

UNRAVELING SERIOUS JUVENILE DELINQUENCY

Risk and Needs
Assessment by
Classification into
Subgroups

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Unraveling serious juvenile delinquency: risk and needs assessment by classification into subgroups

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with references, with summary in Dutch

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On the cover: the Dutch windpowered sawmill 'De Herder' (Leiden, 1884). My great-great-great-great-grandfather Julianus Mulder owned this mill. The familyname 'Mulder' is the old Dutch word for 'miller'. 'De Herder' was on the cover of the dissertation of my father Martyn Mulder as well. Design by Marcel Klijn.

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Unraveling Serious Juvenile Delinquency

Risk and needs assessment by classification into subgroups

Ernstige jeugdcriminaliteit ontrafeld: risk en needs assessment
door middel van classificatie in subgroepen

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Contents

1. General introduction	7
2. Profiling serious juvenile offenders in juvenile institutions: change in risk factors in their population	15
3. Risk factors for overall recidivism and severity of recidivism in serious juvenile offenders	29
4. A classification of risk factors in serious juvenile offenders and the relation between patterns of risk factors and recidivism	45
5. Recidivism in subgroups of serious juvenile offenders: different profiles, different risks?	59
6. Towards an optimal classification of juvenile offenders: subgroups of serious juvenile offenders and severity of recidivism	73
7. A two-step classification of serious juvenile offenders into subgroups	87
8. General discussion	103
References	117
Appendix	129
English summary	137
Nederlandse samenvatting	147
Dankwoord	157
Curriculum Vitae	161

1

General introduction

General introduction

In the Netherlands, the top 5% most serious juvenile offenders are placed in juvenile justice institutions under a mandatory treatment order. After two to six years of treatment, the chance of recidivism is supposed to have been reduced considerably. The new offenses that do take place, are supposed to be less severe in nature than the offenses that were committed before treatment. Over the years, several interventions aimed at these serious offenders have been developed. However, the effectiveness of most interventions has not been demonstrated yet. Specialists in the field have said for years that improvement of interventions is needed. However, until now little research has been done on risk factors that predict recidivism in this group of very serious offenders. This is important because of the risk of this subgroup for society, for the victims and for the juveniles themselves. If more is known about the precursors of serious juvenile offending and recidivism, existing interventions may be improved, new interventions may be developed and the effectiveness of interventions may be higher. However, the accuracy of current ways of predicting offending and future recidivism is still far from perfect with effect sizes that are seldom higher than 0.70 (Hanson & Morton-Bourgon, 2009). Thus new ways to come to evidence-based decision making and the development of evidence-based interventions need to be explored.

With respect to the development of serious juvenile delinquency and the persistence of criminal behavior, two theories should be mentioned. First, Moffitt (1993) distinguishes two types of delinquent behavior: *adolescence-limited* and *life-course persistent* delinquency. The first of the two develops during adolescence, but desists before transition into adulthood. According to Moffitt, *adolescence-limited* delinquency is caused by adolescence specific characteristics and is seen as normative, at least to some degree, because it occurs in a large part of adolescents (30-40%). However, a small number of juveniles start offending during childhood and continue their criminal careers after transition into adulthood, the nature of their behavior thereby becoming *life-course persistent*. Juveniles in this group are characterized by a young age of onset of problem behavior, usually due to a complex interaction of biological, individual and environmental factors (Moffitt, 1997; Moffitt, Caspi, Harrington & Milne, 2002; Donker, Smeenk, Van der Laan & Verhulst, 2003). Because of the persistence and severity of their delinquent behavior, the *life-course persistent* group is seen as most problematic for society. We can assume that the top 5% most serious juvenile offenders are at risk of becoming *life-course persistent* offenders.

The second theoretical model that should be mentioned here is the developmental trajectories-model of Loeber and Hay (1994). These researchers distinguish three developmental trajectories: the authority conflict pathway, a pathway of covert problem behavior and a pathway of overt problem behavior. The first pathway can be

characterized by authority problems and truancy. The covert pathway starts out with lying, going further with stealing and breaking and entering. The overt pathway starts out with bullying and fighting and ends up with serious externalizing criminal behavior, such as assault. Thus, the nature of criminal behavior in each trajectory differs from the other. The further on a pathway one gets, the more serious the behavior; the earlier one starts, the further one usually gets. Juveniles may proceed along one or more of these developmental pathways. The more pathways they take, the faster they proceed and the more serious the behavior finally gets (Kelley, Loeber, Keenan & DeLamatre, 1997). Aggressive boys were particularly at risk of committing covert acts as well, while boys engaging in covert acts were less likely to develop aggressive behavior. Escalation in either the overt or the covert pathway was often preceded by boys' escalation in the authority conflict pathway (Loeber, Farrington, Stouthamer-Loeber & Raskin White, 2008). We can assume that the top 5% most serious juvenile offenders have proceeded along multiple pathways, their behavior having escalated into serious delinquency.

In research on effectiveness of interventions, the *What Works principles* are the leading principles when it comes to maximizing treatment effect (Andrews & Bonta, 1995; Landenberger & Lipsey, 2005; Lowenkamp, Latessa & Holsinger, 2006). According to these principles, effective interventions should be developed according to the following themes: the *risk principle*, the *needs principle* and the *responsivity principle*.

The *risk principle* implies that intensity of treatment should depend on the risk for recidivism: the higher the risk, the more intense treatment is needed.

The *needs principle* signifies that treatment should aim at the areas which are most problematic and which are related to the criminal behavior.

According to the *responsivity principle* interventions should fit the characteristics of the juveniles for whom the intervention has been developed, for instance the level of motivation, the learning (dis-)ability, and their unique possibilities. Better understanding of the *risk*, *needs*, and *characteristics* of serious juvenile offenders is needed, in order to increase treatment effect with the aim to prevent persistence of criminal behavior and to reduce severity of recidivism.

In the Netherlands, as in many other countries, still a lot of work needs to be done in the development of treatment allocation and of effective interventions following the *What Works principles*. First, detailed knowledge is needed about the *risk* of different groups of serious juvenile offenders. This knowledge can be acquired by studying *recidivism rates*: the higher the chance of recidivism, the higher the risk. Second, research needs to be done on the *needs* of serious juvenile offenders. These needs can be determined by studying the *risk profiles* of serious juvenile offenders: the risk factors that predict recidivism and severity of recidivism are the ones that should be targeted by treatment. Last, before developing interventions or improving existing interventions, knowledge is needed about the specific *characteristics* of serious juvenile offenders: the level of

motivation, the specific social and cognitive (dis-) abilities set the conditions that the interventions should meet. In this thesis, the main goal will be to gain more knowledge about the characteristics of very serious juvenile offenders, their risks and their needs.

Aims of this thesis

With this thesis we aimed to extend the knowledge about risk factors that predict both general recidivism and severity of recidivism in serious juvenile offenders. Further, we aimed to find out if risk factors that predict severity of recidivism are the same for the whole group, or if serious juvenile offenders are a heterogeneous group consisting of subgroups with different risk profiles that predict recidivism. Our second aim was to identify the different subgroups of serious juvenile offenders, with distinct characteristics and different risk profiles that predict recidivism.

This results in the following research questions:

1. What are the characteristics of serious juvenile offenders?
2. What risk factors or risk domains predict general recidivism and severity of recidivism within the group of serious juvenile offenders as a whole?
3. Is it possible to distinguish subgroups of serious juvenile offenders on the basis of their criminal careers?
4. Is it possible to distinguish subgroups of serious juvenile offenders on the basis of their risk profile?
5. What risk factors predict not only general recidivism, but also severity of recidivism within the possible subgroups of serious juvenile offenders?

PIJ-study

The most severe measure in Dutch Juvenile Criminal Law is the mandatory treatment order (PIJ-order, which stands for Placement in a judicial Institution for Juveniles), which has been developed for the [top 5%] most serious juvenile offenders. In 2002 the Ministry of Justice of the Netherlands set the objective to find out what the characteristics are of (very) serious juvenile offenders: a subgroup of *all* juvenile delinquents. Until that day, a file was kept of each individual very serious juvenile offender, but there were no data on this group as a whole. The department of corrections developed an instrument with the purpose to study this subgroup of very serious offenders. Between 2002 and 2005 the Juvenile Forensic Profile (FPJ-list) was developed and its psychometric qualities were tested. The inter-rater reliability was studied, along with the convergent validity and the predictive validity (chapter 2). The results showed that the number of missing values was low and that file information was sufficient to score the Juvenile Forensic Profile. The instrument was evaluated in both a residential treatment facility for juvenile offenders as well as an assessment centre for very serious juvenile offenders. After finishing the final version of the FPJ-list, the research for this thesis started. This study is intended

to be the start of a hopefully long set of studies on very serious juvenile offenders. The participants in this thesis are 1179 of the top 5% most serious juvenile offenders of the Netherlands under a mandatory treatment order. To ensure a time at risk of at least two years, only those juvenile offenders were included in the analyses that had been released for at least two years at the time recidivism was registered ($n=728$). For recidivism official offense registration data were used. Severity of recidivism was measured on a twelve-point scale (chapter 3).

Structure of this thesis

In chapter 2 juvenile offenders under a mandatory treatment order are introduced as the most serious juvenile offenders in the Netherlands. The Juvenile Forensic Profile is described as an instrument that has been developed especially for file research in this subgroup of very serious offenders. Characteristics of juvenile offenders under a mandatory treatment order and the risk factors that are present are described in chapter 2. The change in risk factors over ten years time is described.

In chapter 3 recidivism in serious juvenile offenders is described. Also risk factors for recidivism are analyzed. In addition to general recidivism, we also studied risk factors for severity of recidivism. An index for registering severity of recidivism is introduced.

In chapter 4, we used exploratory and confirmatory factor analysis to search for factors that give a meaningful representation of our data. Next, with regression analysis we studied which factors predict severity of recidivism.

Very serious juvenile offenders are a subgroup within all juvenile offenders, but the question rises if they should be considered as a homogeneous group, or if serious juvenile offenders actually consist of subgroups with distinct characteristics. One can search for subgroups on the basis of *offending behavior* in the past or on the basis of common *patterns of risk factors*. In chapter 5, the offending behavior is taken as a starting point. Subgroups are identified on the basis of the criminal careers of the juveniles before conviction to the mandatory treatment order. In chapter 6, we identify subgroups on the basis of patterns of risk factors serious juvenile offenders have in common. Subgroups are created with distinct risk profiles. In both chapters, for each subgroup multiple step-wise regression analysis is used to investigate the risk factors that predict recidivism and severity of recidivism.

In chapter 7 a search for a combined classification in subgroups is described. The aim is to combine the strengths of both methods, as described in chapter 5 and 6, to come to a classification, which takes both the different offending behaviors and risk profiles in account and might be also useful for clinical practice.

Finally, in chapter 8 the main findings of the studies in the foregoing chapters are presented and discussed. With reference to the *What Works principles*, the *responsivity principle* (characteristics of serious juvenile offenders), the *risk principle* (risk for severity

of recidivism) and the *needs principle* (risk factors that predict severity of recidivism) are discussed. The strengths, limitations and implications of this thesis are discussed, for future research, but also for clinical practice and public policy.

Profiling serious juvenile offenders in juvenile institutions: change in risk factors in their population

E.A. Mulder, E.F.J.M. Brand, R.A.R. Bullens & H.J.C. van Marle
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Abstract

A large sample of 74% of all serious juvenile offenders in the Netherlands (n=1147) was studied with the aim to define which risk factors play a role in this high risk group. The Juvenile Forensic Profile with good psychometric qualities was developed to measure seventy risk factors in seven domains: 'history of criminal behavior', 'family and environment', 'offense-related risk factors and substance use', 'psychological factors', 'psychopathology', 'social behavior/ interpersonal relationships' and 'behavior during stay in the institution'. A risk profile of serious juvenile offenders was created and the change of the population over ten years time was analyzed. There was improvement on some risk factors in the sample, and significant increase on one risk factor (IQ). Overall, serious juvenile offenders can be studied as one group.

Introduction

Criminal behavior and the persistence of criminal behavior are an important issue in modern society; juvenile delinquents are a risk for society. Both in the Netherlands and internationally, a high prevalence of mental health problems was found in youth in juvenile detention (Teplin, Abram, McLelland, Dulcan and Mericle, 2002; Vreugdenhil, Doreleijers, Vermeiren, Wouters & Van den Brink, 2004; Vermeiren, Jespers & Moffitt, 2004; Abram, Teplin, McClelland & Dulcan, 2003). Mental health problems are a risk factor for the persistence of criminal behavior as for instance expressed in the SAVRY (Lodewijks, Doreleijers, de Ruiter & de Wit-Grouls, 2006). Incarceration is a last resort in the case of juveniles, and juveniles with mental health problems have a higher chance to engage in criminal behavior (Wasserman, Ko & McReynolds, 2004). Juvenile offenders are an important target for interventions aimed at the prevention of ongoing criminal behavior. The rate of recidivism is high. Juvenile delinquency and recidivism are thought to be caused by a complicated interaction of risk factors (Cottle, Lee and Heilbrun, 2001; Loeber & Farrington, 2001; Loeber, Farrington, Stouthamer Loeber & Raskin White, 2008). The effect of interventions can be maximized if the specific risk factors that cause persistence criminal behavior are the ones that are influenced. Knowledge about risk factors is therefore of utmost importance for risk assessment, prevention and decisions about the targets and intensity of treatment.

Researchers found that risk factors for criminal behavior could be replicated both in the United States and in Europe (Loeber & Farrington, 1999). However, in non-western societies some differences in risk factors were found. For instance, in Japan was found that the fear of stigmatization is a great problem and that social problems and adolescent psychiatric issues influence each other and also increase the risk of criminal behavior (Ando, 2004). In China, which is a communitarian society, social capital variables such as being married or having contact with ones neighbors were found to have a significant protective effect on recidivism (Liu, 2005).

Risk factors can be classified as either static or dynamic. Static risk factors cannot be changed and are primarily useful for the identification of groups at risk for criminal behavior (prevention). Dynamic risk factors can be changed and are useful for treatment, as these are the risk factors that treatment should aim at especially (Glover, Nicholson, Hemmati, Bernfeld & Quinsey, 2002; Webster, Hucker & Bloom, 2002). After the discrimination of static and dynamic risk factors a further division can be made into individual and environmental risk factors.

Examples of static individual risk factors are for instance: neurological factors, early violent behavior, high number of past offenses, conduct problems in childhood, low IQ, a history of truancy and school drop out (Carcach & Leverett, 1999; Wasserman, Miller, & Cothorn, 2000; Cottle, Lee & Heilbrun, 2001; Scaramella, Tand, Spoth & Simons, 2002;

Thomas, Hurley and Grimes, 2002; Vermeiren, de Clippele, Schwab-Stone, Ruchkin and Deboutte, 2002; Burke, Loeber & Birmaher, 2003; Broidy, Nagin, et al., 2003; Pardini, Obradovic, Loeber, 2006; Weerman and van der Laan, 2006). Some dynamic individual risk factors are: lack of self-esteem, adolescent novelty seeking, personality characteristics (such as extraversion); psychopathic personality traits, poor use of leisure time and, as seen above, the presence of psychiatric problems (Heaven, 1996; Wasserman, Miller, & Cothorn, 2000; Cottle, Lee and Heilbrun, 2001; Clingempeel & Henggeler, 2003; Van Dam, Janssens, De Bruyn, 2004; Kotler & McMahon, 2005).

Examples of static environmental risk factors are for instance: parental antisocial behavior, perceived parental rejection and low emotional warmth during childhood, peer rejection during childhood (aggressive behavior), history of criminal behavior by family members (Gorman-Smith, Tolan & Henry, 2000; Henry, Tolan & Gorman-Smith, 2001; Slomkowski, Rende, Conger, Simons and Conger, 2001; Barnow, Lucht & Freyberger, 2005). Some dynamic environmental risk factors are: low emotional support, contact with delinquent peers, living in a disadvantaged neighborhood (Cottle, Lee and Heilbrun, 2001; Clingempeel & Henggeler, 2003; Kubrin & Stewart, 2006).

The relationship between risk factors and criminal behavior is not straightforward. Some risk factors seem to have a reciprocal relationship with delinquent behavior, such as substance use. When someone commits crimes, he has a higher chance of starting to abuse substances and when someone abuses substances, there is a higher chance of criminal behavior (Wilson, Rojas, Haapanen, Duxbury & Steiner, 2001; Prinz & Kerns, 2003; Vreugdenhil, van den Brink, Wouters and Doreleijers 2003; Ford, 2005). Risk factors often interact with each other and therefore it is complicated to define which risk factors actually have the largest effect on the persistence of criminal behavior (Dodge and Pettit, 2003).

Previous research showed that intervention is most effective when it targets the specific risk factors that individual juvenile offenders are subjected to. If we know the existence of risk factors and their changes over time, we are one step further in the development of good risk assessments, and improving treatment effect (Borum, 2003). More knowledge about the specific risk factors that play a role in serious offending and recidivism is therefore of great importance, because this knowledge can be used to improve risk assessment and to develop fitting treatment modalities at an early stage, preventing a life-long persistence of delinquency. In this study a sample of the top 5% most serious juvenile offenders in the Netherlands is taken into account. This subgroup was chosen because it had not been studied extensively before. This specific group is responsible for a large part of juvenile criminal delinquency and is therefore an important target for intervention. Because of the severity of criminal behavior in this group, it is important once more to find out how recidivism in these juvenile offenders can be reduced. Interventions aimed at risk factors that are related to criminal behavior may be

of help to decrease the incidence of aggressive and delinquent conduct problems. The top 5% most serious juvenile offenders are at risk of becoming criminal adults (Kratzer & Hodgins, 1999; Moffitt & Caspi, 2001; Moffitt, Caspi, Harrington & Milne, 2002; Kjelsberg, 2002; Donker, Smeenk, van der Laan & Verhulst, 2006). Therefore, policies aiming to prevent juvenile crime may subsequently decrease adult crime as well, making them a potentially cost-effective way of reducing crime rates, particularly when compared with the cost of incarceration (Kalb and Williams, 2002). Considering this we developed a list of seventy static and dynamic risk factors that have been found to be related to juvenile delinquency and recidivism in previous international research. This instrument has been applied to the top 5% most serious juvenile offenders in The Netherlands, who are under a mandatory treatment order in juvenile justice institutions. We have chosen this population because as they have committed very severe crimes compared to other juvenile delinquents, and are therefore a group in which we have a lot to gain considering the reduction of recidivism and severity of recidivism. In this article the score on seventy risk factors in all life areas are described. The change over time of the subsequent yearcohorts of serious juvenile offenders is analyzed as well.

Methods

Subjects

The subjects in this study are the top 5% most serious juvenile delinquents in the Netherlands: juveniles that are placed in a judicial juvenile institution under a mandatory treatment order (a so-called PIJ-order, which stand for Placement in an Institution for Juveniles for mandatory treatment). A PIJ order can last from 2 to 6 years and is the most severe measure in the Dutch juvenile criminal justice system, which is applied to juveniles between 12 and 18 years old. The criteria are having committed a severe offense/offenses, risk for recidivism and an assessment by a psychiatrist and a psychologist with the conclusion that treatment is in the best interest of both the juvenile and society. The mandatory treatment order lasts for two years, but can be extended to four years in the case of violent offending and to six years in the case of psychopathology (Van der Linden, Ten Siethoff & Zeijlstra-Rijpstra, 2001; Stevens & Van Marle, 2003). Among all Dutch juvenile delinquents in judicial juvenile institutions (both prisons and treatment facilities), overall recidivism after release is 70% within 4 years (Wartna, Harbachi & Van der Laan, 2005). Subjects in this study were male adolescents aged 12 – 23 years, sentenced under a mandatory treatment order between 1995 and 2005. In total 1549 juveniles were sentenced under a mandatory treatment order in this period. In total, 74% of these juvenile offenders (N=1147) could be included in this study for several reasons (administrative reasons, death of a subject, incomplete file information). These

74% juvenile offenders that were included in the study were evenly divided over the period of 1995-2005.

Instrument: Juvenile Forensic Profile (FPJ)

In this study we used a list of 70 risk factors as assessed with the FPJ (Brand and Van Heerde, 2004), which was especially developed for forensic research based on file data. This instrument was derived from existing internationally and nationally validated instruments for risk assessment and for measuring problem behavior (e.g. Child Behavior Check List, Structured Assessment of Violence Risk in Youth, Psychopathy Check List: Youth Version, Juvenile-Sex Offender Assessment Protocol, HCR-20 Violence Risk Assessment Scheme, Forensic Profiles-40). The list contains risk factors concerning seven domains: 'history of criminal behavior', 'family and environment', 'offense-related risk factors and substance use', 'psychological factors', 'psychopathology', 'social behavior/interpersonal relationships' and 'behavior during stay in the institution'. Each risk factor is measured on a three-point scale with 0 = no problems, 1 = some problems, and 2 = severe problems. Previous research on the FPJ-list showed that the available file information was thorough and complete enough to be able to score the instrument (Van 't Hoff, Brand, Van Parijs & Van Heerde, 2002). The interrater-reliability was tested and for the first five domains Kappa was .65- .85, which is good to very good. For the last two domains, Kappa was .45- .47, which is considerably lower. This was probably caused by the fact that the risk factors in these domains were less systematically documented. Next, convergent validity with the SAVRY was tested, which was found to be satisfactory ($K=.61$ over 27 risk factors; Van Heerde, Brand, Van 't Hoff & Mulder, 2004). The predictive validity of the instrument was tested in the first sample of 102 boys. A sum score of nine risk factors that predicted recidivism was created and was found to be a good predictor of recidivism (AUC of .803). In sum, the psychometric qualities of the instrument were found to be satisfactory (Van Heerde & Mulder, 2005, Brand, 2005a; Brand, 2005b).

Procedure

This study was approved by the Medical Ethical Commission of Erasmus University Medical Center. After 1 year of treatment in the institution the completed files of the youngsters were scored with the FPJ-list. We measured after this time to be able to include risk factors during the treatment process. All files ($n=1147$) were read and scored with the FPJ-list by master-students (in psychology or criminology) who were in their last year before graduation. For three weeks the students were trained to score the instrument. The training included a test of the quality of scoring to make sure that the files were read and scored properly.

Statistics

The statistics were calculated with SPSS 15.0. The prevalence of different risk factors is presented using descriptive statistics. Next, the change of the risk factors in the population over time was studied to see if there was an overall decreasing or an increasing risk in the sample of serious juvenile offenders that was convicted to a mandatory treatment order. Ten year-cohorts were created to study the change of the sample over 10 years time. Because of the size of the sample, small differences would be significant if we do not correct for sample size. Therefore, we decided to determine a minimal significant difference, which was set on a change of .025 per year (scores could range from 0-2; .25 over ten years is a respectable change. Consequently the minimal significant difference per year is .025). For each risk factor the minimum significant difference was determined with regression analysis.

Results

Group description

More than half of the sample (59%) consisted of individuals with non-Dutch ethnicity. Juvenile offenders with at least one parent with a non-Dutch nationality were registered as having another ethnicity. One fifth of the juveniles were originally from Surinam or the Dutch Antilles, 15% were of Moroccan nationality and 5% of Turkish nationality. The remaining 19% juvenile offenders were of other western (3%) or non-western (16%) countries.

The sample largely consists of boys ($n=1112$, 97%), with a very small minority of girls ($n=35$, 3%). The age at which juvenile offenders were sentenced to the mandatory treatment order ranged from 12 to 22 ($m=16.8$, $sd=1.43$).

The mandatory treatment order is the most severe sanction in the Netherlands. This is reflected in the severity of offending: 93% of the juveniles in the sample had committed violent offenses (3% with only material damage and 90% with interpersonal violence), 84% had committed property offenses and 25% had committed one or more sex offenses. Most juvenile offenders did not specialize in one type of offense and had committed more than one offense, with a mean of 9 offenses ($sd=10.68$) and 5 violent acts ($sd=6.39$) (on the basis of file information supplied by the juvenile, the school, the parents, the police, but not necessarily with conviction).

Risk factors, family and environment

The scores of juvenile offenders on risk factors of the first domain 'family and environment' are presented in Table 1. The results show that we have to do with youngsters that have been subjected to a lot of problems since childhood. The majority was younger

Table 1. Risk factors 'family and environment', prevalence

Risk Factor	0= no problems	1= some problems	2= very problematic	N
Young age of onset of problem behavior	6%	39%	55%	1128
Availability of parents	27%	46%	27%	1140
Peer rejection	57%	28%	15%	1017
Parental skills	10%	44%	46%	1126
Authority problems	21%	29%	51%	1134
Involvement with criminal peers	22%	43%	35%	1117
Criminal behavior in the family	61%	14%	25%	1014
Physical abuse (by parents)	55%	16%	29%	1036
Neglect	28%	43%	29%	1126
Sexual abuse	87%	5%	8%	1026
Witnessing domestic violence	61%	14%	25%	957
Previous contact with mental health care	11%	17%	72%	1140
Truancy	24%	20%	56%	1111
Low academic achievement	50%	34%	16%	1100
Parental substance abuse	70%	13%	17%	1005
Parental psychiatric disorders	74%	14%	13%	961

than twelve years old when problems started and many youngsters showed serious problems with authority. Most juvenile offenders received treatment before, but without positive results. Domestic violence, physical abuse and neglect were often reported; parents were often not available or did not have good parenting skills. Sexual abuse was reported less often, but this might have been caused by the fact that juveniles did not tell (out of shame about being sexually abused).

Risk factors, offense-related risk factors and substance abuse

In Table 2 offense-related risk factors and substance abuse are reported. Alcohol and drug abuse are highly prevalent: 53% of the sample used cannabis frequently (on a daily to weekly basis). One fifth drank alcohol (on a daily to weekly basis. For hard drugs the numbers of juvenile offenders that used these kind of drugs frequently are quite worrying too: 11% frequently used ecstasy, 9% cocaine and 7% amphetamine.

Table 2. Risk factors 'offense-related risk factors and substance use', prevalence

Risk Factor	0= no problems	1= some problems	2= very problematic	N
Medication stop preceding the offense	97%	3%	0%	1131
Having one/more unknown victims	22%	65%	13%	1132
Planning, searching for a victim	95%	1%	4%	1122
Substance abuse preceding the offense	64%	29%	7%	887
Alcohol abuse	66%	26%	8%	1057
Drug abuse	36%	30%	34%	1090
Gambling	91%	7%	2%	1010

Risk factors, psychological factors

In Table 3, the prevalence of different psychological problems is shown. The far majority of the sample had problems with empathy, a lack of conscience and was easily influenced by criminal peers. Considering intelligence, 11% of serious juvenile offenders had an IQ lower than 70 (mental retardation); almost a third of the juveniles scored an IQ between 70 and 85 and 61% had an IQ higher than 85 (which means they had a low average or normal/higher level of intelligence).

Table 3. Risk factors 'psychological factors', prevalence

Risk Factor	0= no problems	1= some problems	2= very problematic	N
Victim empathy	2%	42%	56%	1131
Lack of conscience	1%	45%	54%	1135
Amendable	10%	33%	57%	1127
Low impulse control	11%	35%	54%	1130
Lack of problem insight	3%	39%	58%	1125
Sexual problems	70%	12%	18%	1107
Intelligence/IQ		Mean= 89.5		922

Risk factors, psychopathology

The prevalence of psychopathology is shown in Table 4. Conduct disorder was diagnosed in 61% of the sample, but almost 90% of serious juvenile offenders had symptoms of a conduct disorder. ADHD was also quite prevalent in our sample. Although the prevalence of mental disorders was lower than that of other risk factors it was higher than prevalence at baseline in adolescents, which for ADHD e.g. is 3-5% (Verhulst, Van der Ende, Ferdinand, & Kasius, 1997).

