, als in de schijnconditie verminderd. CBM zorgde niet voor een vermindering van het middelengebruik bij de follow-up, noch voor een vermindering van delinquente recidive.

Hoewel de RCT niet effectief bleek, slaagde het onderzoek erin aanvaardbare inclusiecijfers te bereiken, wat de haalbaarheid aantoont van het toepassen van CBM in de detentiecontext. Nieuwe inzichten op het gebied van CBM-training geven aan dat het doelgedrag van een interventie (in dit geval het onttrekken van middelen) door de cliënt als wenselijk moet worden gezien. Een systematische scoping review naar behandelmotivatie bij gedetineerde jongeren (***hoofdstuk 3***) onderstreepte dit door het belang van persoonlijke relevantie voor de behandeling van adolescenten, en gedetineerde jonge delinquenten in

het bijzonder, te benadrukken. Jonge delinquenten kunnen gemotiveerd worden voor behandeling en gedragsverandering, zolang zij die verandering maar als relevant en toevoegend aan hun doelen ervaren. Bovendien kan de behandelmotivatie in de detentiecontext effectief worden verbeterd met behulp van Motivational Enhancement Training-paradigma's, met name Motivational Interviewing (MI).

Om de persoonlijke relevantie van het stoppen met middelengebruik voor jonge delinquenten te vergroten, werd een MI-module die oorspronkelijk ontworpen is om de motivatie voor de behandeling van middelengebruik bij volwassenen in de reclassering te vergroten, aangepast voor gedetineerde jonge delinquenten (***hoofdstuk 4***), en samen met CBM getest in een pilot-studie. Deze studie was qua opzet identiek aan de eerder gepresenteerde RCT-studie (***hoofdstuk 2***). De MI-module van zeven sessies begeleidde de deelnemers naar een beslissing over het veranderen van hun middelengebruik door het effect op hun leven te onderzoeken en mogelijke opties voor hulp op te sommen, voor het geval ze tot de beslissing zouden komen hun middelengebruik actief te veranderen. Iedere CBM sessie werd voorafgegaan door een MI sessie.

Uit motivatiemetingen voor en na de toediening van de MI-module bleek dat er geen significante verandering was in de motivatie van de deelnemers om deel te nemen aan de CBM-behandeling, noch om hun middelengebruik te veranderen. De MI-module die was toegepast tracht een duidelijk verband te illustreren tussen toegenomen middelengebruik en toegenomen persoonlijke problemen gedurende het hele leven van de deelnemers, inclusief hun delicten en de consequenties. Het is mogelijk dat onze jonge delinquenten eenvoudigweg te jong waren, waardoor hun middelengebruik nog een onvoldoende negatieve invloed op hun leven had, althans niet in die mate dat zij duidelijk een verband konden zien. Ook moet worden opgemerkt dat de MI-module naast de CBM-trainingen werd toegepast, terwijl de afsluiting van de module zou moeten leiden tot het besluit om met behandeling te starten. Het verschil in timing tussen de MI en de behandeling kan een negatieve invloed hebben gehad op de resultaten.

De MI-pilot is er ook in geslaagd een redelijk aantal deelnemers te includeren. De strategieën die zijn gebruikt in de onderzoeken die in dit proefschrift worden gepresenteerd, zijn effectief gebleken bij het verkrijgen van deelnemers en het garanderen van interventietrouw voor relatief complexe onderzoeksontwerpen binnen een zeer gereguleerde setting, met behoud van ethische overwegingen en data-integriteit. De belangrijkste elementen van deze strategieën en de gebundelde ervaring van de betrokkenen, evenals de lessen die zijn geleerd uit de uitvoering van het project, worden gepresenteerd ter ondersteuning van toekomstig onderzoek (***hoofdstuk 5***).