Table 4. Risk factors 'psychopathology', prevalence

Risk Factor	0= no problems	1= some problems	2= very problematic	N
ADHD	69%	17%	14%	1137
Anxiety disorder	82%	15%	3%	1136
Depressive disorder	75%	20%	5%	1135
Brain organic disorder	79%	18%	3%	1066
Conduct disorder	12%	27%	61%	1141
Feelings of hostility	86%	11%	3%	1136
Autism spectrum disorder	87%	6%	7%	1139
Psychotic symptoms	87%	9%	4%	1137
Sadism	91%	7%	2%	1137

Risk factors, social behavior and interpersonal relationships

Considering social behavior and interpersonal relationships (Table 5), most juvenile offenders had a defective social network and were involved in contacts with antisocial peers. A lack of social skills was characteristic for serious juvenile offenders.

Table 5. Risk factors 'social behavior/ interpersonal relationships', prevalence

Risk Factor	0= no problems	1= some problems	2= very problematic	N
Antisocial behavior during treatment	39%	49%	12%	1120
Network: quality	44%	42%	14%	1101
Network: quantity	7%	48%	45%	1108
Intimate relationships	32%	40%	28%	1081
Prosocial friendships	7%	29%	64%	1106
Lack of social skills	38%	46%	16%	1132

Risk factors, antisocial behavior during treatment

During treatment, approximately half of the juveniles had at least some problems with treatment adherence, the relationship with the therapist or lack of motivation (Table 6). Aggressive incidents were no exception, nor were attempts to escape from the institution or not returning from a leave of absence (absconding). Adequate problem solving strategies were rare in serious juvenile offenders: most of them reacted with aggression or simply avoided conflict situations.

Table 6. Risk factors 'antisocial behavior during treatment', prevalence

Risk Factor	0= no problems	1= some problems	2= very problematic	N
Avoidant coping	43	43	13	1095
Negative/ aggressive coping	22	60	17	1096
Positive/ support seeking coping	17	69	14	1045
Therapeutic alliance	26	56	18	1062
Treatment adherence	55	41	5	1122
Incidents, aggression	63	21	16	1087
Treatment motivation	44	44	12	1082
Self care	68	29	4	1080
Commitment to school / career	45	48	7	1079
Escape / absconding	67	19	15	1137

Changes in the sample over ten years (1995-2005)

Next we studied the development of the amount of risk of the sample of serious juvenile offenders under a mandatory treatment order cross-sectional after the first ten years after the measure 'mandatory treatment order' was implemented (1996-2005). The results are shown in Table 7. On the largest part of the risk factors, the score of new yearcohorts of serious juvenile offenders in the sample did not change, which means that overall we can study juvenile offenders under a mandatory treatment order as one group. There were several specific risk factors however, on which the juveniles in later years had fewer problems at entry than juveniles ten years before: lack of parenting skills, involvement with antisocial peers, a history of neglect, lack of academic achievement, drug abuse, gambling, a lack of social skills, lack of problem solving skills, lack of treatment adherence and a lack of commitment to school. There was one risk factor on which serious juvenile offenders that entered in the later years scored more problematic than ten years

Table 7. Risk factors over ten years time

Risk Factor	Difference	p-value	Improvement	Increasing problems
Family problems and environment				
Parenting skills	-.035	.000	+	
Involvement with antisocial peers	-.037	.000	+	
Neglect	-.034	.000	+	
Lack of academic achievement	-.025	.002	+	
Offense related risk factors and substance abuse				
Drug addiction	-.030	.000	+	
Gambling	-.026	.001	+	
Psychological risk factors				
Intelligence, IQ*	-.823	.000		+
Social behavior and interpersonal relationships				
Lack of social skills	-.026	.001	+	
Antisocial behavior during treatment				
Avoidant coping style	-.045	.000	+	
Lack of positive, support seeking coping	-.042	.000	+	
Lack of treatment adherence	-.032	.000	+	
Lack of commitment to school/ work	-.032	.000	+	

* For IQ a reduction means that the mean IQ is lower, which stands for an increase in risk.

before, which is IQ. Between 1995 and 1999 29% of the juvenile offenders had an IQ lower than 85. Between 2000 and 2005 this percentage increased to 44%. Only those risk factors on which a significant difference were found are reported in Table 7.

Discussion

In this study the aim was to find risk factors that play a role in serious juvenile offending.

The results show a profile of serious juvenile offenders based on the scores on seventy risk factors. The top 5% most serious Dutch juvenile offenders are a multi problem group. The age of onset of problem behavior is young for most of the juveniles in the sample, which is characteristic for life-course persistent offending (Moffitt & Caspi, 2001). Of course we cannot say on the basis of this study if this prognosis of persistent offending is actually the case, because data on the offending behavior in the future are not known yet. However, this will be a subject for future research. Previous research on the total population of juvenile offenders in the Netherlands showed that recidivism is approximately 70% (Wartna, Harbachi & Van der Laan, 2005).

Further, we found a range of problems in the family: serious juvenile offenders were often neglected and abused during their childhood, both physically and sexually. They witnessed domestic violence, their parents often showed a lack of parenting skills or were not available for their offspring, physically, pedagogically or emotionally. Serious

juvenile offenders often had antisocial peers, had authority problems and did not attend school as they were supposed to. These results suggest that intervention should not only aim at the individual juvenile offenders, but also at their families and the environment they grow up in.

Substance abuse was quite prevalent and the juveniles in our sample often had psychological problems, such as lack of conscience and low impulse control. A conduct disorder was the most prevalent disorder, which is to be expected because criminal behavior is one of the main criteria to diagnose this disorder. All these characteristics together suggest that the level of psychopathy may be quite high in serious juvenile offenders. In future research this will be studied, using the Psychopathy Checklist-Youth version (Das, 2008).

Psychopathology is not as prevalent as other risk factors, but the prevalence is still considerably higher than in the total population of youngsters in the Netherlands. Apart from conduct disorder, ADHD was the most prevalent disorder.

If we look at the social and cognitive capabilities of serious juvenile offenders, they often score low on IQ-tests, show a lack of social skills and meaningful interpersonal relationships. They do not have adequate problem solving strategies at their disposal. During treatment, motivation, adherence and therapeutic alliance are problematic. Considering these results we may conclude that during treatment a lot of attention should be paid at treatment adherence (for instance, by Motivational Interviewing; Miller & Rollnick, 2002) and at strengthening the social skills of these juveniles. This should be done in a way that fits the capacities of the juveniles (concrete, a lot of repetition and by 'learning by doing').

After creating a risk profile of serious juvenile offenders, we studied the development of the sample over time. In ten years, several improvements in the general picture were seen in the sample of juvenile offenders under a PIJ-order on several risk factors. Parenting skills and parental neglect seemed to have improved somewhat over time as risk factors, and so did academic achievement, social skills, involvement with antisocial peers, drug addiction and gambling. During treatment, serious juvenile offenders have slightly less problems with coping, treatment adherence and lack of commitment to school or work. This is probably caused by an improvement in the population over time. Although the scores improved, the level of problems on these risk factors was still high. Low intelligence was the only risk factor that increased over time. The serious juvenile offenders that are convicted to a mandatory treatment order are less intelligent today than they were ten years ago. This of course has implications for treatment: treatment methods for juveniles with low IQ should be concrete, should not emphasize on verbal exchange and should include a lot of repetition compared with therapy for average intelligent juveniles.

Conclusion

This study resulted in a substantial amount of knowledge about relative strength of the risk factors that play a role in the lives of serious juvenile offenders in the Netherlands. We were able to include a rather large sample (74%) and to study overall changes in the sample on risk factors over a period of ten years. The number of risk factors was high and both static and dynamic risk factors were included. However, this study has several limitations. First, we based our data on file information, which inevitably resulted in missing information that would have been available if we had interviewed the juveniles and their parents. However, previous research on the psychometric qualities of the FPJ-list showed that the information in the files was ample to score the instrument in a solid way. Another limitation is that we performed only one measurement. Repeated measuring of the dynamic variables would have given more information. To finalize, in future research, we will include data on future offending behavior. If we know which serious juvenile offenders continue their criminal careers into adulthood, we can analyze which risk factors influence desistence or persistence of serious criminal behavior. Information about risk factors for recidivism will give an indication which risk factors are most important to aim at during interventions and which risk profiles enhance the risk for future offending. This might bring us a step closer to reducing serious juvenile offending and reducing the harm this offending causes society.

Risk factors for overall recidivism and severity of recidivism in serious juvenile offenders

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Abstract

This study was aimed at finding risk factors that predict both overall recidivism and severity of recidivism in serious juvenile offenders. Seventy static and dynamic risk factors associated with family characteristics, peers, psychopathology, substance abuse, psychological factors and behavior during treatment were assessed with the Juvenile Forensic Profile (Brand & Van Heerde, 2004) in a sample of 728 juvenile offenders. Official reconviction data were used to register recidivism with a minimum time at risk of two years. Severity of offending was categorized according to the maximum sentence for the offense committed combined with expert opinion. Several risk factors for recidivism were found: past criminal behavior (number of past offenses, young age at first offense, unknown victim of past offenses), conduct disorder, family risk factors (poor parenting skills, criminal behavior in the family, a history of physical and emotional abuse), involvement with criminal peers, and lack of treatment adherence (aggression during treatment, lack of coping strategies). Having a previously unknown victim in past offenses, criminal behavior in the family, lack of treatment adherence and lack of positive coping strategies were predictive of serious (violent) recidivism. The results are discussed in terms of their use for risk assessment and improving treatment effect. Targeting parenting skills, involvement in criminal environment, treatment adherence and problematic coping strategies should reduce severity of recidivism.

Introduction

Juvenile delinquency poses a serious problem to society. Moffitt (1993) distinguishes two types of delinquency: *adolescence-limited* and *life-course persistent* delinquency. The first type of criminal behavior develops during adolescence, but desists after transition into adulthood. *Adolescence-limited* delinquency is caused by adolescence specific characteristics according to Moffitt and is seen as normative, at least to some degree, because it occurs in a large part of adolescents (30-40%). However, a small number of juveniles start offending during childhood and continue their careers after the transition into adulthood, the nature of their behavior thereby becoming *life-course persistent*. Juveniles in this group are characterized by a young age of onset of problem behavior, usually due to a complex interaction of biological, individual and environmental factors (Moffitt, 1997; Moffitt, Caspi, Harrington & Milne, 2002; Donker, Smeenk, van der Laan & Verhulst, 2003). Because of the persistence and severity of their delinquent behavior, the *life-course persistent* group is seen as most problematic for society. Recidivism can best be prevented if treatment targets the *specific* risk factors that are present in serious juvenile offenders (Andrews, Zinger, Hoge, Bonta, Gendreau & Cullen, 1990; Schumacher and Kurz, 2000). For that reason, better understanding of these specific risk factors is needed to increase treatment effect with the aim to prevent persistence of criminal behavior and to reduce severity of recidivism.

Research has shown that criminal recidivism in juveniles is associated with static and dynamic risk factors. Whereas static risk factors cannot be changed, dynamic risk factors can be influenced by intervention (Lodewijks, Doreleijers, de Ruiter & de Wit-Grouls, 2001; Loeber, Slot & Sergeant, 2001; Resnick, Ireland & Borowski, 2004). Static and dynamic risk factors can be further subdivided in individual and environmental risk factors.

Static, individual risk factors include for instance: male gender, neuropsychological characteristics and intelligence (Vermeiren, Schwab-Stone, Ruchkin, De Clippele & Deboutte, 2002; Vermeiren, De Clippele, Schwab-Stone, Ruchkin & Deboutte, 2002) and also early age of onset of problem behavior, early age at first conviction, length and intensity of delinquent careers (Loeber & Farrington, 1998; Carcach & Leverett, 1999; Vermeiren, De Clippele & Deboutte, 2000; Cottle, Lee & Heilbrun, 2001; Loeber, Farrington, Stouthamer Loeber & Raskin White, 2008). Dynamic, individual risk factors include several personality characteristics; the diagnosis of conduct disorder is also a risk factor for recidivism (Van Dam, Janssens & De Bruyn, 2004; Carcach & Leverett, 1999; Kotler & McMahon, 2005; Vermeiren, Jaspers & Moffitt, 2005). Another dynamic, individual risk factor is substance abuse (Hawkins et al., 2000; Ford, 2005). Research with the youth version of the Psychopathy Checklist (PCL-YV) showed that recidivism was also associated with psychopathic traits (Walters, 2003; Das, 2008). Static, environmental risk factors include: parental neglect, physical maltreatment, conflicts with parents (Benda

& Tollet, 1999; Piquero, Brame & Moffitt, 2005; Hawkins et al. 2000) and the presence of a care and protection order (Lynch, Buchman & Krenske, 2003). Dynamic, environmental risk factors include poor social and economic environment, living in a disadvantaged neighborhood, truancy and criminal peers (Carcach & Leverett, 1999; Carr & Vandiver, 2001; Cottle et al., 2001; Marczyk, Heilbrun, Lander & De Matteo., 2003; Wilson, Rjas, Haapanen, Duxbury & Steiner, 2001; Vreugdenhil, 2003; Mbuba, 2004; Oberwittler, 2004; Piquero, Brame & Moffitt, 2005; Kubrin & Stewart, 2006; Pardini, Obradovic, Loeber, 2006; Weerman & van der Laan, 2006).

Although there is a substantial amount of research on risk factors associated with recidivism in general, there is little research neither on risk factors for *severity* of recidivism nor on the predictive value of different risk factors. Further, very serious offenders as a *subgroup* have not been studied often. Severity of recidivism can be defined by for instance frequency of offending, the type of new offenses or the amount of harm that was caused. Looking at severity of recidivism is important because the more serious the offense is, the greater the burden upon society, depending of course on the way it impacts on society and on the victims.

In this study the top 5% most serious offenders in The Netherlands are taken into account. Because of the frequency and severity of offending in this group, we expect that recidivism in this subgroup is similar or even higher than in other juvenile offenders. We followed up our subjects after treatment and registered severity of offending until early adulthood. Previous research shows that most juvenile delinquents are not specialists and that the level of specialization differs per type of offense (Carcach, C., 1999). Therefore we looked at severity of offending over a longer period of time and registered the most serious offense. We expected to find a large number of risk factors in this subgroup, because of the severity of their offending behavior. And although we cannot conclude yet that we have to do with *life-course persistent* offenders, because of the young age of our subjects, we can assume that we have to do with a subgroup that is at great risk of continuing their criminal careers as adults.

The main aim of the present study is to examine on which risk factors recidivists differ from non-recidivists in a group of serious juvenile offenders. We hypothesized that serious juvenile offenders that reoffend have many characteristics in common with *life-course persistent* offenders, among which a young age at onset of offending. The second aim is to examine which risk factors predict severity of recidivism, with severity being defined by the amount of harm, the type of offense and the maximum sentence. We expect to find both environmental and individual risk factors that are predictive of severity of recidivism. Finding dynamic risk factors that predict severity of recidivism would be useful for improving existing interventions with the aim to reduce severity of future offending.

Methods

Subjects

In this study we look at the most serious juvenile delinquents who were adjudicated in the Netherlands: juveniles that are placed in a judicial juvenile institution under a so-called PIJ order (Placement in an Institution for Juveniles for mandatory treatment). A PIJ order can last from 2 to 6 years and is the most severe measure in the Dutch juvenile justice system, which is applied to juveniles between 12 and 18 years old (Van der Linden, Ten Siethoff & Zeijlstra-Rijpstra, 2005; Stevens & Van Marle, 2003). Among all Dutch juvenile delinquents in judicial juvenile institutions (both prisons and treatment facilities), overall recidivism after release is 70% within 4 years, counting all new convictions (Wartna, Harbachi & Van der Laan, 2005).

Subjects in this study were male adolescents aged 12 – 23 years, sentenced under a PIJ-order between 1995 and 2004 ($N=1081$). Official reconviction data were collected in June 2008. These data were used to classify recidivism and also the severity of recidivism. For our analyses we only included recidivism data on subjects with a sufficient time at risk (TaR minimum 2 years; $n=737$). The mean time at risk in our study was 5.83 years ($SD=2.39$, range 2 years – 11.17 years). Previous research shows that most recidivists reoffend within the first year after release, but recidivism continues to rise in the first five to eight years after release (Wartna et al., 2005). We started to register recidivism from the moment the PIJ-order was ended officially. To account for differences in follow-up period, for each juvenile offender the most serious offense was used as a measure for severity and not for instance the number of offenses, which increases as time at risk increases. The criminal records of nine juveniles could not be used for various reasons (for example for administrative reasons, availability of the data, or due to the death of the subject). Eventually 728 subjects were included in our analyses. The mean length of treatment for juvenile delinquents under a PIJ order in our study was approximately two years ($M=33.7$ months; $SD=13.02$). The mean age at release from treatment was 20 years ($SD=1.63$). Time until first new offense ranged from 0 to 8.08 years ($M=1.2$; $SD=1.5$).

Instruments

Juvenile Forensic Profile (FPJ)

In this study we used a list of 70 risk factors as assessed with the FPJ (Brand and Van Heerde, 2004), which was especially developed for forensic research based on file data (See appendix). This instrument was derived from existing internationally and nationally validated instruments for risk assessment and for measuring problem behavior (e.g. Child Behavior Check List, Structured Assessment of Violence Risk in Youth, Psychopathy Check List: Youth Version, Juvenile-Sex Offender Assessment Protocol, HCR-20 Violence

Risk Assessment Scheme, Forensic Profiles-40). The list contains risk factors concerning seven domains: 'history of criminal behavior', 'family and environment', 'offense-related risk factors and substance use', 'psychological factors', 'psychopathology', 'social behavior/interpersonal relationships' and 'behavior during stay in the institution' (see appendix). Each risk factor is measured on a three-point scale with 0 = no problems, 1 = some problems, and 2 = severe problems. Previous research on the FPJ-list showed that the available file information was thorough and complete enough to be able to score the instrument (Van 't Hoff, Brand, Van Parijs & Van Heerde, 2002). The inter-rater reliability was tested (double scoring of 80 files, $r = 0.73$; $K = 0.61$) and a high convergent validity of the FPJ-list with the SAVRY was found (Van Heerde, Brand, Van 't Hoff & Mulder, 2004). The predictive validity of the instrument was tested in the first sample of 102 boys (AUC of .803 with a sum score of nine risk factors). In sum, the psychometric qualities of the instrument were found to be satisfactory (Van Heerde & Mulder, 2005, Brand, 2005a; Brand, 2005b).

Classification of recidivism

To measure recidivism, all convictions starting at release from the institution were registered, together with the date and type of the offense committed. The choice for official reconviction data is straightforward, but it does have some limitations. The most important limitation is that an unknown number of offenses will be lost as only those that led to conviction are counted. Using self report would probably lead to higher recidivism rates than official records. Another limitation is the possible influence on reconviction of changes in policy (Friendship, Beech & Browne, 2002). Despite these limitations, official reconviction data were used because they provide an objective and clear measure for recidivism (Heilbrun et al., 2000).

Recidivism was operationalized in three ways. First we differentiated between recidivism and non-recidivism. Second we differentiated between violent and non-violent recidivism: violent recidivism was defined by having committed at least one violent offense after release, with violence standing for physical violence or threatening with physical violence during the offense. Third, recidivism was operationalized by classifying the severity of the offenses in twelve categories. Severity of offending was determined depending on the Dutch laws increasing maximum sentence, the amount of harm and the amount of violence during the offense. The classification of severity was evaluated by clinicians and law professionals (Van Kordelaar, 2002). In Table 1 the operationalization of recidivism is shown, as well as the severity of recidivism. The twelve categories of severity were mutually exclusive.

Table 1. Maximum severity of recidivism, n=728, Tar \geq 2 years.

12 Categories of severity	Frequency	Percent, %
0=No conviction	146	20.1
1=Misdemeanor	65	8.9
2=Drug offense	7	1.0
3=Vandalism (property)	0	0
4=Property offense	52	7.1
5=Moderate violent offense	127	17.4
6=Violent property offense	61	8.4
7=Serious violent offense	165	22.7
8=Sexual offense	25	3.4
9=Pedosexual offense	7	1.0
10=Manslaughter (attempt)	50	6.9
11=Arson	6	0.8
12=Murder (attempt)	17	2.3

Procedure

The study was approved by the Medical Ethical Commission of Erasmus University Medical Center. After 1 year of treatment the files were scored with the FPJ-list. We measured after this period to be able to include risk factors during treatment. All files (n=1081) were read and scored with the FPJ-list by master-students (in psychology or criminology) who were in their last year before graduation. For three weeks the students were trained to score the instrument. The reconviction data of juvenile offenders were delivered by the official documentation center of the Ministry of Justice (OBJD). The recidivism data include the details on all court appearances, the date and type of offense, and the date of conviction or acquittal. All court appearances dated after release from the judicial juvenile institution were counted as recidivism.

Statistics

First descriptive statistics and frequencies were calculated for recidivism. Due to the fact that the mean score on most risk factors of the FPJ-list in our sample was larger than 1, our data was skewed to the right. Therefore, we used non-parametric tests. The Mann Whitney U-test was used to study the differences between juveniles who recidivated and those who did not; a p-value<.05 was considered to be significant. We also used this test to study differences between violent and non-violent recidivism. We used non-parametric correlation (Spearman's rho) to study the relation between risk factors and severity of recidivism measured in 12 categories. In our analyses, we corrected for multiple comparisons due to the large number of risk factors (n=70).

Results

Group description

Subjects' ages at start of treatment ranged from 12 to 22 years. The fact that there were some subjects over 18 in our sample was because they committed their offenses when they were still minors ($M = 16.9$; $SD = 1.39$). Reasons for conviction were non-violent property offenses (60%), violent offenses (86%, including manslaughter, murder and arson) and sexual offenses (18.8%). The juvenile offenders in the sample did not specialize in one type of offending and most subjects (82%) had committed more than one offense for which they were convicted and put under a mandatory treatment order. The maximum number of registered offense-dates prior to conviction was 36 ($M = 7.13$, $SD = 5.29$). The mean severity of offenses before conviction was 7.20 (categories of severity [see: table 1] = 1-12; $SD = 1.98$).

The lowest IQ measured in the sample was 48 and the highest IQ was 140 ($M = 90$; $SD = 15.81$). Juveniles in the sample were subjected to many risk factors. Scores on the scales 'family and environment', 'psychological factors', 'social behavior/ interpersonal relationships', and 'behavior during stay in the treatment facility' were highest, which means that subjects had the most serious problems in these domains. In 70 percent of the cases, drug use was either problematic (30%) or very problematic (37%). Conduct disorder (CD) was present in the majority of the sample (60%) and 5% of the subjects suffered from a depressive disorder. Although the prevalence of mental disorders was lower than that of other risk factors it was higher than prevalence at baseline in adolescents (Verhulst, Van der Ende, Ferdinand, & Kasius, 1997). Table 2 shows the prevalence of mental health problems before treatment in this sample of very serious juvenile offenders.

Table 2. Mental health problems (%); $n = 728$

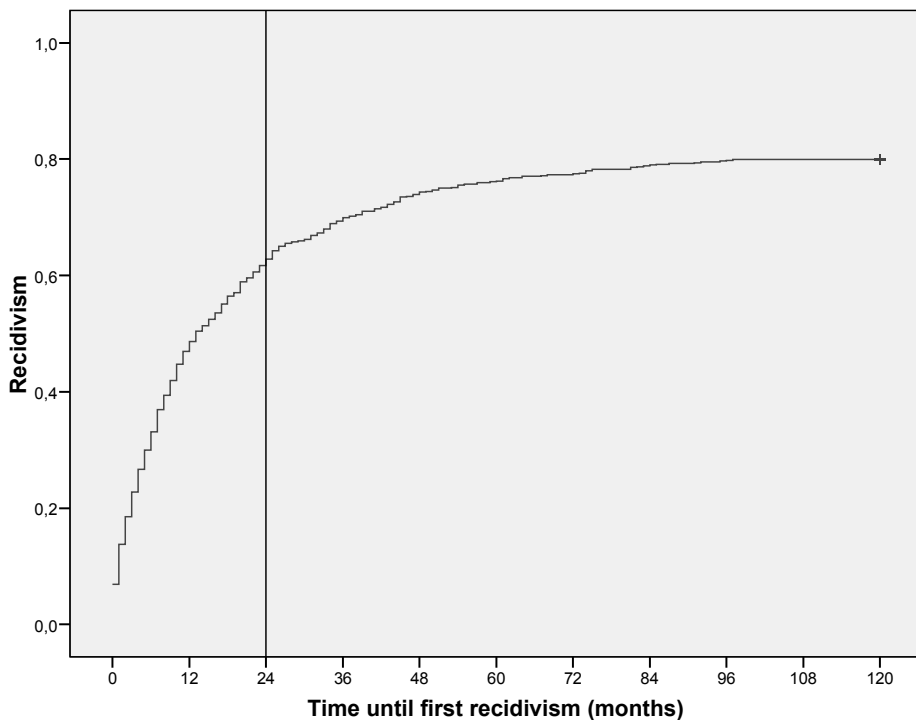
Risk factor	No problems	Moderate problems	Very problematic/ DSM-IV disorder
Drug addiction	33.1	29.8	37.2
ADHD	69.7	18.1	12.2
Anxiety problems	81.4	16.0	2.6
Depressive disorder	75.1	19.7	5.1
Psychotic symptoms	86.5	9.6	3.9
Conduct disorder	13.4	26.2	60.4
Autism Spectrum Disorder	88.2	4.7	7.1

Prevalence of recidivism

With a mean TaR of 5.83 years, recidivism in our study was 79.9%. If we exclude misdemeanors and vandalism (i.e. categories 1-3, or: *less serious recidivism*), recidivism was 70.1%. The results show that 62.9% of our subjects committed a violent offense and

in total there were 4.4% sex offenders after treatment. The mean number of offenses after release was 7.1 ($SD=9.8$). The mean severity of recidivism was 4.8 ($SD= 3.3$, range = 0-12). The results show that 32.9% of the delinquents in our study recidivated with offenses being in categories 4 (property offense), 5 (moderate violent offense) or 6 (violent property offense). Almost a sixth (14.4%) reoffended with a category 7 (serious violent offense) to 12 (murder) offense. The growth curve in Figure 1 shows that after five years the curve reaches asymptote. Striking is the fact that the largest part of onset of recidivism takes place within two years, and that after two years 78.4% of the recidivists had already reoffended.

Figure 1: Growth curve: recidivism 0,1



Risk factors and overall recidivism

We found several *static* risk factors to be significantly higher in recidivists (Table 3): a high number of offenses in the past, young age at the first offense, the victim of past offenses was unrelated to the offender and having parents with poor parenting skills during childhood. Looking at psychopathology, we found several risk factors that were significantly *less* present in recidivists: depressive symptoms, psychotic symptoms, alcohol addiction, including substance abuse preceding the offense, and gambling ad-

diction. There were also some *dynamic* risk factors that were more present in recidivists: contact with criminal peers (measured at the start of treatment), lack of treatment adherence, lack of positive coping and incidents/aggression in the institution. On several risk factors, apart from psychopathology, we found that recidivists scored lower than non-recidivists (e.g. sexual deviance, pedosexuality). These risk factors were characteristic for sex offenders. *Sexual* recidivism was very low compared to other types of offenses (18.8% sex offenses before treatment against 4.4% sex offenses after treatment). This might explain why risk factors that are characteristic for sex offenders, such as sexual problems and pedosexuality, were significantly higher in non-recidivists. If we exclude sex offenders in our analyses indeed the risk factors that were characteristic for sex offenders and higher in non-recidivists are no longer significant.

Table 3. Risk factors and recidivism with TaR \geq 2years; n=728, 0=146, 1=582

Risk factor	Z	p-value
Number of past offenses	-3.482	.000 +
Young age at first conviction	4.052	.000 +
Unknown victim of past offenses	-3.170	.002 -
Poor parenting skills	-1.993	.046 +
Involvement in criminal environment	-2.953	.003 +
Gambling addiction	-1.990	.047 +
Alcohol addiction (in the past)	-2.060	.039 -
Substance abuse preceding the offense	-2.002	.045 -
Victim empathy	-2.163	.031 +
Problem insight	-2.145	.032 +
Depressive symptoms	-2.317	.021 -
Psychotic symptoms	-2.452	.014 -
Lack of treatment adherence	-2.270	.023 +
Coping, lack of positive coping	-2.366	.018 +
Incidents, aggression in institution	-2.451	.014 +

+ = higher score for recidivists; - = lower score for recidivists.

Risk factors and violent recidivism

The results show that 62.9% of the juvenile offenders recidivated with a violent offense (n=458). In this study 37.1% of the population (n=270) did not commit a violent offense after treatment. The differences between violent recidivists (n=458) and non-violent recidivists (n=270) are shown in Table 4.

Compared to the non-violent recidivists, the violent recidivists scored higher on the following static risk factors: a higher number of past offenses, young age at first offense, unknown victim of past offenses, criminal behavior of family members, history of neglect, alcohol abuse by parents. Two risk factors concerning psychopathology were higher in offenders with violent recidivism: alcohol addiction and a diagnosis of conduct disorder.

Table 4. Risk factors and violent recidivism with TaR ≥ 2 years. ; n=728, 0=270, 1=458

Risk factor	Z	p-value
Number of past offenses	-3.905	.000 +
Young age at first offense	-3.437	.001 +
Unknown victim of past offenses	-3.191	.001 -
Involvement in criminal environment	-2.780	.005 +
Criminal behavior of family members	-3.401	.001 +
History of neglect	-2.670	.008 +
Alcohol abuse by parents	-1.983	.047 +
Network, emotional support	-2.291	.022 +
Problem insight	-2.080	.038 +
Conduct disorder	-2.198	.028 +
Alcohol addiction	-2.560	.010 -
Coping, lack of positive coping	-2.177	.029 +
Incidents/ aggression in the institution	-2.766	.006 +
Escape / not returning from leave of absence	-3.437	.001 +
Lack of treatment adherence	-3.000	.003 +

+ = higher score for recidivists; - = lower score for recidivists.

Dynamic risk factors on which violent recidivists scored higher were: involvement in the criminal environment (measured at the start of treatment), lack of problem insight, lack of emotional support, lack of positive coping (defined by help seeking and support seeking as a problem solving strategy), escape, lack of treatment adherence and motivation.

Correlation of risk factors with severity of recidivism

In Table 5 the correlations of risk factors with severity of recidivism (in 12 categories) are shown (p-values). The large number of variables we included caused low correlations to be significant. Therefore, we corrected for the large number of variables and in Table 5 we only report correlations with a p-value $<.01$ (one-tailed). The results show that twelve variables were positively related to severity of recidivism (the more risk, the more serious the new offense committed).

Static risk factors that were found to be related to the severity of recidivism were: a high number of past offenses, young age at first offense, unknown victim of past offenses, history of physical abuse and a history of neglect. Looking at psychopathology we found gambling addiction and conduct disorder to be related to severity of recidivism. Alcohol addiction is a risk factor for offending behavior, but it is negatively correlated with severity of recidivism. Some dynamic risk factors are positively related to severity of recidivism: involvement in criminal environment (measured at the start of treatment), lack of positive coping and lack of treatment adherence. Again we found several risk factors that had a negative correlation with recidivism. These were all more common in sex offenders and we found that they were no longer significant after we excluded sex offenders from our analyses.

Table 5. Correlation (spearman's rho) of risk factors with severity of recidivism in twelve categories; TaR ≥ 2 years.

Risk factor	Severity of recidivism (0, 1-12), n=728
Number of past offenses	.208 **
Young age at first conviction	.240 **
Involvement in criminal environment	.109 **
Criminal behavior in the family	.107 *
History of physical abuse	.112 **
History of neglect	.159 **
Gambling addiction (in the past)	.144 **
Alcohol addiction (in the past)	.116 ** –
Conduct disorder	.120 **
Lack of treatment adherence	.137 **
Unknown victim of past offenses	.113 ** –

**= $p \leq .01$, one-tailed, – = negative correlation.

Predicting overall recidivism and serious (violent) recidivism

Finally, logistic regression analysis was used to find out which risk factors were predictive for overall recidivism, violent recidivism and severity of recidivism. The risk factors that were found to correlate with the different kinds of recidivism were put into logistic regression analyses and multiple linear regression analysis respectively. Sex offenders were left out of the analyses. The results in Table 6a, 6b and 6c show that four risk factors are included in the regression model for general recidivism: a high number of past convictions, having one or more previously unknown victim of past offenses, a lack of parenting skills by the parent and lack of victim empathy. Four risk factors are included in the model for violent recidivism: criminal behavior in the family, lack of positive coping strategies, having one or more previously unknown victims of past offenses and incidents/ aggression in the institution. Finally, six risk factors are included in the model for severity of recidivism: being neglected by the parents, the absence of alcohol abuse, conduct disorder, having one or more unknown victims of past offenses, lack of treatment adherence and gambling.

Table 6a. Logistic regression analysis: predicting general recidivism after treatment (excl. sex offenders).

Step	Variable entered	R ²	Wald	df	P	Step 4 standardized β Coefficient
1	Number of offenses in the past	.043	6,044	1	.014	.087
2	Unknown victim of past offenses	.077	5,318	1	.021	–.635
3	Lack of parenting skills	.101	5,993	1	.014	.627
4	Lack of victim empathy	.125	4,791	1	.029	.643

Table 6b. Logistic regression analysis: predicting violent recidivism after treatment (excl. sex offenders).

Step	Variable entered	R ²	Wald	df	P	Step 4 standardized β Coefficient
1	Criminal behavior in the family	.031	6.031	1	.014	.408
2	Unknown victim of past offenses	.061	5.593	1	.018	-.528
3	Coping, lack of positive coping strategies ¹	.082	3.123	1	.077	.418
4	Incidents/ aggression in the institution	.103	4.398	1	.036	.419

¹ The choice for this model was made in spite of the fact that for one item $p=.077$ ($>.05$) because the improvement of the model was significant after adding the variable 'incidents in the institution'.

Table 6c. Multiple linear regression analysis: predicting severity of recidivism (excl. sex offenders).

Step	Variable entered	R ²	ΔR^2	P	Step 4 standardized β Coefficient
1	Neglect during childhood	.022	.022	.030	.096
2	Alcohol abuse	.036	.014	.001	-.145
3	Conduct disorder	.051	.015	.017	.106
4	Unknown victim of past offenses	.061	.010	.050	-.086
5	Lack of treatment adherence	.070	.009	.038	.091
6	Gambling	.077	.007	.045	.087

Discussion

The aim of the present study was to study risk factors in relation to several operationalizations of recidivism in a subgroup of serious juvenile offenders. Our results show that overall recidivism is 80%. This implies that, after roughly five years of follow-up, 20 percent of those under a PIJ order were not (yet) reconvicted. If minor offenses and misdemeanors are not included, 70 percent of juvenile offenders under a PIJ order continue their criminal careers. These numbers are high. They are comparable with recidivism rates for other (less serious) juvenile delinquents (in prison or on parole: 70-80%), both internationally and in the Netherlands (Wartna et al., 2005). This would imply that our hypothesis that recidivism rates are higher in this population can be rejected. However, as we do not have data on risk factors in other groups of Dutch juvenile offenders yet, nor data on risk factors in comparable groups in other countries, comparison between different groups will be a subject for future research.

Our study has several limitations. Our research was retrospective and based on information of files. Although the information in the files was adequate to register risk factors, information of other sources, such as interviews with the parents could have given even more information. In future research it is to be recommended to compose a prospective longitudinal design with repeated measures. In that way we can do more

definite statements about the actual *causes* of criminal behavior and recidivism. To study the persistence of criminal behavior extensively, follow up should continue further into adulthood. Nevertheless, we were able to include a large sample in our study, consisting of the most serious juvenile offenders. Our follow-up time was considerable. We used an instrument with good psychometric qualities, based on internationally validated instruments, and were able to register a large number of risk factors. In this study we excluded sex offenders because as a subgroup they show considerably lower rates of recidivism than the rest of the sample. In future research it will be interesting to look at differences between subgroups of offenders, on the basis of their offending behavior, low or high IQ or similarity in combinations of risk factors they are subjected to.

The results show that several risk factors measured with the Juvenile Forensic Profile (FPJ) were both more present in the case of recidivism and positively related to the severity of recidivism. We found three *static* risk factors that were significantly related to both general recidivism and the severity of recidivism: number of past offenses, young age at first offense and having one or more previously unknown victims of past offenses. The fact that we found young age of onset of delinquency as a significant risk factor is in line with our hypothesis that recidivists distinguish themselves from desisting offenders by risk factors that are characteristic for life-course persistent offending. We also found *dynamic* risk factors concerning present behavior that were related to both general recidivism and severity of recidivism: involvement in criminal environment (measured at the start of treatment) and lack of treatment adherence. Parents with a lack of parenting skills, the diagnosis of conduct disorder and lack of coping strategies were related to severity of recidivism and higher in violent recidivists. Looking at these risk factors we may conclude that the family, peer influence, treatment adherence and problem solving abilities do play an important role in the persistence and severity of delinquency in this very problematic group. Multiple regression analysis showed that conduct disorder and gambling behavior are individual risk factors that predict severity of recidivism. The fact that the absence of alcohol abuse predicts severity of recidivism may be caused by the fact that treatment was aimed at substance abuse. Finally logistic regression analyses and multiple linear regression analysis confirmed the finding that next to the static risk factors 'high number of past offenses' and 'having an unknown victim in past offenses', the family (history of neglect, lack of parenting skills, criminal behavior in the family) and treatment behavior (lack of positive coping abilities, incidents/ aggression in the institution, lack of treatment adherence) are most important.

Conclusion

Treatment adherence, problem solving abilities and criminal behavior in the family were found to be predictive for severity of recidivism. Our findings further support our hypothesis that both individual and environmental risk factors, such as parenting skills

and developing relationships with non-criminal peers) should be targeted during intervention. The fact that we found environmental risk factors to be related to recidivism underlines the importance of aftercare aimed at successful reintegration of the juvenile in the society. This concerns the family (which was found to be predictive of recidivism) as well as school/work and the social network/peers. The fact that recidivism largely takes place within two years (see Figure 1) also supports the importance of aftercare, as during these first two years the risk is apparently highest.

The more serious recidivism is, the higher the risk a juvenile delinquent poses to society. In our study we found risk factors that were not only more present in the case of general recidivism, but also related to severity of recidivism. This is important, because if we are able to predict severity of recidivism, we can more accurately assess the risk that juvenile delinquents pose to society. We will know which risk factors are linked to more serious recidivism and are therefore more important in making clinical decisions. This will offer the opportunity to develop a more effective risk management model for specific juvenile offenders after release.

A classification of risk factors in serious juvenile offenders and the relation between patterns of risk factors and recidivism

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Abstract

There has been a lot of research on risk factors for recidivism among juvenile offenders in general, and on individual risk factors, but less focus on subgroups of serious juvenile offenders and prediction of recidivism within these. The aim of this study is to find an optimal classification of risk items and to test the predictive value of the resultant factors with respect to severity of recidivism among serious juvenile offenders.

Seventy static and dynamic risk factors in 1179 juvenile offenders were registered with the Juvenile Forensic Profile. Recidivism data were collected on 728 of these offenders with a time at risk of at least 2 years. After factor analysis, independent sample t-tests were used to indicate differences between recidivists and non-recidivists. Logistic multiple linear regression analyses were used to test the potential predictive value of the factors for violent or serious recidivism.

The results show that a nine-factor solution best accounted for the data. The factors were: *antisocial behavior during treatment*, *sexual problems*, *family problems*, *axis-1 psychopathology*, *offense characteristics*, *conscience and empathy*, *intellectual and social capacities*, *social network* and *substance abuse*. Regression analysis showed that the factors *antisocial behavior during treatment*, *family problems* and *axis-1 psychopathology* were associated with seriousness of recidivism.

The significance of *family problems* and *antisocial behavior during treatments* suggest that specific attention to these factors may be important in reducing recidivism. The fact that *antisocial behavior during treatment* consists mainly of dynamic risk factors is hopeful, as these can be influenced by treatment. Consideration of young offenders by subgroup rather than as a homogenous population is likely to yield the best information about risk of serious reoffending and the management of that risk.

Introduction

Internationally, about 5% of juvenile offenders seem to be responsible for the majority of the crimes committed by juveniles (e.g. Schumacher & Kurz, 2000; Meeus et al, 2001; Moffitt, 1993). Further, it has been suggested that this small group will continue their criminal careers into adulthood (life-course persistent), even showing a pattern of progressively more serious offending, as they get older (Moffitt & Caspi, 2001). Intervention for such youths is, therefore, important. According to the *risk and needs principle* (Andrews & Bonta, 1995), intensity of treatment should depend on the nature, extent and severity of the problems at hand (see also, Landenberger & Lipsey, 2005; Lowenkamp et al, 2006), with the areas in which most problems occur being the main targets for treatment (Borum, 2003). Intervention must focus on empirically supported risk factors in order to be effective in the prevention of reoffending in this group. It is, therefore, important to know what these risk factors are.

There has been a substantial amount of research on risk factors for recidivism in juvenile offenders *in general*, highlighting various family background measures, such as parental antisocial behavior, absence of the parents or low emotional warmth (Benda & Tollet, 1999; Conger et al, 2003; Barnow et al, 2005; Hoeve et al, 2008). Peer group factors have also been found to be important, such as adolescent novelty seeking, peer rejection or peer deviance (Benda & Tollet, 1999). The third major category of risk factors lies in the person, including nature and extent of previous criminal behavior (Benda & Tollet, 1999; Carcach & Leverett, 1999) or personality characteristics, psychopathology, intelligence or substance abuse (Carcach & Leverett, 1999; Loeber & Farrington, 2000; Cottle et al, 2001; Duncan et al, 2001; Huang et al, 2001; Vermeiren et al, 2002; Chang et al, 2003; Van Dam et al, 2004; Lattimore et al, 2004). Until now, however, little research has been done on risk factors for persistence of criminal behavior *in subgroups* of offenders.

Persistence of offending can only be established in adulthood, but in juvenile offenders continuing criminal behavior into early adulthood is a good indicator of criminal persistence, so we decided to take this as a measure for persistence of offending. In recent work in the Netherlands with the most serious 5% juvenile offenders, we reported individual risk factors that were related to their recidivism (this thesis). These included both static risk factors such as young age at first offense, a high number of previous offenses, family criminality and low personal academic achievement, and dynamic risk factors including contact with criminal peers, absence of positive coping skills, incidents in the institution, and psychopathology such as conduct disorder or lack of conscience. Besides knowing which single factors are related to recidivism, however, it is useful to know how they combine, and whether distinctive subgroups of youths can be identified. If so, interventions might be focused more effectively and efficiently.

The aims of this study were, therefore, to find an optimal classification of serious juvenile offenders, using factor analysis and then to test the potential value of the resultant classes in the prediction of any violent recidivism and of serious violent recidivism more specifically.

Methods

Subjects

The sample was drawn from all male adolescents aged 12–22 years sentenced between 1st January 1995 and 31st December 2004 under a mandatory treatment order for placement in a Dutch juvenile institution for compulsory treatment ($n=1179$). This mandatory treatment order is the most severe sanction for youths in the Netherlands and can be imposed for periods from two to six years. Such youths represent the top 5% most serious offenders. Half of this cohort had been released from treatment after two years, a further 10% after three years and a further 25% after four years. Youths who had been back in the community – that is at risk for offending – for less than two years prior to data collection were excluded, so that the final sample was of 728 youths.

The mean age at release was 20 years ($sd=1.63$), and the mean age at the date of registration of recidivism (July 2008) was 24 years ($sd=1.25$). The mean time at risk was 5.83 years (range: 2.0–11.17, $sd= 2.39$).

Instruments

Juvenile Forensic Profile (FPJ)

The 70-item Juvenile Forensic Profile (FPJ, Brand & Van Heerde, 2004) was especially developed for offender research using file data. It was constructed from internationally and nationally validated instruments for risk assessment together with instruments for measuring problem behavior, including the Child Behavior Check List, the Structured Assessment of Violence Risk in Youth, the Psychopathy Check List: Youth Version, the Juvenile-Sex Offender Assessment Protocol, and the HCR-20 Violence Risk Assessment Scheme (Achenbach, 1991; Borum, 2006; Forth, Kosson & Hare, 2003; Prentky & Right-hand, 2003; Webster, Douglas, Eaves & Hart, 1997). Each item is measured on a three-point scale: 0 = no problems, 1 = some problems, and 2 = severe problems. Previous research on the FPJ showed that the available file information for this population was thorough and complete enough to be able to score the instrument (Van 't Hoff et al., 2002). The inter-rater reliability was acceptable (double scoring of 80 files, $r= 0.73$; $K=0.61$) and the instrument had a high convergent validity with the SAVRY was found (Van Heerde et al., 2004). The predictive validity of the instrument was tested in a sample of 102 boys (AUC

of .803 with the total score from nine risk factors). Additional work confirmed that the psychometric properties of the instrument are satisfactory (Van Heerde & Mulder, 2005, Brand, 2005a; Brand, 2005b).

Classification of recidivism

The Official Judicial Offense Registry of the Netherlands supplied post-release offense data. These were made up of details on all court appearances, the date and type of offense, and the date of conviction or acquittal. All convictions, dated after release from the juvenile institution were counted as recidivism. Recidivism was operationalized in three ways:

- Recidivism and non-recidivism;
- Violent and non-violent recidivism;
- Seriousness of the offenses was classified according to twelve mutually exclusive categories, based on the maximum sentence, the amount of harm and the amount of violence during the offense. Clinicians and law professionals evaluated the classification (Van Kordelaar, 2002). The classification and distribution of offenses according to this measure is shown in Table 1.

Table 1: Operationalization of offending before treatment; n=728

Violence yes/no	12 Categories	Most serious offense n (%)
0	0=No conviction	0 (0)
0	1=Misdemeanor	0 (0)
0	2=Drug offense	0 (0)
0	3=Vandalism (property)	0 (0)
0	4=Property offense	30 (4.1)
1	5=Moderate violent offense	75 (10.3)
1	6=Violent property offense	250 (34.3)
1	7=Serious violent offense	122 (16.8)
1	8=Sex offense, same age	73 (10.0)
1	9=Pedosexual offense	53 (7.3)
1	10=Manslaughter	71 (9.8)
1	11=Arson	27 (3.7)
1	12=Murder	27 (3.7)

Procedure

Pre-detention and detention data were extracted from the full detention record by final year psychology or criminology undergraduates. The students all received three weeks of training in use of the FPJ. The criminal records of the youths included were all collected in June 2008. Offenses committed after release were counted as recidivism (dependent variable).

Statistics

All statistics were calculated with SPSS 15.0 (Statistical Packages Services and Solutions 15.0 for Windows, 2007). AMOS version 17 was used for confirmatory factor analysis.

Before conducting an exploratory factor analysis, we performed a missing values analysis to control for missing values in our data. According to Little's MCAR test, the missing values were randomly distributed. Next the missing values were imputed by linear regression, followed by adding a small amount of random error in order to keep the same mean and standard deviation per variable. We then used Principal Axis Factoring (PAF) for exploratory factor analysis. We performed split half analysis to test the stability of the factor solution we found. The goodness of fit of the solution was tested with confirmatory factor analysis.

In the behavioral sciences, factors are often inter-related, so we used oblique rotation, which allows correlation between factors. The literature offers different criteria for deciding on the number of factors. A method that is often used is the Eigenvalue method (Meerling, 1988), in which the Eigenvalues of the factors should be higher than one. Next, there should be fewer variables than factors, with the number of factors never exceeding half the number of variables. This would result in Eigenvalues of 2.00 to 3.00. When the Eigenvalue higher than 1.0 criterion is not used, one can look at the curve of the scree plot (Taquet, 1997; Cattell, 1966). In our case this would mean that we should include eight or nine factors (see Figure 1).

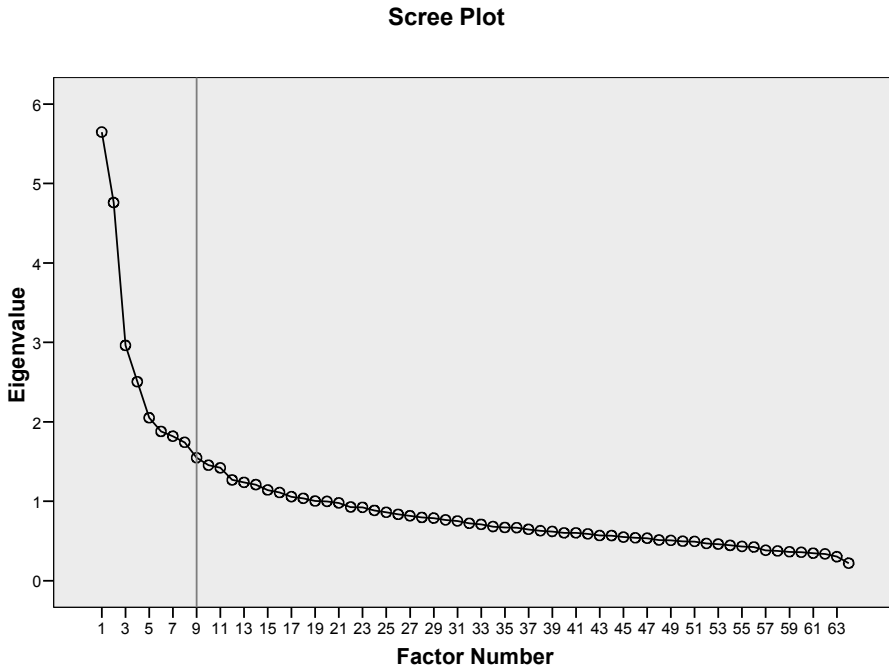
Tabachnick and Fidell (1989) say that one should prefer a higher number of factors to a lower number, because an extra factor might offer interesting results, but items within the factors should be tested for correlation, to make sure that the factors are reliable. Finally, in addition to all the statistical criteria, the interpretation of the chosen factor solution should make clinical or sociological sense (Kim and Mueller, 1978; Tabachnick & Fidell, 1989).

The differences between recidivists and non-recidivists were studied using independent sample t-tests. Logistic regression analysis was applied to find out which factors predicted violent recidivism. Linear regression analysis was used to test which factors predict severity of recidivism.

Results

Group description

The youths, all male, were aged 13-19 years at the start of treatment (mean = 16.3; sd = 1.4). Reasons for index conviction were non-violent property offenses (65.6%), violent offenses (93.9%, including homicide), sexual offenses (15.7%) and arson (4.4%). Most (97%) had committed more than one offense, with an individual maximum of 36 offenses during the overall criminal history prior to conviction.

Figure 1. Scree Plot

The mean IQ for the sample was 90 (range 48-140; $sd=15.81$). The juveniles had been subjected to a lot of risk factors. The mean scores on all items on the FPJ were above 0.5 (range: 0-2); mostly above 1, and on some items higher than 1.5. In 63% of the cases, drug use was either problematic (1) or very problematic (2). Although the prevalence of psychiatric disorders was lower than that of other risk factors, with all mean scores being lower than 1, nevertheless, it was much higher than in the general population (Verhulst et al., 1997). Most of the youths had conduct disorder (CD) ($n=648$, 60%).

Factor analysis

In our sample, we examined eight-factor, nine-factor and ten-factor solutions (see Table 2). For each factor, an interpretive label is suggested: *antisocial behavior, sexual problems, family problems, axis 1 psychopathology, offense characteristics, conscience and empathy, intellectual and social capacities, social network and substance abuse*. On interpretive grounds, a nine-factor solution was preferable to an eight-factor solution, because this allowed substance abuse as a separate factor.

To test the stability of the nine-factor solution, the sample was randomly split in half, and the analysis replicated. Results of the split half factor analysis are shown in Table 3a.

Nine factors are represented in the columns, each with the risk items that belong to that factor. The results show reasonable stability of this solution. Correlations between the factors, shown in Table 3b, are reasonably low, confirming the independence of the factors.

Table 2 Clinical interpretability, 8, 9 & 10 factor solution.