Hoewel de resultaten van de CBM-onderzoeken ontmoedigend waren, zijn ze in lijn met de huidige visie op CBM georiënteerde interventies. Wil CBM effectief zijn, dan moet het worden toegesneden op het individu, met signalen die in een context worden geplaatst die relevant is voor de participant. Trainingsparadigma's moeten gedragsalternatieven voor middelengebruik aanmoedigen, en die alternatieven moeten in overeenstemming zijn met de doelen van de participant. Dit is in lijn met de resultaten met betrekking tot motivatie. Om de behandeling effectief te laten zijn, moeten de jongeren gemotiveerd worden om mee te doen en datgene wat de behandeling hen biedt straks in het dagelijks leven toe te passen. Om gemotiveerd te zijn, moeten jongeren de persoonlijke relevantie van de behandeling inzien en moeten de beoogde resultaten ervan aansluiten bij hun doelen.

Als een CBM-protocol, gekoppeld aan motivatieverbetering, zou voldoen aan actuele ontwerpparameters en zou worden aangeboden als aanvulling op de meer standaard behandelingsopties voor middelengebruik, is er geen reden om aan te nemen dat het niet effectief zou kunnen zijn bij het ondersteunen van jonge delinquenten die iets aan hun middelengebruik willen doen. De resultaten van dit proefschrift roepen echter de vraag op of behandeling in een detentiesetting het beste plan van aanpak is, of dat we ons niet beter in de eerste plaats kunnen richten op het verbeteren van de motivatie. Detentie biedt een ingang tot de jonge delinquenten, waar misschien het beste van kan worden geprofiteerd

door de motivatie voor gedragsverandering te vergroten, indien gekoppeld aan toegang tot professionele diensten na de detentie.

Funding

The studies presented in this dissertation were funded through a grant from the Dutch Ministry of Justice and Safety (December 2012, Case number: 331779), awarded to prof. dr. Reinout W. Wiers. Results of the main RCT study (***Chapter 2***) and preliminary findings from the Motivational Interviewing study (***Chapter 4***) were presented to the Ministry in rapport form. The Ministry has had no role in setting the aims of the studies, execution of the studies, analysis of the data or the writing of any of the manuscripts presented in this dissertation.

Author Contributions

Chapter 2 will be published as:

Van der Baan, H. S., Collot D'Escury-Koenigs, A. L., & Wiers, R. W. (2024). The effectiveness of Cognitive Bias Modification in reducing substance use in detained juveniles: An RCT. *Journal of Behavioral Therapy and Experimental Psychiatry, 82*. https://doi.org/10.1016/j.jbtep.2023.101916

Hans van der Baan developed the study design and the research question, trained the data collectors, oversaw the data collection, conducted the analyses and drafted the manuscript under supervision of Annematt Collot D'Escury-Koenigs and Reinout Wiers. All authors provided feedback and approved the final manuscript for submission.

Chapter 3 is submitted as:

Van der Baan, H. S., Collot D'Escury-Koenigs, A. L., & Wiers, R. W. (n.d.). Motivation in detained young offenders: A scoping review. *Submitted for publication*.

Hans van der Baan decided on the focus of the review and the inclusion criteria, developed the search criteria along with staff the University of Amsterdam library services (who declined authorship and were not involved with the manuscript), selected the literature and compiled the included literature and drafted the manuscript under supervision of Annematt Collot D'Escury-Koenigs and Reinout Wiers. All authors provided feedback and approved the final manuscript for submission.

Chapter 4 is submitted as:

Van der Baan, H. S., Collot D'Escury-Koenigs, A. L. Grasman, R. P. P. P., Schippers, G. M., & Wiers, R. W. (n.d.). Combining Motivational Interviewing and Cognitive Bias Modification training for substances in detained youth. *Under review*.

Hans van der Baan developed the study design, trained the data collectors, oversaw the data collection, and drafted the manuscript under supervision of Annematt Collot D'Escury-Koenigs and Reinout Wiers. Hans van der Baan developed the research question and conducted the

analyses under supervision of Raoul Grasman, Annematt Collot D'Escury-Koenigs, and Reinout Wiers. Hans van der Baan adapted the original Motivational Interviewing module for use with detained young offenders under the supervision of Gerard Schippers, Annematt Collot D'Escury-Koenigs, and Reinout Wiers. All authors provided feedback and approved the final manuscript for submission.