X Factor solution	8 factors	9 factors	10 factors
Label 1	Antisocial behavior	Antisocial behavior	Antisocial behavior
Label 2	Sexual problems	Sexual problems	Sexual problems
Label 3	Family background	Family background	Family background
Label 4	Substance abuse & psychopathology	Psychopathology	Psychopathology
Label 5	Offending behavior	Offending behavior	Offending behavior
Label 6	Conscience & empathy	Conscience & empathy	Conscience & empathy
Label 7	Social skills & cognitive skills	Social skills & cognitive skills	Social skills & cognitive skills
Label 8	Social network	Social network	Social network
Label 9		Substance abuse	Substance abuse
Label 10			Negative loading on social skills, intimate relationships and avoidant coping

Table 3a: Exploratory factor analysis, nine-factor solution

9-factor solution		9-factor solution, split half	
Factor 1 'antisocial behavior during treatment'			
Antisocial behavior in institution	.704	Antisocial behavior in institution	0.672
Negative coping	.669	Negative coping	0.599
Lack of cooperation with treatment	.640	Lack of cooperation with treatment	0.696
Incidents, aggression in institution	.551	Incidents, aggression in institution	0.434
Negative attitude in the institution	.540	Negative attitude in the institution	0.572
Treatment motivation	.536	Treatment motivation	0.692
Lack of commitment to school/work	.455	Lack of commitment to school/work	0.540
Lack of positive coping	.444	Lack of positive coping	0.502
Lack of contact, trust, openness	.346	Lack of contact, trust, openness	0.400
Factor 2 'sexual problems'			
Sexual problems	.858	Sexual problems	0.746
Sexual offending	.710	Sexual offending	0.605
Pedosexuality	.654	Pedosexuality	0.709
Past offense, Searching for a victim	.498	Past offense, Searching for a victim	0.478
Involvement in criminal environment (-)	-.415	Involvement in criminal environment (-)	-0.504
Sexual abuse	.387	Sexual abuse	0.351
Sadism	.338	Sadism	0.391
Autism spectrum disorder	.299	Autism spectrum disorder	0.468
Peer rejection	.283	Peer rejection	0.495
Truancy (-)	-.256	Truancy (-)	

9-factor solution		9-factor solution, split half	
Factor 3 'family'			
Witnessing violence in the family	.660	Witnessing violence in the family	0.643
Lack of consistency of parents/parental control	.622	Lack of consistency of parents/parental control	0.598
Substance abuse by parents	.577	Substance abuse by parents	0.563
Presence / accessibility parents	.521	Presence / accessibility parents	0.518
Problematic family situation	.439	Problematic family situation	0.43
Physical / emotional abuse	.437	Physical / emotional abuse	0.483
Criminal behavior of family	.427	Criminal behavior of family	0.367
Psychopathology in parents	.352	Psychopathology in parents	0.378
Factor 4 'axis 1 psychopathology'			
Psychotic symptoms	.660	Psychotic symptoms	0.764
Offense following psychosis/ medication stop	.547	Offense following psychosis/ medication stop	0.653
Depression (past year)	.312	Depression (past year)	0.264
Poor self care	.303		
Anxiety	.247	Anxiety	0.380
Factor 5 'offense history'			
High number of past offenses	.791	High number of past offenses	0.789
Violent criminal behavior	-.424	Young age at first conviction	-0.446
Young age at first conviction	.559	Violent criminal behavior	0.532
Factor 6 'conscience and empathy'			
Lack of empathy	.658	Lack of empathy	0.630
Lack of conscience	.602	Lack of conscience	0.568
Lack of problem apprehension/ comprehension	.453	Lack of problem apprehension/ comprehension	
Conduct disorder	.402	Conduct disorder	0.492
		Low impulse control	0.435
Factor 7 'intellectual and social skills'			
Low academic achievement	.487	Low academic achievement	0.506
Lack of social skills	.420	Lack of social skills	0.487
Suggestibility	.329	Suggestibility	0.328
Young age of onset of problem behavior	.313	Young age of onset of problem behavior	0.31
Low IQ	-.294	Low IQ	-0.339
ADHD	.286		
Previous contact with mental health care services	.273	Previous contact with mental health care services	0.284
		Lack of social activities	0.306
		Neurological problems	0.268
Factor 8 'social network'			
Network, low quantity	.496	Network, low quantity	-0.282
Network, lack of emotional support	.431	Network, lack of emotional support	-0.336
Lack of social activities	.336	Avoidant coping	-0.354
Factor 9 'substance use'			
Substance use preceding/during offense	.806	Substance use preceding/during offense	0.737
Drug abuse	.688	Drug abuse	0.687
Alcohol abuse	.604	Alcohol abuse	0.587

Note: only factor loadings > 0.24 are shown

Table 3b: Correlations between factors, nine-factor solution

	1	2	3	4	5	6	7	8	9
1	1								
2	-0.037	1							
3	0.078	-0.028	1						
4	0.062	0.247	0.112	1					
5	0.119	-0.043	0.06	-0.097	1				
6	0.275	-0.072	0.06	-0.044	0.075	1			
7	0.189	0.074	0.1	0.124	0.028	0.045	1		
8	0.144	-0.016	0.089	0.134	0.015	0.081	0.065	1	
9	0.165	-0.298	0.094	0.036	0.151	0.129	0.048	-0.033	1

Extraction Method: Principal Axis Factoring

Rotation Method: Oblimin with Kaiser Normalization

Finally, confirmatory factor analysis (CFA) was performed with the eight-, nine- and ten-factor solution in AMOS to test the robustness of the chosen solution. This showed that the nine-factor solution had the best (highest) indices of fit and the lowest root mean square error of approximation (RMSEA). This confirms the finding that the nine-factor solution is the best one. The RMSEA of the nine-factor solution was 0.059, which is good (≤ 0.060 ; Harris, Rice & Lalumière, 2001; Sullivan, 2006). The goodness of fit indices, however, although the best, were quite low (Bentler Bonnet Normed Fit index, Bollen Relative Fit index, Bentler Comparative Fit Index; .68-.73; a GFI of around .90 is considered to be adequate; Harris et al., 2001; Schafer et al., 2004; Sullivan, 2006). This can be explained by the fact that several single items within the nine factors, such as individual risk factors or error terms, are correlated. Inter-correlations often occur in psychological data, because behaviors do not stand alone, but interact with each other. Next, the modification indices were studied to decide which correlations between items should be included in the model. The goodness of fit increased after allowing correlations between errors, which were included in the model.

Recidivism

582 (79.9%) of the youths in this sample re-offended after leaving the institution. If we exclude misdemeanors, drug possession and vandalism (i.e. less serious recidivism), still 510 (70%) of the youths re-offended. 458 (63%) re-offended with a violent offense and 38 (5.2%) with a sexual offense. Very serious recidivism in categories 10 (manslaughter) to 12 (murder) occurred by 73 (10.0%) of these juveniles. The mean severity of recidivism was 4.8 (range 0-12, $sd=3.3$) and the mean number of offenses after treatment was 7.1 ($sd=9.8$). Mean time until first offense after release was nearly 16 months (15.93, range 0-97 months, $sd=19.07$).

Differences between re-offenders and non re-offenders

First one-sample t-test was used to determine the differences between the group of any re-offenders and the group that had no further offense in the study period. Differences were found on factors 2, 4, 5 and 6: *sexual problems* ($t=5.73$, $p=.000$), *axis 1 psychopathology* ($t=5.25$, $p=.000$), *offense history* ($t=-2.94$, $p=.003$) and *conscience/ empathy* ($t=-2.55$, $p=.011$). Re-offenders had higher scores on factors *offense history* and *conscience/empathy*. Youths with high *sexual problem* and *axis 1 psychopathology* scores before treatment were significantly less likely to re-offend.

Prediction of violent recidivism and severity of recidivism

Table 4 shows that the factors *antisocial behavior during treatment*, *sexual problems*, *family problems* and *axis 1 psychopathology* significantly predict violent recidivism, although explained variance is only 12.5%. The first two increased the risk, whereas psychopathology was a protective factor. The factor *sexual problems*, which is specific for sex offenders, was inversely related to violent recidivism. As sex offenders constituted a small group with exceptionally low recidivism rates for the sample, they were excluded from further analyses.

Table 4. Logistic regression analysis: predicting violent recidivism (incl. sex offenders); $n=718$.

Step	Variable entered	R ²	Wald	Df	P	Step 4 standardized β Coefficient
1	Antisocial behavior during treatment	.068	11,165	1	.001	.306
2	Sexual problems	.091	17,822	1	.000	-.426
2	Family problems	.113	6,959	1	.008	.245
4	Axis 1 psychopathology	.125	19,111	1	.000	-.486

Table 5 shows the results of the multiple linear regression analysis. The same factors, which were predictive of violent recidivism, are predictive for seriousness of the re-offending, and in the same direction, but, again, explained variance is low ($R^2=3.7\%$ without sex offenders).

Table 5. Linear regression analysis: predicting severity of recidivism (excl. sex offenders); $n=506$.

Step	Variable entered	R ²	ΔR^2	ΔF	Df	p	Step 4 standardized β Coefficient
1	Axis 1 psychopathology	.014	.014	6,999	505	.008	-.186
2	Family problems	.027	.013	7,107	503	.000	.095
3	Antisocial behavior during treatment	.037	.010	6,471	504	.001	.116

Discussion

This study has shed more light on recidivism among the most serious juvenile offenders in the Netherlands. These youths start offending at a young age, commit a lot of offenses and a high proportion of them are still on a criminal path after treatment. The risk for continuing criminal behavior into adulthood is high (Moffitt, 1993).

Having used both exploratory factor analysis and confirmatory factor analysis to search for the factor solution with the best fit, we found that the 70 risk items of the FPJ can best be described by nine meaningful factors. Four of these factors distinguished recidivists from non-recidivists, although the four included *sexual problems*, and this factor was exclusive to an unusual group within the sample. The only factor that was consistently associated with recidivism, regardless of type, was *axis 1 psychopathology*. Having that at the beginning of treatment was an indication of a positive outcome with respect to desistance from any kind of offending. *Offense history* and *conscience and empathy* were predictive of recidivism generally, but did not differentiate between groups when seeking predictors of violent or serious recidivism. With respect to both of the latter, *antisocial behavior during treatment* and *family problems* indicated an increased risk.

Thus, all of the factors associated with violent or serious recidivism consist solely of dynamic risk items. This is hopeful, because it should be easy to identify such problems during treatment and adjust the treatment and also the aftercare/supervision package accordingly. The items that are included in the *antisocial behavior during treatment* factor all have to do with treatment adherence and the therapeutic relationship. This result seems to be in line with recent findings that the therapeutic relationship is an important factor in reaching treatment effect (Marshall et al., 2003; Walker et al., 2004). Future research may confirm the importance of this factor in reducing recidivism, or evaluate the role of investment in well-qualified therapeutic staff in juvenile institutions, individual attention for each juvenile and new treatment programmes with emphasis on treatment motivation, such as Motivational Interviewing (Miller & Rollnick, 2002).

The importance for recidivism of family problems, such as parental skills, indicates that intervention should not only focus on the individual offender, but also on the family. Findings on this issue are in line with previous research that suggests that a multi-systemic approach works in the prevention of recidivism (e.g. Henggeler et al., 1996). The importance of family problems also makes good after care essential. If juvenile offenders return to an unchanged problematic environment, it is unlikely that any positive change will be sustained.

The inverse relationship between recidivism and *sexual problems* and *axis-I psychopathology* may require different explanations. It is likely that treatment, which includes specific remedies such as medication, works better for axis-I psychopathology than the other problems faced by these youths. The first question about the lower recidivism rate

associated with *sexual problems*, and therefore, essentially with index sex offending, is whether this is artificial – as sex offenders may be less likely to get caught than other types of offenders- or whether it is real. Sexual offending may be an extreme display of sexual experimental behavior in early adolescence, which naturally disappears in late adolescence. There is some evidence to suggest that sex offenses in juveniles are a different phenomenon from sex offenses in adults (Långström & Grann, 2000; Miner, 2002; Nisbet et al., 2004; Letourneau & Miner, 2005). Even in this serious offender group, sexual offending may indeed be limited to adolescence, and indicative of immature experimentation (Bullens et al., 2006).

This study has several limitations. Although the sample was large and the time at risk at least two years, risk factors were measured only once by service staff and then rated from records by research assistants. Repeated measures would give more accurate information about the change or stability in risk factors over time. The interpretability of the factor solution we found was good and the solution could be replicated after split half analysis and with CFA, but the goodness of fit was not very high because of inter-correlation of items. Furthermore, the regression model explained very little of the variance (4-6% excluding sex offenders). The finding that suggests that risk factors for the most serious juvenile offenders differ from those of less serious offenders is not wholly new (Loeber et al., 2008). The fact that we found considerably lower rates of recidivism in sex offenders may indicate that serious juvenile offenders can be classified into several subgroups. These subgroups may differ not only in recidivism rates, but also in risk factors that predict the recidivism in each individual subgroup. The findings should, however, be regarded as preliminary.

Conclusion

In this study we found a nine-factor solution that is useful in understanding recidivism in serious juvenile offenders, but one that must be treated with caution as the explained variance of the regression model is low. Further research might seek to replicate the findings in a larger sample or to test whether recidivism can be reduced if these factors are targeted during intervention.

Recidivism in subgroups of serious juvenile offenders: different profiles, different risks?

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Abstract

In a sample of serious juvenile offenders four subgroups were identified: 1) serious violent offenders, 2) violent property offenders, 3) property offenders, and 4) sex offenders. Violent property offenders are the most serious group, in the number and variety of offenses and in the amount of risk factors. Serious violent offenders and property offenders distinguish themselves by characteristics of overt and covert behavior respectively. Sex offenders are different from the other three groups, in risk profile as well as in recidivism pattern. For each of these four subgroups a different set of risk factors was found to predict severity of recidivism. Treatment should be aimed at *different* risk factors for each subgroup.

Introduction

Research on juvenile offending has mainly concentrated on finding risk factors for the onset and persistence of offending (e.g. Ang & Huan, 2008; Silver & Chow-Martin, 2002; Vermeiren, De Clippele, Schwab-Stone, Ruchkin & Deboutte, 2002; Cottle, Lee & Heilbrun, 2001; Heilbrun, Witte, Keeney, Brock, Westendorf, Waite, Lanier, Buinavert, Schmid & Shumate, 2000; Loeber, & Farrington, 2000; Kelley, Loeber, Keenan & DeLamatre, 1997). Extensive knowledge about risk factors that precede or cause further offending is important. If risk factors can be detected that cause or facilitate recidivism, we know which risk factors should be targeted during intervention. The more serious the offending behavior, the more we have to gain. Evidently: if we manage to reduce either the number of offenses or severity of offending, damage to society will be reduced. Previous research has shown that treatment effect is highest if intensive intervention is selectively assigned to offenders with the highest risk profile, focusing on criminogenic treatment targets, using proven interventions and treatment strategies, with good implementation and follow-up (Borum, 2003). Cognitive behavioral techniques and multi systemic treatment have shown to render the best results in treatment of serious juvenile offenders (Fanniff & Becker, 2006; Reitzel & Carbonell, 2006; Walker, McGovern, Poey & Otis, 2004; Illescas, Sanchez-Meca & Genoves, 2001).

However, the question rises if juvenile offenders should be treated as one homogeneous group, or if they actually consist of subgroups with different risk factors that predict further offending. A theory on the development of criminal behavior and differences between groups of offenders that should be mentioned here, are the developmental trajectories as suggested by Loeber and Hay (1994). These authors distinguish three developmental trajectories: the authority conflict pathway, a pathway of covert problem behavior and a pathway of overt problem behavior. The first pathway is characterized with authority problems and truancy. The covert pathway starts out with lying going over into stealing and breaking and entering. The overt pathway starts out with bullying and fighting and ends up with serious externalizing criminal behavior, such as assault. Thus, the nature of criminal behavior in each trajectory differs from the other. The further on a pathway one gets, the more serious the behavior; the earlier one starts, the higher one usually gets. Juveniles may proceed along one or more of these developmental pathways and the more pathways they take, the faster they proceed and the more serious the behavior finally gets (Kelley, Loeber, Keenan & DeLamatre, 1997). Aggressive boys were particularly at risk of committing covert acts as well, while boys engaging in covert acts were less likely to develop aggressive behaviors. Escalation in either the overt or the covert pathway was often preceded by boys' escalation in the authority conflict pathway (Loeber, Farrington, Stouthamer Loeber & White, 2008). Sex offenders are not specified in the pathway model.

There have been several studies on subgroups of serious offenders, such as violent offenders or sex offenders. However, few studies have compared more than two subgroups of serious juvenile offenders. Previous research has shown that there might be differences in recidivism between subgroups of serious offenders. For instance, the rates for sexual recidivism appear to be lower than for general recidivism, both in juvenile sex offenders and in other types of juvenile offenders (Prentky, Harris, Frizzell & Righthand, 2000; Nisbet, Wilson & Smallbone, 2004; Waite, Keller, McGarvey, Wieckowski, Pinkerton, Brown, 2005). Several general criminological factors play a role in sexual recidivism: early onset of offending, total number of prior offenses (both sex offenses and other types of offenses) and antisocial life style. Dynamic risk factors that are related to sexual re-offending are treatment adherence, problem insight, general psychological problems and failure to complete treatment (Kenny, Keogh & Seidler, 2001; Worling, 2001; Hendriks & Bijleveld, 2008). On the other hand, as the likelihood for juvenile sex offenders to be rearrested for a nonsexual offense is six times larger than for a sexual offense, one can wonder whether juvenile sex offenders should be considered as a distinct subgroup (Caldwell, 2002). Results of previous research suggest that there are differences in risk patterns between adult and juvenile sex offenders (Caldwell, 2002). However, researchers also found risk factors that appear to be specifically predictive for sexual recidivism in juveniles. Sexual deviance for instance, was significant in the prediction of recidivism in sex offenders but not in other types of offenders. Other risk factors that are specific for sexual recidivism are poor social skills, prior sexual offenses, victimized strangers, having had a younger victim, having more than one victim and having committed diverse sexual crimes (Worling & Curwen, 2000; Långström & Grann, 2000; Miner, 2002). Researchers also found differences between sex offenders and non-sex offenders on personality characteristics, problem behavior, history of sexual abuse, nonsexual offending and peer functioning. Inconsistent results were found on demographic factors, family functioning, background, antisocial attitudes, intellectual and neurological functioning (Van Wijk, Vermeiren, Loeber, 't Hart-Kerkhoffs, Doreleijers & Bullens, 2006).

Another subgroup that has been thoroughly studied in the past is the group of violent offenders. In previous research various risk factors for persistent violent offending were found; that is, a history of violence involvement and violence victimization, weapon carrying, school problems, health problems, and friend suicide (Loeber, Kalb & Huizinga, 2001; Resnick, Ireland & Borowsky, 2004). Compared to those who desist from further violent behavior, aggressive juvenile offenders with their behavior transitioning to adulthood have committed more aggressive acts, committed more property crimes, behaved more aggressively and acted more negatively towards peers. On the other hand, violent juvenile offenders that desist from further violent behavior have greater emotional support as young adults, higher job satisfaction, closer peer relationships and fewer psychiatric problems (Clingempeel & Henggeler, 2003). PCL-R psychopathy is a

strong predictor among adult violent offenders, but may be a less valid predictor for violent criminal recidivism among severe juvenile offenders (Långström & Grann, 2002). Previous studies showed mixed results for the relationship between substance use and violent offending (Vreugdenhil, van den Brink, Wouters & Doreleijers, 2003; Resnick, Ireland & Borowsky, 2004). Low family acceptance and low academic achievement predict both violent and property offending. High peer popularity predicts mainly violent offending (Vermeiren & Bogaerts, 2004). Piquero (2000) found that involvement in violent offending is primarily a function of increasing offense frequency.

As stated above, although distinct subgroups of offenders have been studied in previous research, until now little research has been done on comparing more than two subgroups of serious juvenile offenders and/or comparing their risk profiles. The aim of this study was to find an optimal classification of serious juvenile offenders in subgroups on the basis of their past criminal behavior. Latent Class Analysis (Francis, Soothill & Fligelstone, 2004; Hageaars & McCutcheon, 2002; Magidson & Vermunt, 2004) was used to identify subgroups of serious juvenile offenders. We hypothesize that serious juvenile offenders are a heterogeneous group, consisting of several clearly distinct subgroups. We expect to find differences between subgroups of offenders on the basis of their criminal careers, as suggested by Loeber and Hay's model. If we indeed find subgroups of offenders based on the type of offense committed, we will compare recidivism rates and risk factors that predict recidivism in each subgroup. Because we are interested not only in reducing recidivism, but also in reducing severity of recidivism (*harm reduction*; Marshall, & McGuire, 2003) our outcome variable is severity of recidivism. We expect to find that the subgroups differ in recidivism rates and risk factors that predict severity of recidivism, with severity operationalized as the amount of harm, the type of offense and the maximum penalty.

Methods

Subjects

Subjects in this study were male juvenile offenders aged 12–22 years, sentenced to placement in a Dutch juvenile institution for mandatory treatment (a so called PIJ order) between 1995 and 2004 ($n=1154$). The mandatory treatment order is the most severe sanction for juveniles (aged 12–18) in the Netherlands and this subgroup represents the top 5% most serious offenders. For Latent Class Analysis 1111 juveniles could be included in the analyses (the offense data of 43 juveniles could not be used for various reasons, for example administrative reasons, non availability of the data, or due to the death of the subject). The criminal records of the subjects were collected in June 2008. These records were used to register recidivism. For analyses on recidivism, only subjects

with a minimum time between release and measurement of recidivism (Time at Risk) of 2 years were included ($n=728$; range: 2.0-11.17, mean= 5.83, $sd=2.39$). Treatment under a PIJ-order can last from two up to six years. Half of the juvenile delinquents under a PIJ-order in our study had been released from treatment after two years. After three years, 60% had been released, after four years 85% of the subjects, and after six years all juvenile offenders had left the juvenile institution. The mean age at release was 20 years ($sd=1.63$), and the mean age at the date of registration of the total amount of recidivism (July 2008) was 24 years ($sd=1.25$).

Instrument

Juvenile Forensic Profile (FPJ)

In this study we used a list of 70 risk factors as assessed with the Juvenile Forensic Profile (FPJ, Brand & Van Heerde, 2004), which was especially developed for forensic research based on file data. This instrument has been based on existing internationally and nationally validated instruments for risk assessment and on instruments for measuring problem behavior (e.g. Child Behavior Check List, Structured Assessment of Violence Risk in Youth, Psychopathy Check List: Youth Version, Juvenile-Sex Offender Assessment Protocol, HCR-20 Violence Risk Assessment Scheme and the Forensic Profiles-40). Risk factors were scored on a three-point scale with increasing level of risk (0 = no problems, 1 = problematic and 2 = very problematic). Previous research on the FPJ-list showed that the available file information was thorough and sufficient to score the instrument (Van 't Hoff, Brand, Van Parijs & Van Heerde, 2002). The interrater-reliability was tested (double scoring of 80 files, $r=0.73$; $K=0.61$) and a high convergent validity of the FPJ-list with the SAVRY was found (Van Heerde, Brand, Van 't Hoff & Mulder, 2004). The predictive validity of the instrument was tested in the first sample of 102 boys (AUC of .803 with a sum score of nine risk factors, see Brand, 2005a). In sum, the psychometric qualities of the instrument were found to be satisfactory (Van Heerde & Mulder, 2005, Brand, 2005a; Brand, 2005b). All files were scored by trained students (in psychology or criminology) in their last year before graduation. The students all received three weeks of training before reading and scoring the files that were included in the study.

Classification of offending behavior

Official Judicial Offense Registration in the Netherlands supplied the offense data of the juvenile offenders. The data contained the details on all court appearances, the date and type of offense, and the date of conviction or acquittal. Offending behavior was operationalized by classifying the severity of the offenses into twelve types on the basis of increasing severity. In previous research professionals in law and mental health care judged this classification as useful (Van Kordelaar, 2002). Table 1 shows the definition of

the 12 types of offenses with increasing severity, as well as indicates which percentage of the juveniles in the sample committed each of the type of offenses before treatment. In the last column, percentages are over 100% because most serious juvenile offenders are generalists and commit more than one type of offense. All convictions dated *after* release from the juvenile institution were counted as recidivism. Recidivism was operationalized in three ways. First, we differentiated between non-recidivism and recidivism. Second we differentiated between non-violent and violent recidivism. And finally we used the severity index as described in Table 1.

Table 1: Operationalization of offending before treatment; n=728

12 Categories	Valid percent Per type of offense
0=No conviction	0
1=Misdemeanour	31.5
2=Drug offense	4.3
3=Vandalism (property)	25.1
4=Property offense	79.8
5=Moderate violent offense/ assault	64.8
6=Violent property offense	55.4
7=Serious violent offense/ serious assault	23.6
8=Sex offense, same age	15.5
9=Pedosexual offense	8.1
10=Manslaughter	11.7
11=Arson	3.8
12=Murder	3.7

Statistics

Most statistics were calculated with SPSS 15.0 (Statistical Packages for the Social Sciences 15.0 for Windows, 2007). The prevalence of different risk factors is presented using descriptive statistics. Subgroups of offenders were found using Latent Class Analysis (LCA), which was performed with Latent GOLD 4.0 (Vermunt & Magidson, 2005). LCA can be used for clustering cases (offenders) into homogeneous subgroups and has some notable advantages over other clustering techniques (Francis, Soothill & Fligelstone, 2004; Hagenaaars & MCutcheon, 2002; Magidson & Vermunt, 2004). An important difference with traditional clustering techniques such as K-means-clustering, is that LCA is a statistical model, which means that more formal tests are available for deciding about the number of clusters. Other differences are that it can be used with variables of any measurement level and that no decisions about the scaling of the variables need to be made. The outcome of a LCA is probabilistic classification of every case to the identified subgroups, which can be turned into a deterministic classification by assigning cases to the most likely cluster (Vermunt & Magidson, 2002). The subgroups identified with LCA were compared regarding their scores on the 70 risk factors that were registered

with the FPJ-list by using non-parametric Kruskal-Wallis test and Mann-Whitney test. Differences between subgroups in recidivism patterns were analyzed with ANOVA. The correlation of risk factors with severity of recidivism was tested with Spearman's correlation and multiple linear regression analysis was used to analyze prediction of severity of recidivism. Missing Values Analysis was performed to check the influence of missing values on the outcome of regression analysis, which showed that missing values did not significantly influence the outcome. Bonferroni correction was applied to correct for multiple testing.

Results

Latent Class Analysis

The input for the LCA consisted of thirteen categorical variables. The first variable was the number of offenses committed in the past classified into 3 categories (0 = 1-3 convictions; 1 = 4-7 convictions; 2 = 8 or more convictions). The other ones correspond to the twelve types of offenses shown in Table 1; that is, for each type of offense a subject got the score of 0 (no offense in the category) or 1 (one or more offenses in the category). Using these thirteen variables, we estimated models with 1 to 10 latent classes and evaluated the quality of these solutions using the Bayesian Information Criterion (BIC), which is the most used model selection measure in LCA. BIC is a measure weighting model fit (log-likelihood value) and model complexity (number of parameters) where the model with the lowest BIC value is the one that should be preferred. BIC selects the model with four clusters as the best solution. We also looked at other fit measures (likelihood-ratio tests, AIC, and AIC3), each of which pointed at a model with more than four clusters. The simpler four-cluster solution was chosen because of the better fit according to the BIC-value and clinical interpretability.

The four subgroups of offenders that were identified with LCA were given an interpretative label on the basis of their differences in the thirteen variables used to build the clustering. This resulted in the following labeling:

Cluster 1 consists of juvenile offenders that commit (serious) violent offenses and commit these offenses with a low frequency ($n = 114$). Serious offenses are for instance serious assault, but also (with a much lower frequency) manslaughter, arson and murder.

Cluster 2 are high frequent offenders that combine violent and property offenses ($n = 334$). The type of offenses in this subgroup are mainly assault and robbery and, to a lesser extent, theft.

Cluster 3 consists of those juveniles that commit mainly property offenses with a high frequency ($n = 214$). Property offenders commit mainly theft and breaking and entering.

Finally, cluster 4 are mainly sex offenders ($n = 66$).

The time at risk was at least two years for all subgroups and the mean was 5 to 6 years in all subgroups. Time of follow up was not significantly different between the four classes of offenders.

Table 2. Risk factors in the Forensic Profile for Juvenile offenders (FPJ).