Chapter 5 is published as:

van der Baan, H. S.*, de Ruigh, E. L.*, Popma, A., Vermeiren, R., Wiers, R. W., Collot D'Escury-Koenigs, A. L., & Jansen, L. M. C. (2024). Praktische aanbevelingen voor het uitvoeren van onderzoek in gesloten jeugdzorginstellingen. *Tijdschrift voor Forensische Psychiatrie en Psychologie*, *1(1), p.73-88*.

*Shared first authorship

Hans van der Baan and Esther de Ruigh developed the structure of the paper and drafted the manuscript under supervision of Lucres Jansen. All authors contributed their insights and research experiences, from which the recommendations were compiled by Hans van der Baan and Esther de Ruigh. All authors provided feedback and approved the final manuscript for submission.

Acknowledgements

It has been a not-inconsiderable amount of time. Long enough for me to have gotten married, begotten two wonderful children, survived a global pandemic, and generally weathered the ravages of time admirably. I've also written a dissertation, but if you are reading this then the balance of probability has it that you were already aware of that. As momentous an achievement as this is, my meritorious modesty bids me acknowledge the many, many, many people that have helped and supported me along the way.

First and foremost, **the 600+ youth** who filled out our questionnaires, completed our tasks and, in particular, the 230 of you that pushed and pulled hundreds of tiny pictures on a laptop screen again and again (and again, and again, and again, etc.). I am very grateful for the data you have given us, and the insights it has provided.

Many thanks are also due to the professionals at the detention centers where we have collected our data. The administrators for welcoming our study into their organisations, the clinicians for making room for us in their schedules, the liaisons for helping us get set up, the IT-support for providing us with internal communications, the administrative personnel for helping with the VOGs, the group workers for welcoming our data collectors every day and their help in keeping our participants motivated, and the security personnel for looking after us. To all the people who work or have worked at ***De Heuvelrug***, ***De Hartelborgt***, ***De Hunnerberg***, ***Teylingereind***, ***Amsterbaken***, ***JJI Lelystad***, ***De Koppeling*** and ***Stichting 180***, my very sincerest gratitude for all your help and support during the years that we were able to collect our data. Also, quite aside from the help we received, a big shout-out to everyone who works with young offenders every day, doing their best!

Speaking of data collection, I would be remiss if I did not express thanks for the hard work put in by our small (but mighty!) army of data collectors. Be it inside the institutions, visiting the groups, or outside, combing through dossiers or tracking down participants for follow-up measures, the SCREEN project would have been dead in the water without its SCREEN-students, which is why I want to convey my very heartfelt alphabetical thanks to (*takes a deep breath*): **Agnes**, **Anna**, **Anne**, **Annekee**, **Annemiek**, **Ariandra**, **Arman**,

Aydan, **Berend**, **Carolien**, **Daphne**, **Dieuwertje**, **Eline**, **Eveline**, **Flora**, **Francien**, **Genevieve**, **Hanneke**, **Ilse**, **Imke**, **Iris**, **Jeanne**, **Jesse**, **Johnna**, **Joya**, **Judith D.**, **Judith van V.**, **Kyarah**, **Laura B. M.**, **Laura v.d. K.**, **Lieke**, **Liesanne**, **Linda**, **Lindsey**, **Lisa**, **Maarten**, **Madelon**, **Madieke**, **Mandy**, **Meyke**, **Milou**, **Musab**, **Myrthe**, **Nancy**, **Nanienke**, **Naomi**, **Natascha**, **Nicole**, **Nina**, **Noor**, **Pien**, **Rahel**, **Roanne**, **Rosanne**, **Seyma**, **Shirley**, **Sofie T.**, **Sophie K.**, **Sophie Z.**, **Steffany**, **Tara**, **Tessa B.**, **Tessa K.**, **Tessa S.**, **Titia**, **Willem**, **Xamirah**, **Yoni**, & **Yvet**.

Which rather neatly brings me to the SCREEN project itself, starting with my promotor and co-promotor, **Reinout** and **Annematt**. Thank you for never giving up on me these past (*mumbles something unintelligible*) years. Your constant support, positivity, and most all of your endless, unquestioning certainty that I was going to pull this off, have been invaluable to me. Thank you for giving me the chance to do this, all your feedback and encouragement, and I hope that you are satisfied with the result.

Bruno V., thank you for your input and supervision during the early phases of the project. **Matthias**, you have been an amazing help to the whole SCREEN project, pitching in where needed, showing us the ropes inside the institutions, and supervising the MI intervisies (i.e., pizza nights) with me.

Lucres, **Arne** and **Robert**, thank you for your expertise, and for sharing your resources with us. Without your contacts and greater knowledge of the forensic side of things, not to mention your friendliness and openness to collaboration, this whole thing would've been a lot harder

Last, but very, very far from least, **Esther**. Thank you for, well, pretty much everything. Thank you for your friendship, support and the occasional swift kick to the butt when I earned it. Thank you for relying on my strengths, and letting me rely on yours to compensate my weaknesses. Most of all, thank you for doing this together with me, I could not have done it without you.

Thanks, too, to the Dutch **Ministery of Justice and Safety**, who funded the projects that resulted in the SCREEN collaboration. **Ton Eijken**, **Anja Frowijn**, **Annelies Jorna**, **Maaike Kempes**, **Kathy de Kogel** and **Hanna Swaab**, many thanks for your input, feedback, and patience during the Klankbord process.

Getting the right type of data requires training, and once you have that data, it needs to be managed. Test materials need to be designed, analysis plans need to be formulated, specialists may need to be consulted, and someone is going to have to check all that data to make sure everything's shipshape. I want to thank **Bruno Boutin**, for IT-support and programming the entire SCREEN test battery; **Gerard Schippers**, for providing us with the MI module and help in adapting it to youth; **Maarten Merkx**, for his expertise and unbounded enthusiasm while training our students; **Raoul Grasman**, for sparring with me about the best methodological approach; **Janneke Staaks**, for her bibliothecal expertise and assistance; and **Buket Demirel**, for not only pushing and pulling a lot of small pictures, but counting them, too.

All that has culminated in the dissertation before you, evaluated and approved by my reading committee. **Prof. dr. Anneke Goudriaan**, **prof. dr. Richard Ridderinkhof**, **dr. Eva Billen**, **prof. dr. Lucres Nauta-Jansen**, and **prof. dr. Jean-Louis van Gelder**, thank you for taking the time to read my dissertation and for your approval.

Support comes in many forms of course, and every PhD student knows the value of the collegial commiseration. Many thanks therefore to my fellow ADAPTees (and associated): **Andrea**, **Bram**, **Denise**, **Elske**, **Emese**, **Eva**, **Helle**, **Henry**, **Janna**, **Kiki**, **Leone**, **Mae**, **Maien**, **Marilisa**, **Mieke**, **Poppy**, **Si**, **Tess**, **Thomas**, **Tim**, **Wouter**, and **Yang**, for all their advice, insights, chats, pool-games, team outings, and the frankly obscene numbers of innocent peasants sentenced to death for being werewolves.

Similarly, my other UvA colleagues: **Annemie**, **Bianca**, **Brenda**, **Gabry**, **Gerald**, **Gorka**, **Helga**, **Ilonka**, **Ingmar**, **Joost**, **Laura**, **Maaike**, **Marija**, **Nicole**, **Nihayra**, **Patrick**,

Tessa, **Tjitske**, **Tycho**, and **Wery**. Many thanks also to the ever-redoubtable **Ellen** and **Helma** for all their hard work over the years, I'm fairly certain that I've returned all UvA hardware now. And lastly, a very big thank-you to **prof. dr. Hilde Huizenga**, for keeping some space for me in the department and allowing me to finish this off.