Risk factors	K-W Chi-square (p)	1: Serious violent offenders M (sd)	2: Violent property offenders M (sd)	3: Property offenders M (sd)	4: Sex offenders M (sd)
Parenting skills	8.30 (.040)	1.36 (.62)	1.46 (.60)⁴	1.43 (.61)⁴	1.22 (.68)
Criminal behavior in the family	18.39 (.000)	0.44 (.76)⁴	0.78 (.89)¹⁴	.72 (.88)¹⁴	.38 (.71)
Involvement with criminal peers	159.55 (.000)	0.74 (.73)⁴	1.42 (.60)¹⁴	1.33 (.63)¹⁴	.33 (.54)
Previous contact with mental health services	15.66 (.001)	1.50 (.71)	1.74 (.57)¹⁴	1.63 (.66)¹⁴	1.53 (.75)
Authority problems	51.85 (.000)	1.22 (.82)⁴	1.39 (.74)⁴	1.39 (.79)⁴	.59 (.79)
Truancy	76.39 (.000)	1.21 (.86)⁴	1.45 (.76)¹⁴	1.48 (.74)¹⁴	.52 (.71)
Having an unknown victim	16.36 (.001)	0.97 (.66)	0.80 (.62)¹⁴	.74 (.51)¹⁴	1.00 (.47)
Substance abuse during/ preceding the offense	41.44 (.000)	0.41 (.54)⁴	0.62 (.68)⁴	.51 (.71)⁴	.05 (.22)
Alcohol abuse	27.40 (.000)	0.40 (.62)⁴	0.52 (.67)³⁴	.32 (.54)⁴	.14 (.43)
Drug abuse	76.00 (.000)	0.83 (.86)⁴	1.21 (.79)¹⁴	1.14 (.80)⁴	.25 (.59)
Conduct disorder	81.35 (.000)	1.29 (.74)⁴	1.62 (.60)⁴	1.56 (.67)¹⁴	.71 (.86)
Lack of conscience	12.26 (.007)	1.39 (.53)	1.58 (.51)¹⁴	1.53 (.51)	1.45 (.53)
Low impulse control	13.12 (.004)	1.56 (.64)⁴	1.48 (.67)⁴	1.38 (.68)⁴	1.20 (.80)
Problem insight	12.60 (.006)	1.41 (.59)	1.57 (.55)¹⁴	1.52 (.54)	1.69 (.47)
Antisocial behavior in the institution	10.63 (.014)	.58 (.62)	0.75 (.67)⁴	.76 (.64)⁴	.57 (.64)
Escape, absconding	34.60 (.000)	0.32 (.66)⁴	0.62 (.78)¹⁴	.50 (.73)⁴	.15 (.44)
Anxiety disorder	15.66 (.001)	0.37 (.63)³	.19 (.41)	.14 (.37)	0.31 (.61)²³
Autism spectrum disorder	49.64 (.000)	0.25 (.61)²³	.14 (.49)	.10 (.40)	0.60 (.84)¹²³
Sadism	30.42 (.000)	0.13 (.41)³	.05 (.22)	.08 (.29)	0.37 (.70)²³
Searching for a victim, planning	153.90 (.000)	.04 (.27)	.03 (.22)	.00 (.00)	0.64 (.91)¹²³
History of sexual abuse	50.58 (.000)	.24 (.63)	.17 (.51)	.12 (.44)	0.68 (.86)¹²³
Sexual problems	233.31 (.000)	.37 (.61)	.29 (.62)	.16 (.49)	1.82 (.49)¹²³
Pedosexuality	322.31 (.000)	.05 (.29)	.02 (.19)	.02 (.18)	1.20 (.96)¹²³
Intelligence/ IQ	12.35 (.006)	93.67 (16.27)	89.87 (15.17)	92.45 (15.41)	85.17 (17.96)¹²³
Low academic achievement	11.27 (.010)	.56 (.77)	.68 (.71)	.64 (.77)	0.92 (.79)¹²³
Neurological problems	12.49 (.006)	.24 (.47)	.27 (.52)	.20 (.46)	0.44 (.59)¹²³
Peer rejection	20.76 (.000)	.69 (.81)	.51 (.70)	.50 (.69)	0.98 (.87)¹²³
Lack of intimate relationships	16.94 (.001)	.84 (.76)	.91 (.78)	.94 (.77)	1.32 (.71)¹²³
Lack of social skills	23.70 (.000)	.78 (.73)	.75 (.67)	.74 (.68)	1.20 (.68)¹²³
Avoidant coping style	8.16 (.043)	.72 (.77)	.71 (.67)	.79 (.71)	0.97 (.68)¹²³

¹²³⁴ = significant differences with one or more of the four other cluster, $p \leq .0083$ (Bonferroni correction)

Risk profile of four subgroups of offenders

Next, the scores of the four subgroups on the 70 risk factors were compared. The results of the Kruskal-Wallis test show that the subgroups differ on several risk factors. These risk factors, together with the mean scores and standard deviation are shown in Table 2. The high frequent violent property offenders (cluster 2) appear to be the most problematic subgroup, as they score higher on risk factors than the other subgroups. They score highest on alcohol abuse, lack of conscience and of problem insight. They also score high on conduct disorder, low impulse control, alcohol and drugs abuse (also during the offense), involvement with criminal peers, criminal behavior in the family, lack of parenting skills, authority problems, truancy, antisocial behavior in the institution and escape from the treatment facility. Property offenders score higher than the two other subgroups on these risk factors as well. Serious violent offenders still score higher than sex offenders on some of the same variables on which property offenders and violent and property offenders distinguish themselves. They differentiate themselves from property and violent/property offenders by a higher score on anxiety disorder, autism spectrum disorder and sadism. Sex offenders also score high on these risk factors. Finally, sex offenders appear to be quite different from the other three groups. They score significantly higher on several risk factors that have to do with problems in interpersonal relationships, poor cognitive abilities and sexual problems.

Recidivism in four subgroups of offenders

Differences between subgroups were analyzed with ANOVA. The results are shown in Table 3. Sex offenders score lowest on both overall recidivism and on violent recidivism. They also have the lowest severity of recidivism. Serious violent offenders score significantly lower than the remaining two subgroups on overall recidivism and severity of recidivism. They score significantly lower on violent recidivism than violent property offenders, but on this variable they do not differ significantly from property offenders. Violent property offenders and property offenders both score high on all variables, but do not significantly differ from each other on recidivism. Property offenders scored lowest on severity before treatment, but commit significantly more serious offenses than sex offenders and serious violent offenders after treatment.

Table 3. Differences in recidivism and severity between subgroups

Subgroup	Recidivism	Violent recidivism	Sexual recidivism	Severity of past offenses	Severity of recidivism
1: Serious violent	69% ²³⁴	50% ²⁴	6%	8.75 ²³	3.78 ²³⁴
2: Violent and property	89% ¹⁴	74% ¹⁴	6%	7.06 ¹³⁴	5.59 ¹⁴
3: Property	82% ¹⁴	64% ⁴	5%	6.11 ¹²⁴	4.87 ¹⁴
4: Sex offenders	47% ¹²³	27% ¹²³	3%	8.71 ²³	2.05 ¹²³

¹²³⁴ = significant differences with other cluster, $p \leq .05$ (Bonferroni correction)

Predicting severity of recidivism in four subgroups of offenders

Finally, we used nonparametric correlation and multiple linear regression analysis, to find out which risk factors significantly predict severity of recidivism in the four subgroups of offenders. The variables that significantly correlated with severity of recidivism in each subgroup were used as input for multiple linear regression analysis.

Table 4 shows the results of the (stepwise) linear regression analysis per subgroup. Each subgroup turned out to have a *different* set of risk factors to predict severity of recidivism.

For serious violent offenders, having witnessed domestic violence and the presence of a conduct disorder predict the severity of recidivism. Lack of treatment compliance, a negative (aggressive) coping style, a high number of offenses in the past, being neglected by the parents and having a large but antisocial network predict severity of recidivism in violent property offenders. For property offenders a history of physical abuse, having an unknown victim in past offenses, lack of treatment motivation, the absence of an anxiety disorder and feelings of hostility predict severity of recidivism. Finally, in sex offenders those juveniles that did not have an autism spectrum disorder and were involved in incidents in the treatment facility were found to score higher on severity of recidivism. It might be that these juveniles represent the more antisocial juveniles among sex offenders that generalize in their offending behavior and are bound to commit new offenses.

Table 4. Stepwise linear regression analysis: predicting severity of recidivism.

Step	Variable entered	R ²	ΔR ²	P	Final step standardized β Coefficient
Subgroup 1 Serious violent offenders					
1	Conduct disorder	.113	.113	,000	,329
2	Witnessing domestic violence	.171	.058	,006	,285
Subgroup 2 Violent property offenders					
1	Treatment compliance (medication adherence)	.027	.027	,001	-,182
2	Defective social network	.048	.021	,003	-,160
3	Negative coping	.066	.018	,016	,131
4	Number of offenses in the past	.082	.016	,018	,125
5	Neglect	.094	.008	,034	,113
Subgroup 3 Property offenders					
1	Feelings of hostility	.048	.048	,000	-,229
2	Physical abuse	.080	.032	,003	,195
3	Having an unknown victim in the past	.102	.018	,012	-,163
4	Anxiety disorder	.127	.025	,025	-,146
5	Lack of treatment motivation	.146	.019	,029	,142
Subgroup 4 sex offenders					
1	Incidents/aggression during treatment	.141	.141	,003	,353
2	Autism spectrum disorder	.199	.058	,037	-,242

Discussion

The aim of this study was to find out whether serious juvenile offenders can be subdivided into distinct subgroups on the basis of the offending behavior. We were able to distinguish four different subgroups with Latent Class Analysis. The largest group consists of those juveniles that combine violent offenses and property offenses and do so with a high frequency. Further we distinguished high frequent property offenders, low frequent serious violent offenders and sex offenders. In previous studies violent offenders and sex offenders have already been studied as a subgroup. What is new is that in this study we were able to compare different subgroups on their risk profile, rate of recidivism and risk factors that predict recidivism. Further, our study resulted in statistical evidence for the existence of distinct subgroups of serious offenders instead of merely clinical and theoretical considerations.

A closer look at these subgroups shows that each group has its own different risk profile. The results are in line with the developmental trajectories as suggested by Loeber and Hay (1994) as described in the introduction. The subgroups we find in this study fit the developmental trajectories: property offenders fit the covert pathway, serious violent offenders fit the overt pathway and violent property offenders fit a combination of these two. The fact that all three groups score significantly higher as compared to sex offenders on truancy and school dropout as well as having authority problems suggests that they probably followed the authority conflict pathway as well. This is in line with the theory of Loeber et al., as described above.

This study not only confirms the results of Loeber et al., it also provides extra support for the developmental pathways, in that the present study shows that the groups have distinct risk profiles. The three groups do have several characteristics in common, but the violent property offenders, who proceed along two pathways at the same time, are the most disadvantageous group. They are characterized by overt problem behavior (low impulse control, conduct disorder), authority conflict, family problems and antisocial peers. Property offenders distinguish themselves from the serious violent offenders and violent property offenders by having one or more unknown victims in past offenses. Serious violent offenders are characterized by risk factors that fit overt problem behavior: conduct disorder, low impulse control, substance abuse and authority problems. Sex offenders are quite different from the other three groups. They are characterized by social problems and psychopathology (peer rejection, lack of social skills, an autism spectrum disorder), low intelligence and low academic achievement and sexual problems (history of sexual abuse and for a small number of sexual delinquents also sadism).

The findings further showed that the four subgroups also differ regarding recidivism rates and regarding risk factors that predict recidivism. Serious violent offenders and sex offenders commit the most serious offenses before treatment, but after treatment

they show the largest reduction in general recidivism, in violent offending as well as in severity of offending. Although violent property offenders do not show significantly higher recidivism rates than property offenders, they are the most serious group of the four. The fact that violent property offenders and property offenders are also the most serious groups *after* treatment might point to the fact that treatment as it is, is less effective for these two subgroups. An alternative explanation might be that these most serious subgroups are also more resistant to therapy, because of the fact that they may be more psychopathic in nature. Psychopathy was not measured in this study, but we found that violent property offenders and property offenders score higher on lack of conscience and problem insight, which can be considered as a proxy for psychopathy. Thus, in violent property offenders and property offenders we have a lot to gain, when more effective treatment modules for these specific subgroups become available. Sex offenders show the lowest recidivism rates of all four subgroups. This is in line with findings of previous research that for most juvenile sex offenders goes that their behavior appears to be adolescence-limited instead of their behavior being a precursor of adult sex offending (Van Wijk, Mali, Bullens & Vermeiren, 2007; Caldwell, 2002).

Risk factors that predict severity of recidivism are different for each subgroup and are again in line with Loeber and Hay's developmental trajectories. The presence of a conduct disorder (overt problem behavior) predicts severity of offending in serious violent offenders, the subgroup that appears to have followed the overt pathway. Further, having witnessed violence as a child predicts violent recidivism in early adulthood. In violent property offenders, the most problematic group, severity of offending can be predicted by overt, externalizing behavior (negative coping style, lack of treatment compliance), family problems (neglect), previous offending behavior (high number of past offenses) and problems in the social network. Severity of offending in the subgroup of property offenders can best be predicted by several risk factors that are characteristic for covert problem behavior: not being acquainted to victims in past offenses and reporting feelings of hostility. The diagnosis of an anxiety disorder at start of treatment protects against severe recidivism. This might be explained by the symptoms of anxiety (e.g. avoidance of social activities and public situations) being contradictory with, and therefore protective of, offending behavior. The same might be true for autism spectrum disorder in sex offenders, which was highly prevalent in this subgroup but negatively related to severity of recidivism. Chances are that autism spectrum disorder was not diagnosed until after conviction to the mandatory treatment order and no treatment was applied earlier. Those juvenile offenders that have been diagnosed correctly at start of treatment might have benefited from treatment and therefore showed less severe recidivism. However, this possibility should be looked into further.

This study has several limitations. Risk factors were measured only once and on the basis of file information. Although the information in the files was substantial, still some

information might have gotten lost while repeated measures would have given more accurate information. Important strengths of this study are the long follow up time, the very large sample and the large number of data on both offending behavior and risk factors, which were derived with a psychometrically good instrument.

This study has rendered some knowledge about distinct subgroups of serious juvenile offenders, with each subgroup having its own risk profile and its own recidivism pattern. This will have, of course, implications for treatment. Different treatment modalities should be applied in each subgroup, focusing on the specific risk factors that predict severity of offending, such as family factors and treatment adherence.

Conclusion

In this study we succeeded not only in demonstrating four subgroups of juvenile offenders, but we also found differences in recidivism rates, as well as different risk profiles for each subgroup. These results are important and have considerable implications for treatment: the results indicate that treatment should aim at different risk factors, depending on the subgroups one belongs to. In future research attention should be paid to the application of subgroups in clinical practice. Questions such as 'how do we decide to which subgroup a juvenile offender belongs?' should be addressed, and treatment modalities should be tested for their effect on reduction of recidivism and on reduction of severity of recidivism in different subgroups (*harm reduction*; Marshall & McGuire, 2003).

Towards an optimal classification of juvenile offenders: subgroups of serious juvenile offenders and severity of recidivism

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Abstract

The aim of this study was to identify subgroups of serious juvenile offenders on the basis of their risk profiles, using a data-driven approach. The sample consists of 1179 of the top 5% most serious juvenile offenders in the Netherlands. A part of the sample, 728 juvenile offenders with a time at risk of at least two years, were included in analyses on recidivism and the prediction of recidivism. Six subgroups of serious juvenile offenders were identified with cluster analysis on the basis of their scores on seventy static and dynamic risk factors: cluster 1) antisocial identity, 2) frequent offenders, 3) flat profile, 4) sexual problems and weak social identity, 5) sexual problems, and 6) problematic family background. Clusters 4 and 5 are the most serious offenders before treatment, committing mainly sex offenses. However, they have significantly lower rates of recidivism than the other four groups. For each of the six clusters a unique set of risk factors was found to predict severity of recidivism. The results suggest that intervention should aim at *different* risk factors for each subgroup.

Introduction

Serious juvenile offenders are a great burden on society and are therefore an important target for intervention. The aim of intervention is to keep these serious offenders from continuing their careers into adulthood, with their behavior getting a *life course-persistent* character (Moffitt, Caspi, Harrington & Milne, 2002). In previous research we found several static and dynamic risk factors that are associated with recidivism and severity of recidivism in a large sample of the top 5% most serious juvenile offenders in the Netherlands (n= 728; this thesis). The results showed that antisocial behavior during treatment, lack of problem solving strategies, family problems (lack of parenting skills, criminal behavior in the family) and offense history (number of convictions, having one/ more unknown victims of past offenses) predict recidivism (this thesis). These findings are in line with international studies on serious juvenile delinquency in which the following risk factors for persistence of offending were found: early age of onset, violent behavior in the past, genetic disposition, conduct disorder, ADHD (Loeber & Farrington, 2001; Cottle, Lee & Heilbrun, 2001; Clingempeel & Henggeler, 2003; Vermeiren, 2003), psychopathic personality features (Booker Loper, Hoffschmidt & Ash, 2001; Johnson, Listwan, Van Voorhis & Ritchey, 2007), neurocognitive problems, temperament and behavior problems, inadequate parenting (Moffitt & Caspi, 2001; Raine, Moffitt, Caspi, Loeber, Stouthamer-Loeber & Lynam, 2005), low family acceptance and low academic achievement (Vermeiren, Bogaerts, Ruchkin, Deboutte & Schwab-Stone, 2004), living in a bad neighborhood (Oberwittler, 2004) and substance abuse (Dawkins, 1997; Potter & Jensen, 2003).

According to the *What Works principles*, effective interventions should aim at the needs of juvenile offenders (*needs principle*) and treatment intensity should depend on the level of risk (*risk principle*) (Andrews & Bonta, 1995). If we know which risk factors predict recidivism and especially severity of recidivism we know which risk factors should be targeted in the first place during treatment. However, the question is a) Should we consider very serious juvenile offenders as one homogeneous group and offer the same intervention to all serious juvenile offenders? And b) Are risk factors for recidivism equal for the whole group? And if not: Do serious juvenile offenders actually consist of distinct subgroups with differences in risk profiles and hence different treatment needs?

Theory on the development of criminal behavior suggests that different pathways exist towards serious juvenile offending, each with its own characteristics (Loeber, Farrington, Stouthamer-Loeber & Raskin White, 2008). Moffitt et al. (2002) also identified different types of offending behavior in juveniles, with different prognoses for adulthood. These theories suggest that different types of serious juvenile offenders can be identified. The results of previous research support this notion: for instance, rates of recidivism differ between subgroups of offenders. In previous research, lower rates for sexual recidivism

were found than for non-sexual recidivism, both in juvenile sex offenders and in other types of juvenile offenders (Prentky, Harris, Frizzell & Righthand, 2000; Caldwell, 2002; Nisbet, Wilson & Smallbone, 2004; Waite, Keller, McGarvey, Wieckowski, Pinkerton & Brown, 2005). Several studies found risk factors specific for recidivism in subgroups of offenders. For instance, in young sex offenders poor social skills, sexual deviancy, prior sexual offenses, victimized strangers, having had a younger victim, more than one victim and diverse sexual crimes (Worling & Curwen, 2000; Långström & Grann, 2000; Miner, 2002). Several general criminological factors also play a role in sexual recidivism: early onset of offending, total number of prior offenses (both sex offenses and other types of offenses) and an antisocial life style. Dynamic risk factors that are related to sexual re-offending are treatment adherence, problem insight, general psychological problems and failure to complete treatment (Kenny, Keogh & Seidler, 2001; Worling, 2001; Hendriks & Bijleveld, 2008).

Although we may hypothesize that subgroups do exist and that there are differences in risk factors, we do not know what the best classification of juvenile offenders is and what the differences in risk profiles actually are. In previous research, offenders have usually been classified on the basis of the type of offense they committed, for instance property offenders, violent offenders or sex offenders, sometimes in combination with another variable, such as substance use (Dembo & Schmeidler, 2003). However, we may find that a classification based on specific combinations of risk factors might be actually more adequate than a classification on the basis of the type of offenses committed. Sex offenders for instance appear to be a heterogeneous group based on both offense characteristics and risk factors (Långström, Grann & Lindblad, 2000; Parks & Bard, 2006; Van Wijk, Mali, Bullens & Vermeiren, 2007). This approach of classification based on risk factors is interesting, because it focuses on the combination of aspects that underlie problematic behavior instead of the behavior itself (symptomatic approach). There have been some studies in which subgroups were found with distinct combinations of risk factors, for instance on the basis of neuropsychological characteristics or personality typologies (Teichner, Golden, Crum, Azrin, Donahue & Van Hasselt, 2000; Stefurak, Calhoun & Glaser, 2004), but there has not been much research on risk factors for recidivism in these subgroups. Further, there has been little research on comparing subgroups of offenders or on comparing their risk profiles (Onifade et al., 2008).

The aim of this study was to find an optimal classification of serious juvenile offenders on the basis of specific combinations of risk factors. Cluster analysis was used to search for subgroups in a sample of the top 5% most serious offenders in the Netherlands. We expect to find that serious juvenile offenders are a heterogeneous group, consisting of several subgroups with clearly distinct patterns of risk factors. Next we looked at differences in recidivism rates and at differences in risk factors that predict severity of recidivism. We are not only interested in reducing the rate of recidivism, but also in reducing

the severity of recidivism (*harm reduction*; Marshall, & McGuire, 2003; Laws, 1996). The outcome variable therefore is severity of recidivism. We expect that subgroups will differ in recidivism rates and risk factors that predict severity of recidivism, with severity being defined by the amount of harm, the type of offense and the maximum penalty.

Methods

Subjects

Participants in this study were male adolescents aged 12–22 years, sentenced to placement in a Dutch juvenile institution for mandatory treatment (PIJ order, Placement in an Institution for Juveniles; Lodewijks, Doreleijers & Ruiter, 2008) between 1995 and 2004 ($n=1179$). A mandatory treatment order can last from 2 to 6 years and is the most severe measure in the Dutch juvenile justice system, which is applied to juveniles between 12 and 18 years old (Van der Linden, Ten Siethoff & Zeijlstra-Rijpstra, 2003; Stevens & Van Marle, 2003). Data on these serious juvenile offenders was used for cluster analysis to come to a classification in subgroups.

The criminal records of the participants were collected in June 2008. These records were used to register recidivism and severity of recidivism. Overall recidivism among all Dutch juvenile offenders in juvenile judicial institutions (both prisons and treatment facilities) is 70% within 4 years (Wartna, Harbachi & Van der Laan, 2005). Internationally, recidivism rates in serious juvenile offenders were found up to 80% (Trulson, Marquart, Mullings & Caeti, 2005). Previous research shows that within one year after release most recidivists have already re-offended, but recidivism continues to rise in the first five to eight years after release (Wartna et al., 2005). We started to register recidivism (dependent variable) from the moment the PIJ-order officially was ended and we included only those juvenile offenders that had been released for at least two years. Eventually 728 participants were included in the analyses. The mean age at release from the treatment facility was 20 years ($SD=1.63$). Time until first reoffense ranged from 0 to 8.08 years ($M=1.2$; $SD=1.5$). The minimum time at risk was two years and the mean time at risk in our study was 5.83 years ($SD=2.39$, Median: 5.58 years, range 2 years – 11.17 years).

Instruments

Juvenile Forensic Profile (FPJ)

A list of 70 risk factors were assessed with the FPJ (Brand and Van Heerde, 2004), an instrument which was especially developed for forensic research based on file data. This instrument was derived from existing internationally and nationally validated instruments for risk assessment and for measuring problem behavior (e.g. Child Behavior

Check List, Structured Assessment of Violence Risk in Youth, Psychopathy Check List: Youth Version, Juvenile-Sex Offender Assessment Protocol, HCR-20 Violence Risk Assessment Scheme, Forensic Profiles-40). The list contains risk factors concerning seven domains: 'history of criminal behavior', 'family and environment', 'offense-related risk factors and substance use', 'psychological factors', 'psychopathology', 'social behavior/interpersonal relationships' and 'behavior during stay in the institution' (see appendix). Each risk factor is measured on a three-point scale with 0 = no problems, 1 = some problems, and 2 = severe problems. Previous research on the FPJ-list showed that the available file information was thorough and complete enough to be able to score the instrument (Van 't Hoff, Brand, Van Parijs & Van Heerde, 2002). The interrater-reliability was tested (double scoring of 80 files, $r=0.73$; $K=0.61$) and a high convergent validity of the FPJ-list with the SAVRY was found (Van Heerde, Brand, Van 't Hoff & Mulder, 2004). The predictive validity of the instrument was tested in the first sample of 102 boys (AUC of .803 with a sum-score of nine risk factors; Brand, 2005a). In sum, the psychometric qualities of the instrument were found to be satisfactory (Van Heerde & Mulder, 2005; Brand, 2005b).

Classification of recidivism

To measure recidivism, all convictions starting at release from the institution were registered, together with the date and type of the offense committed. The choice for official reconviction data is straightforward, but it does have some limitations. The most important limitation is that an unknown number of offenses will get lost, as only those that have led to a conviction are counted. Using self report would probably lead to higher recidivism rates than official records. Another limitation is the possible influence on reconviction of changes in policy (Friendship, Beech & Browne, 2002). Despite these limitations, official reconviction data were used because they provide an objective and clear measure for recidivism (Heilbrun et al., 2000).

Severity of recidivism was operationalized by classifying the seriousness of the offenses in twelve categories. Severity of offending was determined depending on the Dutch' laws increasing maximum sentence, the amount of harm and the amount of violence during the offense. The classification of severity was evaluated by Dutch clinicians and law professionals (Van Kordelaar, 2002). Table 1 shows the operationalization of severity of offending behavior (before treatment). The twelve categories of severity are mutually exclusive.

Procedure

The study was approved by the Medical Ethical Commission of Erasmus University Medical Center in Rotterdam, the Netherlands. The information obtained on the participants was anonymous. After 1 year of treatment, the files were scored with the FPJ-list. We

Table 1: Operationalization of offending before treatment; n=728

Severity of offending 12 Categories	Valid percent Per type of offense
0=No conviction	0
1=Misdemeanor	31.5
2=Drug offense	4.3
3=Vandalism (property)	25.1
4=Property offense	79.8
5=Moderate violent offense	64.8
6=Violent property offense	55.4
7=Serious violent offense	23.6
8=Sex offense, same age	15.5
9=Pedosexual offense	8.1
10=Manslaughter	11.7
11=Arson	3.8
12=Murder	3.7

measured after this period to be able to include risk factors *during* treatment. All files (n=1179) were read and scored with the FPJ-list by master-students (in psychology or criminology) who were in their last year before graduation. Before scoring the files, the students received three weeks of training and after three weeks the reliability of the scoring was tested. Recidivism data of juvenile offenders were delivered by the official registration center of the Ministry of Justice. The recidivism data include the details on all court appearances, the date and type of offense, and the date of conviction or acquittal. All convictions dated after release from the judicial juvenile institution were counted as recidivism.

Statistics

All statistics were calculated with SPSS 15.0 for Windows. In previous research, exploratory factor analysis was used to find a meaningful classification of risk items of the FPJ-list (Mulder, Brand, Bullens & van Marle, 2009). This revealed a nine-factor structure in the data. Next, these nine factors were used as input for hierarchical cluster analysis, which was used to identify subgroups of offenders with specific combinations of risk factors. Cluster analysis is an exploratory multivariate procedure for detecting groupings in data that may be used with dichotomous or interval-level data. It seeks to classify cases in a way that maximizes differences between groups. In this study we clustered cases to find out how serious juvenile offenders may be classified in subgroups based on common patterns of risk factors. After the hierarchical cluster analysis an iterative K-means clustering technique was used to identify cases. Split half analyses were performed to validate the cluster solution we found. Post-hoc comparisons between clusters were conducted for a final 6-cluster model using analyses of variance (ANOVA) analysis. Before performing a cluster analysis, multivariate outliers were removed, depending on

Cook's distance ($>.0050$) and Mahalanobis distance (>25.0). After removing outliers 1107 (of 1179) subjects were included in the cluster analysis.

For recidivism, descriptive statistics and frequencies were calculated first. Due to the fact that the mean score on most risk factors of the FPJ-list in our sample was larger than 1, our data were skewed to the right. Therefore, we used the non-parametric Mann Whitney U-test to study the differences between juveniles who recidivated and those who did not; a $p\text{-value} < .05$ was considered to be significant. We also used this test to study differences between violent and non-violent recidivism. We used non-parametric correlation (Spearman's rho) to study the relation between risk factors and seriousness of recidivism measured in 12 categories. In our analyses, we corrected for multiple comparisons with Bonferroni correction, due to the large number of risk factors ($n=70$), which was used in analyses on recidivism. Linear regression analysis was used to test which risk factors predict severity of recidivism. Missing Values Analysis was performed to check if missing values were missing at random, which was the case. Missing values did not significantly influence the outcome of regression analysis.

Results

Cluster analysis

Based on the scree-plot of the fusion coefficients (Mojena's rule; Aldenderfer & Blashfield, 1984), AIC and BIC criteria, outcome measures of the TSC procedure in SPSS and interpretability, we chose a 6-cluster solution, which is shown in Table 2. These criteria have been suggested by previous research (Aldenderfer & Blashfield, 1984; Milligan & Cooper, 1985). The 6 largest clusters were selected and were used as input for iterative K-means clustering. Split half analyses were used to test the validity of the cluster solution we found. The same patterns that are shown in Table 2 were found in the results of split half analyses. We studied the differences between the results of the two solutions of cluster analyses with ANOVA. Although the patterns within each cluster were the same for all solutions, the height of the mean factor score differed somewhat between both split half solutions. After correction for the high number of cases, the differences between factor-scores were no longer significant. However, we found one inconsistency: in the first cluster, there was a significant difference between the mean score of the two split half solutions on factor 4: axis I psychopathology. This difference might be explained by the low base rate of psychopathology. Next, after testing the robustness of the 6-cluster solution, we tested the consistency between the six clusters. ANOVA showed that the clusters are indeed significantly different on the nine different factors. The six-cluster solution and the mean score on the nine factors of each cluster are shown in Table 2.

Table 2. 6-Cluster solution; n=1107

Nine factor scores	Cluster 1: n=233	Cluster 2: n=128	Cluster 3: n=336	Cluster 4: n=113	Cluster 5: n=86	Cluster 6: n=211
F1: Antisocial behavior during treatment	1.052	.195	-.370	.163	-.595	-.542
F2: Sexual problems	-.194	-.481	-.470	1.592	1.405	-.319
F3: Family problems	.401	-.197	-.519	.011	-.610	.779
F4: Axis 1 Psychopathology	.380	-.459	-.438	.303	.261	.025
F5: Offense history	-.024	1.260	-.318	-.135	-.477	-.149
F6: Conscience and empathy	.601	.221	.126	.199	-.980	-.685
F7: Social skills and cognitive abilities	.454	-.175	-.368	.721	-.543	.085
F8: Social Network	.348	.135	-.282	.217	-.301	-.027
F9: Substance abuse	.532	.584	-.062	-.753	-1.049	-.016

Each cluster was given an interpretative label on the basis of the factor scores. Cluster 1 consists of juvenile offenders that are characterized by antisocial behavior during treatment and lack of conscience and empathy, the antisocial identity offenders. Cluster 2 are frequent offenders (high score on the factor 'offense history') who also have problems with substance abuse. Cluster 3 do not score higher than the other clusters on one of the factors and can be labelled as *average* juvenile offenders with a 'flat profile'. Cluster 4 are juvenile offenders with both sexual problems and lack of social skills and cognitive abilities, 'sexual problem group with a weak social identity'. Cluster 5 are offenders with sexual problems only. The last cluster, cluster 6, consists of juvenile offenders with a problematic family background.

Subgroups, pattern of offending prior to the mandatory treatment order

For the analyses of offending behavior and recidivism we included only those subjects that had a time at risk of at least two years (n=728). The pattern of offending of each cluster before treatment was studied. The results in Table 3 show that clusters 4 and 5 have committed mainly sex offenses before treatment (80% and 72% respectively). These two clusters committed far less property offenses and violent offenses before treatment than the other four clusters: 35-47% for cluster 4 and 5, against 88-96% for clusters 1, 2, 3 and 6. If we look at the three most serious violent offenses only, this pattern seems to be somewhat different. Serious assault was still more prevalent in clusters 1, 2, 3 and 6. But manslaughter was most prevalent in clusters 1, 3, 5 and 6 and murder was most prevalent in clusters 3, 5 and 6. However, the differences in these three categories were not significant with ANOVA. The differences on property offending ($F=43.29$, $p=.000$), violent offending ($F=48.52$, $p=.000$) and sexual offending ($F=77.83$, $p=.000$) were significant with Bonferroni correction.

Table 3. Subgroups, patterns of offending; n=728.

Cluster	Property offending	Violent offending	Sexual offending	Serious assault	Manslaughter	Murder
1: Antisocial identity; n=150	91%	95%	8%	29%	12%	2%
2: Frequent offenders; n=91	96%	96%	11%	29%	5%	1%
3: Flat profile; n=203	92%	95%	12%	23%	12%	5%
4: Sexual problems and weak social identity; n=59	47%**	47%**	80%**	14%	5%	0%
5: Sexual problems; n=46	35%**	46%**	71%**	9%	15%	7%
6: Problematic family background; n=160	88%	92%	8%	24%	15%	5%

** = significant differences with the other four clusters, $p \leq .05$ (Bonferroni correction)

Recidivism, prevalence

Next, recidivism rates were calculated for each subgroup. With ANOVA differences between clusters were analyzed. Clusters 1, 2, 3 and 6 do not appear to differ significantly from each other considering recidivism. But clusters 4 and 5 score significantly lower than all of the other clusters on overall recidivism, violent recidivism and severity of recidivism. This in contrast with the situation before treatment: clusters 4 and 5 scored significantly higher than all of the other clusters on severity of offending before treatment. This is to be expected because offenders in these two clusters mainly committed sex offenses before treatment, which score high on the severity scale. However, this accentuates the discrepancy we find after treatment, when these two clusters commit significantly less severe offenses than all the other clusters. Recidivism rates are shown in Table 4.

Table 4. Differences in recidivism and severity between subgroups; n=728.

	Recidivism	Violent recidivism	Sexual recidivism	Severity of past offenses	Severity of recidivism
1: Antisocial identity; n=150	87%	75%	5%	6.97	5.56
2: Frequent offenders; n=91	84%	69%	3%	6.57	5.16
3: Flat profile; n=203	85%	65%	5%	7.03	4.87
4: Sexual problems and weak social identity; n=59	58%**	39%**	10%	8.20**	3.10**
5: Sexual problems; n=46	50%**	28%**	7%	8.52**	2.24**
6: Problematic family background; n=160	85%	66%	5%	7.09	5.16

** = significant differences with the other four clusters, $p \leq .05$ (Bonferroni correction)

Recidivism, prediction

For each subgroup a unique risk profile was found that predicts severity of recidivism. In Table 5 the results of stepwise linear regression analysis are shown for each of the six subgroups.

Table 5. Linear regression analysis, stepwise: predicting severity of recidivism.

Step	Variable entered	R ²	ΔR ²	P	Final step standardized β Coefficient
Subgroup 1: Antisocial identity (n= 150)					
1	Parents parenting skills	.092	.092	.001	.269
2	Psychotic disorder	.145	.053	.003	-.233
Subgroup 2: Frequent offenders (n= 91)					
1	Criminal behavior in the family	.100	.100	.019	.233
2	Gambling	.164	.064	.004	.271
3	Large social network	.226	.062	.008	-.250
4	Drug abuse	.276	.050	.016	-.237
Subgroup 3: Flat profile (n= 203)					
1	Being acquainted to ones victim(s)	.024	.024	.060	-.130
2	Alcohol abuse	.044	.020	.026	-.154
3	Feelings of hostility before treatment	.062	.018	.031	-.149
4	Lack of empathy	.080	.018	.049	.136
Subgroup 4: Sexual problems and a weak social identity (n= 59)					
1	Involvement with antisocial peers	.206	.206	.001	.376
2	Incidents in the institution	.323	.117	.005	.318
3	Authority problems	.379	.056	.030	.240
Subgroup 5: Sexual problems (n= 46)					
1	Academic achievement	.115	.115	.032	-.340
Subgroup 6: Problematic family background (n= 160)					
1	Accessibility of the parents	.042	.042	.008	-.205
2	Incidents in the institution	.077	.035	.016	.187

The results show that in subgroup 1 (antisocial identity), severity of recidivism can be predicted by antisocial behavior during treatment and the absence of a psychotic disorder ($R^2 = .145$). In the second subgroup (frequent offenders) criminal behavior in the family, a small social network, gambling problems and the absence of drug abuse predict severity of recidivism ($R^2 = .276$). In the flat profile subgroup, subgroup 3, severity of recidivism can be predicted by having one/more unknown victims of past offenses, lack of empathy, not reporting feeling of hostility before treatment and the absence of alcohol abuse ($R^2 = .080$). In subgroup 4, with sexual problems and a weak social identity, involvement with antisocial peers, aggressive incidents in the treatment facility and authority problems predict severity of recidivism ($R^2 = .379$). The risk factor that predicts recidivism in subgroup 5, with sexual problems only, is the absence of low academic achievement ($R^2 = .115$). Finally, in the last subgroup that can be characterized by a problematic family background, the results show that accessibility of the parents and the occurrence of aggressive incidents in the treatment facility are predictive for severity of recidivism ($R^2 = .077$).

Discussion

The aim of this study was to find distinct subgroups within a sample of serious juvenile offenders, on the basis of the risk factors they have in common. Using cluster analysis, we succeeded to find six subgroups, each with its own characteristics. The first subgroup consists of antisocial juvenile offenders: they are characterized with a lack of conscience and empathy, and with problematic behavior during treatment. This subgroup seems to be the most serious one of the six, with the highest rates for recidivism and severity of recidivism. The second subgroup is composed of frequent offenders with substance abuse problems. We found one subgroup that does not show a peak on either one of the risk domains. They have been labelled as the 'flat profile' group: they are the average juvenile offenders under a mandatory treatment order. The sixth subgroup consists of juvenile offenders with problems in the family and during childhood, such as lack of parenting skills, domestic violence and neglect. Finally, we found two groups, the fourth and the fifth cluster, which are characterized by sexual problems: one with a lack of social and cognitive skills and one with sexual problems only. These two groups commit mainly sex offenses before treatment. Although these two groups committed less violent offenses and property offenses before treatment, the group with sexual problems only also committed some very serious offenses before treatment such as manslaughter and murder. Although the differences between the different subgroups in serious violent offending were not significant, we may say that the sexual problems only group is the most severe groups of the two sexual problems-groups and might be the group with the most antisocial characteristics. This would be an interesting topic for further research. The two groups with sexual problems have the lowest recidivism rates of all six groups. The differences between the two groups with sexual problems and the other four groups were significant on almost all offending and re-offending variables. The sexual problems groups commit the most serious offenses before treatment, sex offenses scoring high on the severity scale (category 8 and 9). After treatment, however, the sexual problem groups score by far the lowest on both the rate of recidivism and on severity of recidivism. The two sexual problem groups do not differ significantly from each other on either offending before treatment or recidivism; neither do the other four clusters / subgroups.

Next, the results of regression analysis show that each cluster/ subgroup has its own unique set of risk factors that significantly predicts severity of recidivism. The strength of the predictive value of the six models differs somewhat: severity of recidivism is harder to predict in the non-specific subgroup and the subgroup with family problems. The explained variance in these groups is under ten percent ($R^2 = .077 / .08$, $r = .27 / .28$), which stands for a AUC of around .66, with .50 being the same as chance (according to the conversion table, presented by Rice & Harris, 2005). But although these rates are

quite low for actuarial risk assessment, they are useful for clinical practice. And they give important information about risk factors that are (relatively) of most importance and that should be targeted during treatment. In the subgroup with family problems, juvenile offenders who have experienced peer rejection and had low academic achievement in the past, show less severe recidivism. In the non-specific subgroup severity of recidivism is predicted by having one or more unknown victims in the past, lack of victim empathy, the absence of alcohol abuse and the absence of feelings of hostility before treatment.

In the other four subgroups, the models for prediction of severity of recidivism are quite stronger (with AUC ranging from .70 to .87). Subgroup 1 is characterized by antisocial behavior and the presence of antisocial behavior also predicts severity of recidivism after treatment. Psychiatric problems are most prevalent in this subgroup, but those juvenile offenders that had psychotic symptoms show less severe recidivism. Possibly for some of the juvenile offenders in this subgroup, the psychotic disorder preceded or even caused criminal behavior in the past, and treatment was applied to these symptoms, which possibly caused a reduction in problematic behavior.

In the second subgroup problems with parents and peers (criminal behavior in the family, an antisocial network), gambling problems and the absence of drug abuse predict severity of recidivism. This last fact might be caused by the fact that drug abuse was tackled during treatment. The absence of drug abuse might have caused a reduction in severity of recidivism.

Finally in the two groups with sexual problems we found two different sets of risk factors that predict severity of recidivism. In the subgroup with lack of social and cognitive skills involvement with antisocial peers, aggressive incidents in the treatment facility and authority problems predict severity of recidivism. The absence of low academic achievement predicts recidivism in the subgroup with sexual problems only.

Although this study produced interesting findings, it does have several limitations. First, not all of the subgroups were of an acceptable size. The sexual problem subgroups were quite small, which is in line with previous studies ($n=59$, 8% of the population, and $n=46$, 6% of the population, respectively) and so was the frequent offender/substance abuse subgroup ($n=91$). However, the time of follow up was considerable and the number of risk factors was large. A strong point in this study was that the results were significant after correction for the large number of risk factors that was studied. Another limitation is that we based the results on file information. Also, a repeated-measures design would give more information about the development of risk factors over time. In future research repeated measures with a larger sample is recommended.

With respect to the *What Works principles* (Andrews & Bonta, 1995), the results of this study provide information on the specific characteristics of serious juvenile offenders. We found differences in risk between clusters of serious juvenile offenders, which has implications for the level of intensity of intervention according to the *risk principle*.

Each cluster was found to have a different set of risk factors that predicts severity of recidivism, which indicates that the *needs* of juvenile offenders are different for each cluster. According to the *needs principle*, interventions should aim at the specific needs of offenders.

Conclusion

In this study we found six distinct subgroups on the basis of specific combinations of risk factors. Each subgroup appears to have its own unique set of risk factors that predicts severity of recidivism after treatment.

We can conclude that by dividing serious juvenile offenders in six clusters/ subgroups we gain information on the specific needs of serious juvenile offenders, which differ according to the subgroup they belong to. The predictive validity differs somewhat between subgroups, which means that there is still a lot to improve with respect to risk assessment. But nonetheless, risk assessment in three of the six distinct subgroups, the two sexual problem groups and the frequent offender group, appears to be a lot better than in the group as a whole. Of course we should look into this further in future research. Another important finding is that each subgroup has its own unique set of problems that predict severity of recidivism and that should be targeted during treatment. Recidivism and severity of recidivism are very high in serious juvenile offenders. If we can reduce recidivism and severity of recidivism, the burden on society may diminish considerably.

A two-step classification of serious juvenile offenders into subgroups

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In revision, *Crime and delinquency*

Abstract

In previous research, four subgroups of serious juvenile offenders were identified with Latent Class Analysis on the basis of criminal careers. With cluster analysis, six subgroups were found on the basis of their risk profiles. In this study both classifications were combined into a classification in 24 subgroups. Eighteen subgroups actually occur in clinical settings. The results show differences in rates of recidivism and serious recidivism. The highest risk subgroups are: violent property offenders with an antisocial identity, with sexual problems and a weak social identity, those with a problematic family background and property offenders with sexual problems and a weak social identity. Subgroups with considerably lower rates of general and violent recidivism are: serious violent offenders and sex offenders, with sexual problems only and those with sexual problems and a weak social identity. The results of this study provide information on the risk factors that predict severity of recidivism. According to the *risk principle*, intensity of intervention should depend on the level of risk of an offender.

Introduction

Serious juvenile offenders are responsible for a large part of crime committed by juveniles (Loeber, Slot & Sergeant, 2001) and they are at risk of becoming chronic offenders (Moffitt, 1993; Moffitt & Caspi, 2001; Moffitt, Caspi, Harrington & Milne, 2002). Therefore, they are an important target for intervention. Over the years there has been a substantial amount of research on risk factors for persistence of offending behavior in serious juvenile offenders. The risk factors that predict recidivism are the first ones that should be targeted during intervention, to maximize treatment effect. The question is if risk factors for recidivism are the same for all serious juvenile offenders or if there are subgroups of offenders with its own set of risk factors that predict recidivism.

Researchers in previous studies found subgroups on the basis of past offending behavior. For instance, some studies found subgroups of delinquents with different levels of delinquency, mental health problems and substance abuse (Dembo & Schmeidler, 2003; Potter & Jenson, 2003). In previous research, distinct subtypes of sex offenders were found on the basis of offense characteristics (Långström, Grann & Lindblad, 2000; Parks & Bard, 2006). Other researchers distinguished subgroups with distinct criminal careers, defined by the age at onset, the level of problem behavior and whether or not the problem behavior continued into adulthood. These subgroups also differed on personality and background characteristics (Nagin & Tremblay, 1999; Chung, Hill, Hawkins, Gilchrist & Nagin, 2002; Van der Geest, Bijleveld & Blokland, 2007; Van der Geest & Bijleveld, 2008).

Several studies have addressed the question which risk factors predict recidivism in different subgroups of offenders. With respect to sex offenders, researchers found that most risk factors that predict sexual offending also predict general offending (Caldwell, 2002). Some risk factors were found to be specific for sexual recidivism: a history of sexual abuse, a young age at start of offending, number of sex offenses committed, involvement with younger children, having had a male victim, the presence of cognitive distortions, sexual deviance, a lack of social skills and impulsivity (Långström & Grann, 2000; Prentky, Harris, Frizzell & Righthand, 2000; Kenny, Keugh & Seidler, 2001; Miner, 2002; Nisbet, Wilson & Smallbone, 2004; Waite, Keller, McGarvey, Wieckowski, Pinkerton & Brown, 2005; Vandiver, 2006).

Risk factors for violent recidivism are for instance: an early start of violent behavior, violence victimization, psychopathic traits, the presence of psychiatric problems, lack of emotional support and alcohol abuse (Huang, White, Kosterman, Catalano & Hawkins, 2001; Loeber & Farrington, 2001; Kjelsberg, 2002; Långström & Grann, 2002; Clingempeel & Henggeler, 2003; Resnick, Ireland & Borowski, 2004).

Another way of classifying juvenile offenders into subgroups is on the basis of background characteristics instead of offense data. Several studies found subgroups on the basis of characteristics they have in common, such as the amount of risk factors, person-

ality characteristics or psychopathic features (Stefurak, Calhoun & Glaser, 2004; Juon, Doherty & Ensminger, 2006; Wareham, Dembo, Poythress, Childs & Schneider, 2009).

Although there has been some research aimed at identifying subgroups of offenders, differences in recidivism and differences in risk factors for recidivism between subgroups have not been studied yet. Most studies on reoffending focus on one subgroup, such as sex offenders or violent offenders, but fail to compare subgroups of offenders, with the consequence that specificity has been lost with regard to special profiles of risk factors. Nevertheless, a classification in subgroups on the basis of risk profiles would provide extra information that is useful for both risk assessment and treatment. The question is what the best way is to classify offenders: on the basis of offending behavior or on the basis of risk profiles?

In previous research we found that serious juvenile offenders can be divided in several homogeneous subgroups. Both a classification on the basis of offending behavior and a classification on the basis of the risk factors that subgroups have in common were found (this thesis). Classifying serious juvenile offenders in subgroups, not only on the basis of clinical interpretability but with Latent Class Analysis and cluster analysis to ensure statistical significance, enables us to examine which risk factors predict recidivism in each subgroup.

The aim of this study was to find an optimal classification of serious juvenile offenders by combining the strengths of both classifications we found in previous studies. In this way we can include information about both behavior (criminal careers) and symptoms (risk factors) that underlie the persistence of serious criminal behavior.

Methods

Subjects

Subjects in this study were male adolescents aged 12–22 years, sentenced to placement in a Dutch juvenile institution for mandatory treatment (PIJ order, Placement in an Institution for Juveniles; Lodewijks, Doreleijers & De Ruiter, 2008) between 1995 and 2004 ($n=1179$). A mandatory treatment order can last from 2 to 6 years and is the most severe measure in the Dutch juvenile justice system, which is applied to juveniles between 12 and 18 years old (Van der Linden, Ten Siethoff & Zeijlstra-Rijpstra, 2001; Stevens & Van Marle, 2003). In previous research, data on these serious juvenile offenders was used for cluster analysis (for a description of this method, see: Aldenderfer & Blashfield, 1984; Milligan & Cooper, 1985) and Latent Class Analysis (for a description of LCA, see: Francis, Soothill & Fligelstone, 2004; Magidson & Vermunt, 2004) to identify subgroups. LCA identified four subgroups: serious violent offenders, frequent violent/ property offenders, frequent property offenders and sex offenders. With cluster analysis we were able

to identify six clusters/ subgroups: 1) juveniles with an antisocial identity, 2) frequent offenders, 3) average juvenile offenders, with a flat profile 4) juvenile offenders with sexual problems and a weak social identity, 5) juveniles with sexual problems only, 6) problematic family background (this thesis).

The criminal records of the subjects were collected in June 2008. These records were used to register recidivism and severity of recidivism. Overall recidivism among all Dutch juvenile offenders in juvenile judicial institutions (both prisons and treatment facilities) is 70% within 4 years (Wartna, Harbachi & Van der Laan, 2005). Internationally, recidivism rates in serious juvenile offenders were found up to 80% (Trulson, Marquart, Mullings & Caeti, 2005). Previous research shows that within one year after release a high percentage of reconviction is found (most recidivists have already re-offended), but the recidivism rate continues to rise in the first five to eight years after release (Wartna et al., 2005). We started to register recidivism (dependent variable) from the moment the mandatory treatment order was ended officially. To account for differences in follow-up period, for each juvenile offender the most serious offense was used as a measure for severity and, for instance, not the number of offenses, which increases as time at risk increases. The criminal records of nine juveniles could not be used for various reasons (for example for administrative reasons, availability of the data, or due to the death of the subject). After exclusion of all juveniles with a time at risk of less than two years, 719 subjects were included in our analyses. The mean age at release from the treatment facility was 20 years ($SD=1.63$). Time until first re-offense ranged from 0 to 8.08 years ($M=1.2$; $SD=1.5$). The minimum time at risk was two years and the mean time at risk in our study was 5.83 years ($SD=2.39$, range 2 years – 11.17 years).

Instruments

Juvenile Forensic Profile (FPJ)

A list of 70 risk factors was assessed with the FPJ (Juvenile Forensic Profile; Brand and Van Heerde, 2004), an instrument that was especially developed for forensic research based on file data. This instrument was derived from existing internationally and nationally validated instruments for risk assessment and for measuring problem behavior (e.g. Child Behavior Check List, Structured Assessment of Violence Risk in Youth, Psychopathy Check List: Youth Version, Juvenile-Sex Offender Assessment Protocol, HCR-20 Violence Risk Assessment Scheme and Forensic Profiles-40). The list contains risk factors concerning seven domains: 'history of criminal behavior', 'family and environment', 'offense-related risk factors and substance use', 'psychological factors', 'psychopathology', 'social behavior/interpersonal relationships' and 'behavior during stay in the institution' (see appendix). Each risk factor is measured on a three-point scale with 0 = no problems, 1 = some problems, and 2 = severe problems. Previous research on the FPJ-list showed

that the available file information on juvenile offenders under a mandatory treatment order was thorough and complete enough to be able to score the instrument (Van 't Hoff, Brand, Van Parijs & Van Heerde, 2002). The interrater-reliability was tested (double scoring of 80 files, $r = 0.73$; $K = 0.61$) and a high convergent validity of the FPJ-list with the SAVRY was found (Van Heerde, Brand, Van 't Hoff & Mulder, 2004). The predictive validity of the instrument was tested in the first sample of 102 boys (AUC of .803 with a sum-score of nine risk factors). In sum, the psychometric qualities of the instrument were found to be satisfactory (Van Heerde & Mulder, 2005, Brand, 2005a; Brand, 2005b).

Classification of recidivism

To measure recidivism, all convictions starting at release from the institution were registered, together with the date and type of the offense committed. The choice for official reconviction data is straightforward, but it does have some limitations. The most important limitation is that an unknown number of offenses will get lost, as only those that have led to a conviction are counted. Using self-report would perhaps lead to higher recidivism rates than official records. Another limitation is the possible influence of changes in policy on conviction rates (Friendship, Beech & Browne, 2002). Despite these limitations, official reconviction data were used because they provide an objective and clear measure for recidivism (Heilbrun et al., 2000). Severity of recidivism was operationalized by classifying the severity of the offenses in twelve categories. Severity of offending was determined depending on the Dutch' laws increasing maximum sentence, the amount of harm and the amount of violence during the offense. The classification of severity was evaluated by Dutch clinicians and law professionals (Van Kordelaar, 2002).

Procedure

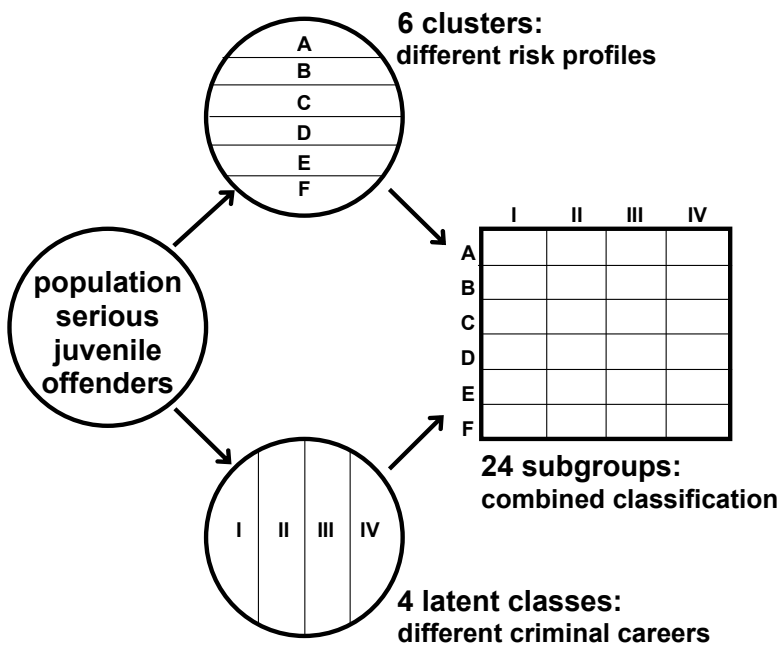
The study was approved by the Medical Ethical Commission of Erasmus University Medical Centre in Rotterdam, the Netherlands. After 1 year of treatment in the juvenile institution, the files were scored with the FPJ-list. We measured after this period to be able to include risk factors *during* treatment. All files ($n = 1179$) were read and scored with the FPJ-list by master-students (in psychology or criminology) who were in their last year before graduation. Before scoring the files, the students received three weeks of training. Reconviction data of juvenile offenders were delivered by the official registration centre of the Ministry of Justice. The recidivism data include the details on all court appearances, the date and type of offense, and the date of conviction or acquittal. All convictions dated after release from the judicial juvenile institution were counted as recidivism.