At this point I'd like to smoothly segue like a well-oiled Segway to my friends. **Alon**, **Arjan**, and **Karel**, thank you for being there for me (even if you guys are not here all that often, or, for that matter, all there) for oh so many years. **Joris**, thanks for many fun nights playing games, and fun days watching our kids play games. **Claire**, even though you're not here anymore, I'm glad I got to share with you that I finished. **Taylor**, thank you for your enthusiasm for my, let's say extracurricular activities, these past few years, and our Discord chats. **Thomas** and **Petra**, thank you guys for being such great friends to me and my family, hopefully for many more years to come. **Casper**, thank you for the weekly dinners and you're ever willingness to join me in the various forms of make-believe and escapism that we've enjoyed over the years, as well as for making your swords available should they be required for the defence.

Hinze & **Marjolein**, thank you for the many years of support and friendship, and for never bringing back vegemite. Though we don't see you guys nearly enough, it's always great when we do, and we hope to do so for many years still. **Esin**, **Can** and **Gün**, thank you for Aslı, for shaping this wonderful being that is in my life. **Mark** & **Lot**, dank jullie allebei voor al het geluk dat jullie brengen aan mijn zus en broertje. **Hilde** & **Bartje**, thanking you for being there for me feels a bit like thanking my arm for being my arm. Not that I take you for granted, I simply don't know any better than that you are there for me, always have been, always will be. I treasure you more than you know. **Mama** en **Papa**, dank jullie voor alles (letterlijk). Ik doe misschien niet altijd wat jullie zouden doen, maar ik hoop dat ik jullie trots maak.

Maddy, **Jake**, **Cathelijne**, **Maegan**, **Thomas**, **Steve**, **Olivier**, en **David**, het is werkelijk een voorrecht om van zo dicht bij te mogen meemaken hoe jullie opgroeien. **Mijn peetkind-in-wording**: Ik kan niet wachten om je te ontmoeten.

Aslıcım, benim canım, I owe you and love you more than I can possibly say. Know that I am excited to begin the next chapter of our lives, and I wouldn't want to do it with anyone else. **Jaap** and **Mina**, without question my favourite causes of delay and distraction, I hope you know, and always will, that daddy loves you more than anything and that there is absolutely nothing you can do about it. You are my pride and joy, now and forever.

Curriculum Vitae

Hans van der Baan was born on March 21st 1983, in Amsterdam, the Netherlands. After completing bilingual (Dutch/English) secondary education, he graduated from University College Utrecht in 2004 with a Bachelor of Arts degree, majoring in the Social Sciences with a minor in Philosophy. In 2007 he obtained a Bachelor of Science degree from the University of Utrecht, majoring in Developmental Psychology. In 2009 be obtained his Master of Science degree at the University of Utrecht, in the Development and Socialization in Childhood and Adolescence Research Master program, during which he did a research internship at Standford University, California, USA. After working as an assistant lab manager for a while, he started his PhD research in 2013 at the Developmental Psychology programme group at the University of Amsterdam, which culminated in this dissertation. During this time, he has also been a tertiary education teacher, both at the University of Amsterdam and the University of Utrecht. Since 2022 he has combined his research with the challenge of being a (near) fulltime homemaker.

Hans van der Baan is geboren op 21 maart 1983 in Amsterdam. Nadat hij tweetalig (Nederlands/Engels) middelbaar onderwijs had afgerond, studeerde hij in 2004 af aan het University College Utrecht met een Bachelor of Arts in de Sociale Wetenschappen met een minor in Filosofie. In 2007 behaalde hij zijn Bachelor of Science aan de Universiteit Utrecht, met als hoofdvak Ontwikkelingspsychologie. In 2009 behaalde hij zijn Master of Science aan de Universiteit Utrecht, in het Development and Socialization in Childhood and Adolescence Research Master programma, waarbij hij een onderzoeksstage deed aan Standford University, Californië, VS. Na een tijdje als assistent-labmanager te hebben gewerkt, begon hij in 2013 met zijn promotieonderzoek bij de programmagroep Ontwikkelingspsychologie van de Universiteit van Amsterdam, dat uitmondde in dit proefschrift. Gedurende deze tijd is hij ook docent geweest in het tertiair onderwijs, zowel aan de Universiteit van Amsterdam als aan de Universiteit Utrecht. Sinds 2022 combineert hij zijn onderzoek met de uitdaging van een (bijna) fulltime huisvader te zijn.