Statistics

All statistics were calculated with SPSS 15.0 for Windows. In previous research we found subgroups of offenders in two ways: with Latent Class Analysis and cluster analysis. With Latent Class Analysis we identified four subgroups on the basis of the types of offenses committed in the past and the frequency of offending (this thesis). Six subgroups based on combinations of risk factors they have in common have been identified with cluster analysis (this thesis).

In the present study the overlap of both classifications was studied with a cross tabulation. A classification is suggested that makes use of the strengths of both ways of classifying subgroups. In Figure 1, the different steps in this study are shown for the classification in subgroups. Descriptive statistics are used for analyses of the recidivism rates in each subgroup. The results of multiple linear regression analysis are shown for all subgroups to see which risk factors predict severity of recidivism. Finally, the risk factors that predict severity of recidivism in all subgroups are listed.

Figure 1. A two-step classification of serious juvenile offenders into subgroups



Results

Results of previous research

Risk factors for severity of offending in the total sample

In previous research, we found that in the total sample of Dutch serious juvenile offenders, treatment adherence, problem solving skills and criminal behavior in the family were found to be predictive for severity of recidivism. The findings further supported the notion that both individual risk factors (such as problem solving skills) and environmental risk factors (such as parenting skills and developing relationships with non-criminal peers) predict recidivism as well as severity of recidivism (this thesis). These findings are in line with other national and international research on juvenile offenders (Moffitt, Caspi, Harrington & Milne, 2002; Donker, Smeenk, van der Laan & Verhulst, 2003; Loeber, Farrington, Stouthamer Loeber & Raskin White, 2008).

Classification on the basis of offending behavior

The next step in previous research was to search for subgroups of offenders. We found four statistically based subgroups of serious juvenile offenders with Latent Class Analysis on the basis of the frequency and severity of their criminal behavior in the past (this thesis). Next, risk factors for severity of recidivism were analyzed with multiple (step-wise) linear regression analysis in each of these subgroups. Each subgroup turned out to have a *specific* combination of risk factors that predicts severity of recidivism. For serious violent offenders, having witnessed domestic violence and the presence of a conduct disorder predict the severity of recidivism ($R^2 = .171$). Lack of treatment compliance, a negative (aggressive) coping style, a high number of offenses in the past, being neglected by the parents and having a large but antisocial network predict severity of recidivism in violent property offenders ($R^2 = .094$). For property offenders a history of physical abuse, having an unknown victim in past offenses, lack of treatment motivation, the absence of an anxiety disorder and feelings of hostility predict severity of recidivism ($R^2 = .146$). Finally, in sex offenders those juveniles that did not have an autism spectrum disorder and were involved in incidents in the treatment facility were found to score higher on severity of recidivism ($R^2 = .199$)¹. It might be that these sex offenders are the more antisocial juveniles that generalize in their offending behavior and are bound to commit new offenses.

¹ This unexpected result is probably caused by the fact that risk factors were measured at the start of treatment. The possibility exists that autism spectrum disorder has been diagnosed at the start of treatment and that the problematic behavior, connected to this disorder, has been adequately addressed during treatment.

Classification on the basis of combinations of risk factors

In another recent study, six subgroups were found on the basis of risk profile they have in common (this thesis). With multiple (stepwise) linear regression analysis the risk factors that predict severity of recidivism have been analyzed for each subgroup. In subgroup 1 ('antisocial identity'), severity of recidivism can be predicted by antisocial behavior during treatment and the absence of a psychotic disorder ($R^2 = .145$). In the second subgroup ('frequent offenders') criminal behavior in the family, a large social network before treatment, gambling problems and the absence of drug abuse predict severity of recidivism ($R^2 = .276$). In the 'flat profile' subgroup, subgroup 3, severity of recidivism can be predicted by having one/more unknown victims of past offenses, lack of empathy, absence of feelings of hostility before treatment and the absence of alcohol abuse ($R^2 = .080$). In subgroup 4, with 'sexual problems and a weak social identity', involvement with antisocial peers, aggressive incidents in the institution and authority problems predict severity of recidivism ($R^2 = .379$). The risk factor that predicts recidivism in subgroup 5, with 'sexual problems only', is the absence of low academic achievement ($R^2 = .115$). Finally, in the last subgroup that can be characterized by a 'problematic family background', the results show that accessibility of the parents and the occurrence of aggressive incidents in the institution are predictive for severity of recidivism ($R^2 = .077$).

A combination of two classifications of serious juvenile offenders

In Table 1 a combination of the two described types of classifications is shown. This results in a classification in six risk profiles, each in combination with one out of four patterns of offending behavior. Looking at the total picture (that is, $4 \times 6 = 24$ subgroups), we see that 6 combinations of subgroups contain no more than one percent of the total population. On the basis of this result we might conclude that only 18 theoretical subgroup-combinations do actually occur in clinical practice, which are:

- A. Serious juvenile offenders with an antisocial identity** commit either serious violent offenses (I), violent and property offenses (II) or property offenses (III).
- B. Frequent serious juvenile offenders** commit either violent and property offenses (II) or property offenses (III).
- C. Serious juvenile offenders with a flat profile** commit either serious violent offenses (I), violent and property offenses (II) or property offenses (III).
- D. Serious juvenile offenders with sexual problems and a weak social identity** commit mainly violent and property offenses (II) or sex offenses (IV), but also serious violent offenses (I) and property offenses (III).
- E. Serious juvenile offenders with sexual problems only** commit mainly serious violent offenses (I) or sex offenses (IV), but also violent and property offenses (II).
- F. Serious juvenile offenders with a problematic family background** commit either serious violent offenses (I), violent and property offenses (II) or property offenses (III).

Table 1. Cross table of the classifications in four and six subgroups; N=1045

	I Serious violent offenders	II Violent property offenders	III Property offenders	IV Sex offenders	Total
Cluster A Antisocial identity	37 (4%)	114 (11%)	61 (6%)	3 (0%)	215 (21%)
Cluster B Frequent offenders	9 (1%)	74 (7%)	35 (3%)	2 (0%)	120 (11%)
Cluster C Flat profile	50 (5%)	160 (15%)	105 (10%)	4 (0%)	319 (31%)
Cluster D Sexual problems/ weak social identity	13 (1%)	23 (2%)	13 (1%)	58 (6%)	107 (10%)
Cluster E Sexual problems	21 (2%)	9 (1%)	4 (0%)	48 (5%)	82 (8%)
Cluster F Problematic family background	42 (4%)	89 (9%)	68 (7%)	3 (0%)	202 (19%)
	172 (17%)	469 (45%)	286 (27%)	118 (11%)	1045 (100%)

Bold numbers are the subgroups that were included; italic numbers were too small and not included

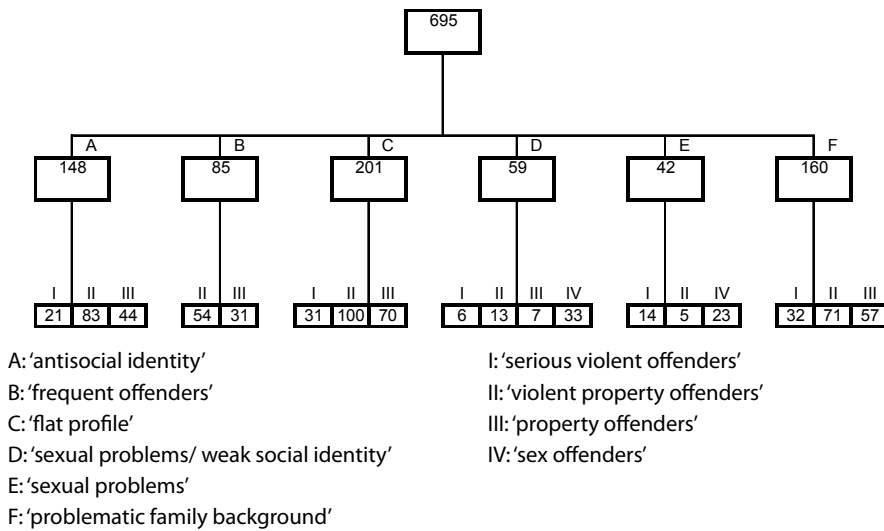
In Figure 2 a summary of the results is shown: the combined classification of subgroups, which results in eighteen subgroups with one out of six different risk profiles (A-F) and one out of four types of criminal careers (I-IV). The six clusters are: A 'antisocial identity', B 'frequent offenders', C 'flat profile', D 'sexual problems/ weak social identity', E 'sexual problems' and F 'problematic family background'. The four types of criminal careers are: I 'serious violent offenders', II 'violent property offenders', III 'property offenders', IV 'sex offenders'.

Risk factors for severity of recidivism in a combination of two classifications of serious juvenile offenders

The results of previous studies (this thesis) showed specific risk factors that predict severity of recidivism in each latent class and in each cluster. Table 2 shows the static and dynamic risk factors that were found to predict severity of recidivism in all combinations of subgroups. The dynamic risk factors can be influenced by intervention. The results show a combination of individual risk factors, risk factors that have to do with treatment adherence, the family, peers and the social network, psychopathology and substance abuse.

Recidivism in subgroups of offenders

Next, we studied recidivism to find out if there are differences between subgroups. For analyses of recidivism we only included juvenile offenders with a time at risk of at least two years (n=719). Table 3 shows the recidivism rates for all combinations of subgroups.

Figure 2. Combined classification of serious juvenile offenders in subgroups**Table 2.** Static and dynamic risk factors that predict severity of recidivism in total population of 24 subgroups, Time at risk ≥ 2 years, $n=719$;

STATIC RISK FACTORS	DYNAMIC RISK FACTORS
Criminal behavior in the family	Lack of empathy
Physical abuse	Lack of positive coping skills
Witnessing domestic violence	Incidents in the institution
Neglect	Treatment compliance (medication faith)
Low accessibility of the parents (during childhood)	Lack of treatment motivation
Lack of parenting skills (during childhood)	Defective social network
Authority problems during childhood	Conduct disorder
Feelings of hostility before treatment	Absence of psychotic disorder
Low academic achievement	Absence of anxiety disorder
High number of offenses in the past	Absence of autism spectrum disorder
Having one or more unknown victim in the past	Gambling
	Drug abuse
	Alcohol abuse

Only variables with $p < .05$ that were included in the regression models are presented here.

Recidivism in the total sample of 719 serious juvenile offenders is 79.9%. An increase or decrease of recidivism is considered to be significant if it is at least twice the base rate. This means that with a base rate of 20% no recidivism, 40% is a significant increase and 10% is a significant decrease. In conclusion, recidivism rates higher than 90% are significantly higher than base rate and recidivism rates lower than 60% are significantly lower than base rate (effect = 0.5 SD; Monahan et al., 2000; Monahan et al., 2005). Looking at the rates per subgroup the first thing to notice is that some subgroups score consider-

ably higher on recidivism than the total population: violent property offenders with a problematic family background and an antisocial identity have recidivism rates of 93% and 90% respectively, and recidivism in violent property offenders with sexual problems and a weak social identity is 92%. Other subgroups with high recidivism, although not significantly higher than base rate, are frequent property offenders (87%) and property offenders with sexual problems and a weak social identity (86%).

The lowest recidivism rates are in serious violent offenders with sexual problems (36%) and sex offenders with sexual problems and a weak social identity (39%). Other subgroups that score relatively low on recidivism are serious violent offenders with sexual problems and a weak social identity (50%) and sex offenders with sexual problems only (52%).

Table 3. Recidivism, Time at risk ≥ 2 years, $n=719$;

	I Serious violent offenders	II Violent property offenders	III Property offenders	IV Sex offenders	Total
Cluster A Antisocial identity	17 (81%)	<u>75 (90%)</u>	36 (82%)	2 (100%)	130 (87%)
Cluster B Frequent offenders	5 (83%)	44 (81%)	27 (87%)	0	76 (84%)
Cluster C Flat profile	24 (77%)	<u>89 (89%)</u>	57 (81%)	2 (100%)	172 (85%)
Cluster D Sexual problems/ weak social identity	<u>3 (50%)</u>	<u>12 (92%)</u>	6 (86%)	<u>13 (39%)</u>	34 (58%)
Cluster E Sexual problems	<u>5 (36%)</u>	4 (80%)	2 (50%)	<u>12 (52%)</u>	23 (50%)
Cluster F Problematic family background	23 (72%)	<u>66 (93%)</u>	47 (82%)	0	136 (85%)

Bold numbers are the subgroups that were included, Italic numbers were too small and not included.

Underlined numbers are significantly different from base rate recidivism of 79.9%.

Serious recidivism in subgroups of offenders

In Table 4 for each subgroup the rate of violent recidivism, which is a measure for severity of recidivism, is shown. In the total sample serious recidivism is 62.9%. Because the base rate of 63% is close to 50%, a large difference is needed to double the base rate and reach significance ($<26\%$ and $>82\%$). However, because of clinical significance of the results, we decided to include differences $<35\%$ and $>75\%$ as significant decrease and increase of serious recidivism.

Some subgroups score considerably higher than average: violent property offenders with an antisocial identity (82%) and those with a problematic family background (76%). Property offenders with sexual problems and a weak social identity also have a high rate

Table 4. Serious recidivism, Time at risk ≥ 2 years, $n=719$;

	I Serious violent offenders	II Violent property offenders	III Property offenders	IV Sex offenders	Total
Cluster A Antisocial identity	13 (62%)	<u>68 (82%)</u>	30 (68%)	1 (50%)	112 (75%)
Cluster B Frequent offenders	4 (67%)	37 (69%)	22 (71%)	0	63 (69%)
Cluster C Flat profile	14 (45%)	70 (70%)	45 (64%)	2 (100%)	131 (65%)
Cluster D Sexual problems/ weak social identity	<u>2 (33%)</u>	9 (69%)	<u>6 (86%)</u>	<u>6 (18%)</u>	23 (39%)
Cluster E Sexual problems	<u>2 (14%)</u>	3 (60%)	1 (25%)	<u>7 (30%)</u>	13 (28%)
Cluster F Problematic family background	20 (63%)	<u>54 (76%)</u>	32 (56%)	0	106 (66%)

Bold numbers are the subgroups that were included, Italic numbers were too small and not included

Underlined numbers are significantly different from base rate recidivism of 62.9%.

of violent recidivism (86%). Although this subgroup contains only 7 persons, it appears to be a very serious group: these juveniles committed mainly property offenses before treatment, but the severity of offending seems to increase after release with violent recidivism reaching a rate of 86%. Several groups score considerably lower than average on violent recidivism: serious violent offenders with sexual problems and a weak social identity (33%) and those with sexual problems (14%), sex offenders with sexual problems and a weak social identity (18%) and those with sexual problems only (30%).

Discussion

The aim of this study was to find an optimal classification of serious juvenile offenders that is useful for clinical practice. In previous research we found two ways of classifying serious juvenile offenders: one classification on the basis of their criminal careers (types and frequency of offending behavior, subgroup I-IV) and one classification on the basis of their risk profile (combination of risk factors, cluster A-F). For each subgroup we found risk factors that predict severity of recidivism. In the present study we combined the two classifications with 24 theoretical subgroups as a result: 6 subgroups with six distinct risk profiles, each with one of four types of offending patterns. Six of these 24 subgroups appear to be very small to non-existing in reality (0-1.0%), which leaves us with 18 subgroups that do actually occur in clinical settings.

The first step from a classification on the basis of statistical analyses and theory to one that is practically useful is to find out which subgroups have the highest chance of recidivism and serious recidivism and are therefore the highest-risk groups. Violent property offenders with an antisocial identity (AII) and those with a problematic family background (FII) have the highest rates of both general and serious recidivism. Property offenders with sexual problems and a weak social identity (DIII) are another subgroup that keeps on committing serious crimes after treatment. A few other groups should be mentioned that score higher on general recidivism only: violent property offenders with sexual problems and a weak social identity (DII) and frequent property offenders (BIII).

On the other hand, we also found several subgroups with considerably lower rates of general and violent recidivism: serious violent offenders with sexual problems only (EI) and serious violent offenders with sexual problems and a weak social identity (DI); sex offenders with sexual problems and a weak social identity (DIV) and sex offenders with sexual problems only (EIV). These groups commit the most severe crimes before treatment, but apparently do not often continue their criminal careers after treatment. A possible explanation of this effect is that it is a consequence of effective intervention in these subgroups. Another possibility however, is that we are dealing with offending behavior that is -at least for a part- adolescence-limited (Moffitt, 1993; Moffitt & Caspi, 2001). With respect to sex offenders, findings in other studies suggest that sex offenses in juveniles for a large part are indeed limited to adolescence and thus seem to be an extreme form of impulsive and experimenting behavior. The youngsters in these groups are not exactly the same as the adults that commit sexually driven crimes. Juvenile sex offenders appear to be different from adult sex offenders in that respect (Långström & Grann, 2000; Miner, 2002; Nisbet, Wilson & Smallbone, 2004; Letourneau & Miner, 2005; Bullens, van Wijk & Mali, 2006).

There are seven subgroups with a risk profile that includes sexual problems: three in cluster E with sexual problems only and four in cluster D, which is also characterized by a weak social identity. We found that four of these subgroups represent a relatively low risk: the serious violent offenders (DI, EI) and the sex offenders (DIV, EIV). However, the other three subgroups represent a relatively high risk: the violent property offenders (DII, EII) and the property offenders (EIII). An explanation of this phenomenon is that the specialists, the 'pure' sex offenders and those that committed one or a few serious violent offenses, are serious juvenile offenders that desist from criminal behavior in the future. On the other hand, the generalists, violent property offenders and property offenders that have sexual problems as well, are all the more risky for general recidivism and serious recidivism. These subgroups represent multi-problem youth that have a high chance of becoming life-course persistent offenders. This finding is in line with existing theoretical models, such as Loeber and Hay's developmental pathways (Loeber,

Farrington, Stouthamer Loeber & Raskin White, 2008), which states that the more pathways of criminal behavior are followed, the higher the risk.

According to the *What Works principles* juveniles with severe problems or with multiple problem areas should therefore be treated with a higher intensity, or should receive multimodal treatment (Landenberger & Lipsey, 2005; Lowenkamp, Latessa & Holsinger, 2006). Since we know that serious juvenile offenders can be subdivided in subgroups on the basis of their risk profile and their offending behavior, the results of this study provide information on which risk factors predict severity of recidivism. These risk factors are an interesting basis for further research on treatment effectiveness and exploring the possibility to reduce severity of recidivism by influencing these risk factors.

This study has several limitations. For one, the findings have been based on file information, attained with one measurement before treatment. A repeated measures design or a longitudinal prospective study design could give more solid information about the actual causes of persistent criminal behavior. Another limitation is that although the sample is very large, if we divide the sample in 24 subgroups, we are left with smaller groups. Further research on the validation of subgroups is needed to give more definite answers to the questions addressed in this paper with respect to generalizability.

Conclusion

The aim of this study was to find an optimal classification of juvenile offenders. We found that a combination of offending behavior and risk profile led to a classification in 24 subgroups. Eighteen of these theoretical subgroups do actually occur in clinical settings. We found that recidivism rates differ between subgroups, which offers an indication of the level of risk of each subgroup. According to the *risk principle*, high-risk serious juvenile offenders need treatment with the intensity depending on the level of risk (Andrews & Bonta). Further, following the *needs principle*, intervention should fit the treatment needs of serious juvenile offenders, which can be determined by deciding what subgroup an offender belongs to. A list of static and dynamic risk factors predicts general recidivism and severity of recidivism over all eighteen subgroups. This list of risk factors can be seen as the 'needs' of these juvenile offenders. According to the *needs principle*, intervention should aim at the specific risk factors that predict recidivism in each subgroup. This is an interesting topic for further research on treatment effectiveness with the aim to reduce severity of recidivism.

General discussion

General discussion

In this thesis the top 5% most serious juvenile offenders in the Netherlands were studied. These youngsters have committed not only petty crime, but also very serious offenses, such as sex offenses, serious assault and even murder. Recidivism in these juvenile offenders is high. They are at risk of continuing their criminal careers after release and after transition into adulthood, becoming *life-course persistent* offenders. The cost of crime is high, in the first place for the victims and their family, but also for society. Incarceration is expensive and ineffective and material and non-material costs of recidivism are high too. Reducing recidivism, even in small percentages, actually saves a substantial amount of physical and emotional harm in the first place, but also a considerable amount of money (Groot, De Hoop, Houkes & Sikkel, 2007). According to theory, risk factors that predict recidivism should be targeted during intervention to decrease recidivism. However, the accuracy of current ways of risk assessment and prediction of recidivism is still far from satisfactory with effect sizes which are seldom higher than 0.70. So, new ways to come to evidence-based decision making need to be explored (Hanson & Morton-Bourgon, 2009).

Aims

With this thesis we aimed to extend the knowledge about risk factors that predict both general recidivism and severity of recidivism in serious juvenile offenders. Further, we aimed to find out if risk factors that predict severity of recidivism are the same for the whole group, or if serious juvenile offenders are a heterogeneous group with different risk profiles that predict recidivism. Our third aim was to identify subgroups of serious juvenile offenders, with distinct characteristics and different risk profiles that predict recidivism.

This results in the following research questions:

1. What are the characteristics of serious juvenile offenders?
2. What risk factors or risk domains predict general recidivism and severity of recidivism within the group of serious juvenile offenders as a whole?
3. Is it possible to distinguish subgroups of serious juvenile offenders on the basis of their criminal careers?
4. Is it possible to distinguish subgroups of serious juvenile offenders on the basis of their risk profile?
5. What risk factors predict not only general recidivism, but also severity of recidivism within the possible subgroups of serious juvenile offenders?

Findings and interpretation

In the following paragraph, the main findings of the studies in this thesis are recapitulated.

The results in [chapter 2](#) address the first research question, providing us with information on the characteristics of serious juvenile offenders. Serious juvenile offenders are a multi problem group: most juvenile offenders start showing problematic behavior at a young age. They experience a range of problems in the family (neglect, physical and/or sexual abuse, witnessing domestic violence, parents with a lack of parenting skills, or parents who were neither physically or emotionally available for their children, nor capable of raising them adequately). Serious juvenile offenders often have contact with antisocial peers, have authority problems and levels of truancy and school drop out are high. Substance abuse is quite prevalent and the juveniles in our sample often have psychological problems, such as lack of conscience and low impulse control. A conduct disorder is the most prevalent mental disorder. Other psychopathology is not as prevalent, but the prevalence is still considerably higher than in the total population of youngsters in the Netherlands. Apart from conduct disorder, ADHD is the most prevalent disorder. The social and cognitive capabilities of serious juvenile offenders turn out to be often limited. They do not have adequate problem solving strategies at their disposal. During treatment, motivation, adherence and therapeutic alliance are problematic.

After creating a risk profile of serious juvenile offenders, we studied the development of the sample over time. In ten years time, several improvements in the general picture were seen in the sample of juvenile offenders under a mandatory treatment order. However, although some scores on risk factors improved, the level of problems remained constantly high. Low intelligence is the only risk factor that aggravated over time: very serious juvenile offenders that are convicted to a mandatory treatment order are - on average - less intelligent today than they were ten years ago.

The next step was to study recidivism in serious juvenile offenders and the risk factors that predict recidivism. The results in the [third chapter](#) show that *overall* recidivism is almost 80%, and if minor offenses and misdemeanors are not included, 70% of serious juvenile offenders under a mandatory treatment order continue their criminal careers. The results show that several risk factors measured with the Juvenile Forensic Profile (FPJ-list) are both more present in the case of recidivism and positively related to the severity of recidivism. Logistic regression analyses and multiple linear regression analysis showed that, apart from the static risk factors 'high number of past offenses' and 'having one/more unknown victims in past offenses', also family risk factors and problematic behavior during treatment predict recidivism and severity of recidivism.

After studying, in the [fourth chapter](#), the relationship between seventy risk factors and severity of recidivism with exploratory and confirmatory factor analysis, results

showed that the seventy risk items can be described by nine meaningful factors. These factors are *Antisocial behavior during treatment*, *Sexual problems*, *Family problems*, *Axis 1 psychopathology*, *Offense characteristics*, *Conscience and empathy*, *Intellectual and social skills*, *Social network* and *Substance abuse*. Recidivists scored higher (i.e. worse) than non-recidivists on the factors *Offense history* and *Conscience and empathy*, and lower on the factors *Sexual problems* and *Axis 1 psychopathology*. The factors *Antisocial behavior during treatment*, *Family problems* and *Axis 1-psychopathology* predict severity of recidivism. However, the explained variance of the regression model was quite low (4-6%). We also found evidence for the existence of subgroups with different recidivism rates. These results lead to the conclusion that a combination of single items probably leads to the best risk prediction and that further research should look into possible differences in risk factors for recidivism between subgroups. Nevertheless, the results are useful for intervention as they give an indication of risk domains that interventions should aim at.

In [chapter 5](#) four subgroups were identified with Latent Class Analysis on the basis of the criminal careers of the juvenile offenders. The largest group consists of juveniles that combine violent offenses and property offenses and do so with a high frequency. Further, we distinguished a group that committed mainly property offenses with a high frequency, one group of low frequent serious violent offenders and, finally, sex offenders. Each subgroup was found to have its own risk profile. The results coincide to a great extent with the developmental trajectories as suggested by Loeber and Hay (1994): property offenders fit the covert pathway, serious violent offenders fit the overt pathway and violent property offenders fit a combination of these two. The fact that all three groups score high on truancy and school dropout as well as having authority problems suggests that they have probably followed the authority conflict pathway as well. Further, the risk profiles of the subgroups support these findings: the violent property offenders, who proceed along two pathways at the same time, are the most disadvantageous group. They can be characterized by overt problem behavior (low impulse control, conduct disorder), authority conflict, family problems and antisocial peers. Property offenders distinguish themselves from the serious violent offenders and violent property offenders by having one or more unknown victims in past offenses. Serious violent offenders are characterized by risk factors that fit overt problem behavior, conduct disorder, low impulse control, substance abuse and authority problems. Sex offenders turn out to be quite different from the other three groups. They are characterized by social problems, psychopathology, low intelligence, low academic achievement and sexual problems. The findings further showed that the four subgroups also differ regarding their recidivism rates and regarding the risk factors that predict recidivism. Serious violent offenders and sex offenders commit the most serious offenses before treatment, but after treatment they show the largest reduction in severity of offending. Violent property offenders and property offenders stay the most serious subgroups

after treatment. Each subgroup was found to have its own unique set of risk factors that predicts severity of recidivism.

In the sixth chapter we found six clusters with cluster analysis, on the basis of the combination of risk factors juveniles within each cluster have in common. The first cluster consists of antisocial juvenile offenders: they are characterized by a lack of conscience and empathy and also with problematic behavior during treatment. This cluster seems to be the most serious one of the six, with the highest rates for recidivism and severity of recidivism. The second cluster is composed of frequent offenders with substance abuse problems. We found one cluster that does not show a peak on either one of the risk domains. This cluster has been labelled as the flat profile group. One cluster consists of juvenile offenders with problems in the family and during childhood, such as being exposed to a lack of parenting skills, domestic violence and neglect. Finally, we found two clusters that are characterized by sexual problems: one with a lack of social and cognitive skills and one with sexual problems only. These two groups commit mainly sex offenses before treatment. However, these two groups have the lowest recidivism rates of all six groups, and they score by far the lowest on both the rate of recidivism and on severity of recidivism. The two sexual problem groups do not differ significantly from each other on either offending before treatment or recidivism; neither do the other four clusters.

Next, the results of regression analysis show that each cluster has its own unique set of risk factors that significantly predicts severity of recidivism. The strength of the predictive value of the six models differs somewhat: severity of recidivism is harder to predict in the flat profile cluster and in the cluster with family problems. The explained variance in these groups is under ten percent ($R^2 = .077/.08$, $r = .27/.28$). In the other four clusters, the models for prediction of severity of recidivism are stronger (cluster 1 antisocial identity: $R^2 = .15$, $r = .39$; cluster 2 frequent offenders: $R^2 = .28$, $r = .53$; cluster 4 sexual problems with a lack of social and cognitive skills: $R^2 = .38$, $r = .62$ and cluster 5 sexual problems only: $R^2 = .12$, $r = .35$).

The results of regression analysis also show that in several clusters risk factors are inversely related to recidivism. For example, psychiatric problems predict lower severity of recidivism. These results may be explained by the following underlying mechanism. Possibly for some of the juvenile offenders a psychotic disorder or drugs abuse preceded or even caused criminal behavior in the past. Treatment was applied to these symptoms, which possibly caused a reduction in problematic behavior. For juvenile offenders with an autism spectrum disorder, after diagnosis adequate measures may be taken for treatment and support. Another explanation might be that juveniles with psychiatric problems are less antisocial than other serious juvenile offenders, their behaviour being mainly explained by the presence of the psychiatric disorder. Consequently, their risk for recidivism is lower. Nevertheless, although recidivism in some serious juvenile offenders

is lower than the base rate of 79.9%, it is still higher than 50%. We may conclude that psychiatric problems are definitely risk factors that should be taken into consideration. This is especially important considering the fact that many instruments for risk assessment do not give much attention to psychiatric disorders (Borum, 2006; Webster, Douglas, Eaves & Hart, 1997).

In the final chapter, the two classifications described in the foregoing studies were combined into a classification in 24 subgroups, based on both the criminal behavior and the risk profile. Of these 24 theoretical subgroups, 18 subgroups do actually occur in clinical practice. The static and dynamic risk factors that predict general recidivism and severity of recidivism over all the 18 subgroups are shown. The results show differences in rates of recidivism and serious recidivism (appendix 2). According to the *risk principle* intensity of intervention should depend on the level of risk of an offender. The results show which subgroups are the highest risk subgroups:

- violent property offenders with an antisocial identity;
- violent property offenders with sexual problems and a weak social identity;
- violent property offenders with a problematic family background, and
- property offenders with sexual problems and a weak social identity.

Subgroups with considerably lower rates of general and violent recidivism are:

- serious violent offenders with sexual problems only;
- serious violent offenders with sexual problems and a weak social identity;
- sex offenders with sexual problems only, and
- sex offenders with sexual problems and a weak social identity.

Considering the *criminal careers* of very serious juvenile offenders, these findings show that juveniles who combine violent offenses and property offenses are the highest at risk in the sample, no matter what their risk profile is. We have got to do with generalizing behavior, which is apparently hard to influence. Another issue that should be noticed is the fact that serious violent offenders and sex offenders, who committed the most serious offenses *before* treatment, have significantly lower rates of recidivism than the other subgroups *after* release (40-50%).

Considering the *risk profiles* of very serious juvenile offenders, the findings show that the two clusters of juveniles with sexual problems contain both subgroups with significantly *higher* rates of recidivism (juveniles who commit violent offences as well as property offenses and sexually orientated crimes) than average, as well as subgroups with significantly *lower* rates of recidivism (juvenile offenders that concentrate on sex offending). This result asks for careful assessment of serious juvenile offenders with sexual problems.

Limitations and Strengths

This study has several limitations. First, although the sample was very large, there was no control group that can be used for comparison. This was inherent to the choice to study *all* of the very serious juvenile offenders in The Netherlands, who do form a unique group and for that reason are hard to compare with other groups. We tried to solve this problem the best we could by performing split half analyses. Of course we were also able to compare subgroups of offenders, which in a way approximates the use of control groups, but has the disadvantage that this 'control group' consists also of juvenile delinquents instead of non-delinquents. For that reason, only further prospective research with a longitudinal design that includes not only serious offenders, but also non-offenders might provide us with more definite answers to our questions.

Another limitation is the fact that there was only *one* measurement of risk factors, and because of the cross sectional design we did not have information about the development of the dynamic risk factors over time. However, the measurement that formed the basis for the data in this study was taken after one year of treatment. In this way we had a good clinical picture of the characteristics, abilities and inabilities of the research population. For future research we plan to perform repeated measures with the FPJ-list to include the development of dynamic risk factors during and after treatment as well.

A third limitation is that we used file information only. Although the information in the files was extensive and sufficient to score the Juvenile Forensic Profile, interviewing the parents and the school might have provided us with more information, as a diagnostic interview, such as the K-SADS (Kaufman, Birmaher, Brent, Rao & Ryan, 1996) would have. However, administering this interview is very labor-intensive, which is a contra-indication for the use of such an instrument in relation to the file studies in this thesis.

Finally, external validation of the results of this thesis is needed to confirm the existence of the subgroups we found in another sample of serious juvenile offenders.

An important strength of this thesis is that we were able to include a large number of over one thousand very serious juvenile offenders, which has not been done before. In the studies on recidivism we decided to include only juveniles with a time at risk of at least two years. Previous research showed that most reoffenders commit their first new offense within two years after release (Wartna, Harbachi & Van der Laan, 2005). By only including juvenile offenders with a time at risk of *at least* two years, we made sure that they had enough time to reoffend.

Another strength of this research is that we included a large number of risk factors, both static and dynamic risk factors, individual and environmental risk factors.

On top of that, the offense data were quite detailed. We did not only include information about whether recidivism did occur or not, which was often the case in previous research, but we also included details about the severity of offending (type of offense,

number of offenses, amount of harm). These qualities enabled us to study the relationship between risk factors and recidivism in more detail.

Finally, in this thesis we found distinct subgroups on the basis of criminal careers and risk profile that were both *statistically significant* and *clinically relevant*. Instead of focusing on one subgroup, we were able to compare all the subgroups we found in the total population. In previous research subgroups of juvenile offenders were usually created on the basis of clinical impressions. However, in this thesis we identified subgroups that were not only clinically relevant, but also *statistically significant*. Moreover, we succeeded in combining the criminal career and the risk profile as a basis for classification in subgroups. This resulted in an extensive description of a variety of subgroups of violent offenders, property offenders and sex offenders, with a problematic family background, with an antisocial identity, or another risk profile and, on top of that, the level of risk and the risk factors that predict recidivism.

Theoretical implications

Our study had several theoretical implications. First, with respect to the four criminal-career-subgroups, we found that this classification is in line with the findings of Loeber and Hay (1994).

This is remarkable because of the fact that the sample consists of the top 5% most serious juvenile offenders in the Netherlands. Theoretically, these juveniles should have reached the end of the line. They are assumed to have walked multiple pathways and to have generalized their criminal behavior. Nevertheless, in the subgroups of very serious offenders we found in this study we can *still* distinguish Loeber and Hay's *developmental pathways*, as property offenders fit the covert pathway, serious violent offenders the overt pathway and violent property offenders a combination of these two. All three groups score high on truancy and school dropout as well as having authority problems, which suggests that they probably belonged to the authority conflict pathway as well. The specific developmental trajectories of the juveniles are a basis for a fitting approach of serious criminal behavior in juveniles.

The violent property offenders are the most disadvantageous group, which is as expected, as this subgroup of serious juvenile offenders appears to have proceeded along *two* pathways at the same time. The characteristics of serious violent offenders and property offenders respectively, match the overt and the covert pathway. The fourth subgroup we found, sex offenders, is quite different from the other three groups and does not fit the developmental pathways of Loeber and Hay (1994). They are characterized by social problems and psychopathology, low intelligence and low academic achievement and sexual problems. The fact that we can distinguish developmental trajectories in very

serious juvenile offenders means that we have information about the characteristics of their behavior, which is important for intervention purposes.

Further, the results in this thesis are important for theoretical assumptions about sex offenders. Sex offenses are considered to be one of the most serious offenses. For example, in the severity index used in this thesis, only life offenses score higher on severity than sex offenses. However, the results clearly show that sex offenders have the *lowest* rates of recidivism and severity of recidivism of all subgroups of offenders. Before concluding anything, we should ask ourselves whether the effect we found is accurate, as sex offenders may be less likely to get caught than other types of offenders. On the basis of this thesis we cannot answer this question as we only have *official* reconviction data to our disposal. However, if - with some caution - we assume that the effect that we have found is realistic, this finding supports the evidence found in some other studies, which suggests that sexual offending may indeed be - at least partly - limited to adolescence (*adolescence-limited*, Moffitt 1993), and indicative of immature experimentation (Bullens et al., 2006). We found this to be the case even in the very serious offender group in this study. In this respect, our findings support the notion that sex offenses in juveniles are a *different* phenomenon from sex offenses in adults (Långström & Grann, 2000; Miner, 2002; Nisbet et al, 2004; Letourneau & Miner, 2005). Another implication that follows from the results is that within sex offenders specialists distinguish themselves from so-called generalists. That is, juvenile offenders with only sexual problems that is, 'specialize' in sex offenses, are of lower risk for the community than juvenile offenders with sexual problems who also commit violent offenses and/or property offenses.

The results further show that serious juvenile offenders as a group differ from other types of offenders studied in previous research, both in risk profile and risk factors for recidivism. We found evidence that serious juvenile offenders are a heterogeneous group on its own that consists of several distinct subgroups, each with its own unique characteristics and risk profile. This is an important finding with implications for theory on the causes of persistent criminal behavior. Further research may refine the existing theories about developmental pathways, integrating theory on serious violent offenders, property offenders and sex offenders.

Clinical implications / policy implications

In the first chapter the *What Works principles* have been described as the leading principles in developing new interventions and increasing treatment effectiveness in the last decade (Andrews & Bonta, 1995; Landenberger & Lipsey, 2005; Lowenkamp, Latessa & Holsinger, 2006). According to this principle, effective interventions should be developed according to the following themes: the *risk principle*, the *needs principle*

and the *responsivity principle*. In this thesis, important steps were taken in gaining more extensive knowledge about the characteristics of serious juvenile offenders, their risks and their needs.

First, the *risk principle* implies, as stated before, that intensity of treatment should depend on the risk for recidivism: treatment intensity should be highest for the high-risk groups and lowest for the subgroups with the lowest rates of recidivism and severity of recidivism. With respect to this principle the results show that differences exist in risk for recidivism between subgroups. Several high-risk subgroups were identified, as well as several groups with a considerably lower risk. Violent property offenders are among the highest risk groups and therefore, according to the *risk principle*, should receive treatment with a high intensity.

On the other hand, the results suggest that lower risk subgroups of sex offenders need a different kind of less intensive treatment than for instance violent property offenders, which is quite unexpected and remarkable considering the severity of sex offending. However, this conclusion is in line with the notion that sex offenses - though extreme in nature - may be during adolescence (at least for a large group of juveniles) a display of experimenting behavior that is limited to adolescence. We may have found a strong example of *adolescence-limited* offending behavior (Moffitt, 1993). At the same time, the results show that sex offenders are *not* a homogeneous but rather a heterogenic group: within juvenile offenders with sexual problems subgroups are found with a considerably lower risk (specialists) and several high-risk subgroups (generalists). This is in line with research by Van Gerwen et al. (2009), who found that the 'specialist generalist' (combining sex offenses with violent and/or property offenses) belong to the more risky groups (concerning recidivism). They combine antisocial behavior with sexual deviance, which is a strong predictor for new offenses. This finding asks for careful assessment of juvenile sex offenders to decide what the intensity of treatment should be. Although the base rate of sexual recidivism is low, the existence of high-risk subgroups within juvenile sex offenders pleas for intervention aimed at these more risky subgroups with their respective risk factors.

Then, according to the *needs principle* interventions should meet the criminogenic needs of juvenile offenders. This means that the risk factors that predict recidivism and severity of recidivism are the first ones that should be targeted during treatment. In chapter 7 we listed the risk factors that predict severity of recidivism in the eighteen subgroup-combinations.

We found that in all subgroups, risk factors that are concerned with the individual (conduct disorder, lack of empathy, feelings of hostility before treatment, authority problems, lack of positive coping skills and academic achievement) and risk factors that have to do with treatment adherence (incidents in the institution, treatment compliance/ medication faith and lack of treatment motivation) predict severity of recidivism.

On the basis of these results, these two categories of risk factors should be the basis of interventions developed for serious juvenile offenders. The other categories of risk factors that predict severity of recidivism in subgroups of serious juvenile offenders are risk factors that have to do with family/parents, peers/social network, psychopathology and substance abuse. For each of these categories, an extra treatment module could be added on top of basic treatment. In this way modular treatment can be applied that fits the needs of the specific subgroup a juvenile offender belongs to.

Finally, with respect to the *responsivity principle* the results show that a large portion of serious juvenile offenders has an IQ lower than average and a lack of social skills. Furthermore, treatment motivation is a problem for most juvenile offenders. We may conclude that, in order to meet the *responsivity principle*, every intervention should pay attention to treatment adherence (for instance, by Motivational Interviewing; Miller & Rollnick, 2002). Interventions should also better fit the low cognitive capacities of the juveniles and the cultural background of families when for instance MST is applied. This can be done by for instance using concrete language and material, such as pictograms, a lot of repetition and 'learning by doing'. The fact that cognitive skills in most serious juvenile offenders are low is an important finding since most existing interventions have been developed for juveniles with average cognitive skills.

The results of this thesis inform us of the risk factors that interventions should aim at. However, we may well find that the demands concerning the required intervention do not coincide with the supply. In fact, treatment programs that have been scientifically proven to be effective in reducing recidivism are still scarce. One example of a treatment program that has been studied extensively and has been proven to be effective is multisystemic treatment (MST; Curtis, Ronan & Borduin, 2004). MST is an example of a treatment program that addresses also family problems and parenting skills instead of focusing on only the individual, as most interventions for serious juvenile offenders do. The results of this thesis suggest that MST might be quite appropriate for serious juvenile offenders as an alternative for residential treatment. However, it may be even more appropriate as a module, when applied in combination with modules that target other risk factors, such as the individual or treatment adherence. In this way all the needs of very serious juvenile offenders can be addressed.

Another finding, in line of the foregoing, that has implications for clinical practice is the importance of family factors. In juvenile justice institutions treatment is applied to very serious juvenile offenders, but their parents are often out of the picture. One cause is that parents are often not available, which is part of the problem. However, another cause is that intervention focuses mainly on the individual. Programs for after care and interventions in the family are being developed. The results of this thesis suggest that

parents and aftercare should be an integrated part of treatment. After all, they are often the ones a juvenile offenders returns to for living space or support after release.

Finally, the fact that psychopathology occurs in several subgroups as a risk factor for severity of recidivism indicates that there is a need to address psychopathology, such as a conduct disorder, ADHD, psychotic symptoms and autism spectrum disorder, during treatment. Psychopathology/psychiatric disorders are not always integrated in existing interventions, neither are they integrated in existing instruments for risk assessment (www.justitie.nl, 2009). This implies that this module should be added to the existing range of interventions, or that new interventions that include psychopathology should be developed. In the Netherlands there is a chronic shortage of specialized psychiatrists for offender therapy (Council for the Administration of Criminal Justice and Protection of Juveniles, 2007). This asks for investments in training and recruiting psychiatrists and psychologists for treatment in juvenile justice institutions.

Future research

In this study we found risk factors in serious juvenile offenders not only for overall recidivism, but also for severity of recidivism. Not only static risk factors were found, but also dynamic risk factors, which can be influenced during intervention. We found two statistically significant ways of classifying serious juvenile offenders in subgroups: one on the basis of their criminal careers and one on the basis of their risk profile. The classifications were combined into a joint classification in 18 subgroups of serious juvenile offenders. This enables us to paint a clear picture of differences in characteristics, in risk and in risk profile of all subgroups.

Further research is needed to validate the classification in subgroups we found. After validation, the next aim for future research is to accommodate the classification in subgroups for clinical practice. Existing assessment tools, if needed completed with new assessment tools, can be used to develop an instrument for clinical practice to classify juvenile offenders as an alternative for residential treatment. in subgroups at the start of the treatment. In this way both the assessment procedure and the decision which intervention should be applied can be improved into evidence-based decision making. We may be able then to improve existing care by developing new ways of intervention, with the aim to increase treatment effect.

Of course, in future research the intensity and type of intervention as well as treatment effectiveness should be studied to evaluate whether recidivism can be reduced if the risk factors in the different subgroups are targeted during intervention (for an example of recent research on treatment effectiveness, see Breuk, 2009). Another interesting topic for future research is to find other risk factors that complete the picture in explaining

persistence or desistance of criminal behavior. In this thesis we included both individual and environmental risk factors, both static and dynamic *risk* factors. In future research, also more *protective* factors should be included (Loeber, Pardini, Stouthamer-Loeber & Raine, 2007; De Vogel, De Ruiter, Bouman & De Vries Robbé, 2009) as well as biological risk factors (Raine et al., 2005; Popma et al., 2007). We expect to find an interaction of biological risk factors, protective factors and the risk factors found in this study. When we are able to combine all these different parts of the puzzle, we will probably find more answers relating to the improvement of evidence-based intervention and evidence-based decision making that still need to be addressed, with the aim to reduce very serious juvenile delinquency.

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APPENDIX 1

**The Forensic Profile for Juvenile
offenders (FPJ)**

Appendix 1





1: FAMILY AND ENVIRONMENT	2: HISTORY OF CRIMINAL BEHAVIOR	SOCIAL BEHAVIOR/ INTERPERSONAL RELATIONSHIPS
Young age of onset	Violent behavior in the past	Antisocial behavior in the institution
Accessibility of the parents	Criminal non-violent behavior in the past	Network, emotional support
Parents parenting skills	Number of past offenses	Network, quantity
Authority problems	Severity of past offending	
Involvement with criminal peers		Intimate relationships
Criminal behavior in the family	PSYCHOLOGICAL FACTORS	Prosocial leisure activities
Physical abuse	Lack of empathy	Social skills
Neglect	Lack of conscience	
Sexual abuse	Amendable	
Previous contact with mental health services	Impulse control	BEHAVIOR DURING STAY IN THE INSTITUTION
Substance abuse by parents	Problem insight	Avoidant coping style
Mental health problems, parents	Sexual problems	Negative (aggressive) coping style
Peer rejection	Intelligence/ IQ	Positive (support seeking) coping style
Academic achievement		Therapeutic relationship
Truancy		Lack of treatment adherence
OFFENSE-RELATED RISK FACTORS AND SUBSTANCE USE		Incidents, aggression in the institution
Number of solo offenses	PSYCHOPATHOLOGY	Lack of treatment motivation
Number of group offenses	Anxiety disorder	Self care
Offense during medication stop	Depressive disorder (last year)	Positive commitment to school/work
Substance abuse during/ preceding the offense	Neurological problems	Escape, absconding
Alcohol abuse	Conduct disorder	
Drug abuse	Feelings of hostility	
Gambling	Autism spectrum disorder	
Being acquainted with the victim	Psychothic disorder	
Pedosexuality	Sadism	
Searching for a victim, planning the offense		

APPENDIX 2

**24 subgroups of serious juvenile
offenders on the basis of criminal
carreers and risk profile**

	I: SERIOUS VIOLENT OFFENDERS	II: VIOLENT PROPERTY OFFENDERS	III: PROPERTY OFFENDERS	IV: SEX OFFENDERS
A: ANTISOCIAL IDENTITY	SERIOUS ASSAULT, MANSLAUGHTER, ARSON & MURDER ANTISOCIAL IDENTITY	ASSAULT, ROBBERY, BREAKING & ENTERING, THEFT (HIGH FREQUENT) ANTISOCIAL IDENTITY	BREAKING & ENTERING, THEFT (FREQUENT) ANTISOCIAL IDENTITY	SEX OFFENSE ANTISOCIAL IDENTITY
B: FREQUENT OFFENDERS	SERIOUS ASSAULT, MANSLAUGHTER, ARSON & MURDER FREQUENT OFFENDER	ASSAULT, ROBBERY, BREAKING & ENTERING, THEFT (HIGH FREQUENT) FREQUENT OFFENDER	BREAKING & ENTERING, THEFT (FREQUENT) FREQUENT OFFENDER	SEX OFFENSE FREQUENT OFFENDER
C: FLAT PROFILE	SERIOUS ASSAULT, MANSLAUGHTER, ARSON & MURDER AVERAGE JUVENILE OFFENDER	ASSAULT, ROBBERY, BREAKING & ENTERING, THEFT (HIGH FREQUENT) AVERAGE JUVENILE OFFENDER	BREAKING & ENTERING, THEFT (FREQUENT) AVERAGE JUVENILE OFFENDER	SEX OFFENSE AVERAGE JUVENILE OFFENDER
D: SEXUAL PROBLEMS / WEAK SOCIAL IDENTITY	SERIOUS ASSAULT, MANSLAUGHTER, ARSON & MURDER SEXUAL PROBLEMS, LACK OF SOCIAL & COGNITIVE SKILLS	ASSAULT, ROBBERY, BREAKING & ENTERING, THEFT (HIGH FREQUENT) SEXUAL PROBLEMS, LACK OF SOCIAL & COGNITIVE SKILLS	BREAKING & ENTERING, THEFT (FREQUENT) SEXUAL PROBLEMS, LACK OF SOCIAL & COGNITIVE SKILLS	SEX OFFENSE SEXUAL PROBLEMS, LACK OF SOCIAL & COGNITIVE SKILLS
E: SEXUAL PROBLEMS	SERIOUS ASSAULT, MANSLAUGHTER, ARSON & MURDER SEXUAL PROBLEMS ONLY	ASSAULT, ROBBERY, BREAKING & ENTERING, THEFT (HIGH FREQUENT) SEXUAL PROBLEMS ONLY	BREAKING & ENTERING, THEFT (FREQUENT) SEXUAL PROBLEMS ONLY	SEX OFFENSE SEXUAL PROBLEMS ONLY
F: PROBLEMATIC FAMILY BACKGROUND	SERIOUS ASSAULT, MANSLAUGHTER, ARSON & MURDER PROBLEMATIC FAMILY BACKGROUND	ASSAULT, ROBBERY, BREAKING & ENTERING, THEFT (HIGH FREQUENT) PROBLEMATIC FAMILY BACKGROUND	BREAKING & ENTERING, THEFT (FREQUENT) PROBLEMATIC FAMILY BACKGROUND	SEX OFFENSE PROBLEMATIC FAMILY BACKGROUND

LEGEND

	Too small to take into consideration
	Low risk for recidivism
	Medium risk for recidivism
	High risk for recidivism

English summary

Introduction

In the Netherlands, serious juvenile offenders are placed in juvenile justice institutions under a mandatory treatment order. After two to six years of treatment, the chance of recidivism is supposed to have been reduced considerably. The new offenses that do take place, are supposed to be less severe in nature than the offenses that were committed before treatment. However, until now little research has been done on risk factors that predict recidivism in this group of very serious offenders and that should be aimed at during treatment. In research on effectiveness of interventions, the *What Works principles* are the leading principles when it comes to maximizing treatment effect (Andrews & Bonta, 1995; Landenberger & Lipsey, 2005; Lowenkamp, Latessa & Holsinger, 2006). According to these principles, effective interventions should be developed according to the following themes: the *risk principle*, the *needs principle* and the *responsivity principle*. The *risk principle* implies that intensity of treatment should depend on the risk for recidivism: the higher the risk, the higher treatment intensity should be. The *needs principle* signifies that treatment should aim at the areas which are most problematic and which are related to the criminal behavior. The *responsivity principle* implies that interventions should fit the characteristics of the juveniles it aims at: their level of motivation, the learning ability, and the unique possibilities of the juveniles.

In this thesis we give more insight in the characteristics of serious juvenile offenders, the differences in risk for recidivism, and the risk factors that predict recidivism.

Research questions

1. What are the characteristics of serious juvenile offenders?
2. What risk factors or risk domains predict general recidivism and severity of recidivism within the group of serious juvenile offenders as a whole?
3. Is it possible to distinguish subgroups of serious juvenile offenders on the basis of their criminal careers?
4. Is it possible to distinguish subgroups of serious juvenile offenders on the basis of their risk profile?
5. What risk factors predict not only general recidivism, but also severity of recidivism within the possible subgroups of serious juvenile offenders?

Methods

The participants in this thesis are 1179 of the top 5% most serious juvenile offenders of the Netherlands: those convicted to a mandatory treatment order between 1996 and 2005. This is the most severe measure in Dutch Juvenile Criminal Law. Between 2002

and 2005 the Juvenile Forensic Profile was developed as an instrument to measure risk factors from file information on the juveniles in the sample. The psychometric qualities were tested and found to be satisfactory (chapter 2). To ensure a time at risk of at least two years, only those juvenile offenders were included in the analyses that had been released for at least two years at the time recidivism was registered ($n=728$). For recidivism official offense registration data were used. Severity of recidivism was measured on a twelve-point scale (chapter 3).

Findings

The results of the first study show that serious juvenile offenders are a multi problem group: the age of onset of problem behavior is young and they have a range of problems in the family. Serious juvenile offenders often have contact with antisocial peers, have authority problems and the rate of truancy and school drop out is high. Substance abuse problems are high as are psychological problems, such as lack of conscience and low impulse control. A conduct disorder is the most prevalent psychiatric disorder, and the prevalence of ADHD is high too. The social and cognitive capabilities of serious juvenile offenders are often limited. During treatment, motivation, adherence and therapeutic alliance are problematic. In ten years time, several improvements can be seen in the general picture in the sample of juvenile offenders under a mandatory treatment order. However, although some scores on risk factors improved, the level of problems remained high. Low intelligence was the only risk factor that aggravated over time. Serious juvenile offenders that are convicted to a mandatory treatment order are on average less intelligent today than they were ten years ago.

In chapter 3, the risk factors that predict recidivism in serious juvenile offenders are studied. The results in the third chapter show that overall recidivism is almost 80%. Logistic regression analyses and multiple linear regression analysis showed that the static risk factors 'high number of past offenses' and 'having one/ more unknown victims in past offenses' predict severity of recidivism. Family risk factors and problematic behavior during treatment also predict recidivism and severity of recidivism.

After studying the relationship between seventy risk factors and severity of recidivism, in the fourth chapter, with exploratory and confirmatory factor analysis we found that the seventy risk items can be described by nine meaningful factors. These factors are *Antisocial behavior during treatment*, *Sexual problems*, *Family problems*, *Axis 1 psychopathology*, *Offense characteristics*, *Conscience and empathy*, *Intellectual and social skills*, *Social network* and *Substance abuse*. Recidivists scored higher than non-recidivists on the factors *Offense history* and *Conscience and empathy*, and lower on the factors *Sexual problems* and *Axis 1 psychopathology*. The factors *Antisocial behavior during treatment*,

Family problems and *Axis 1-psychopathology* predict severity of recidivism. However, the explained variance of the regression model was quite low (4-6%) and we found evidence of the existence of subgroups with different recidivism rates. The results lead to the conclusion that a combination of single items probably leads to the best risk prediction. Nevertheless, the results are useful for intervention as they give an indication of risk domains that interventions should aim at.

In [chapter 5](#) we identified four subgroups with Latent Class Analysis on the basis of the criminal careers of the juvenile offenders: low frequent serious juvenile offenders, juveniles that combine violent offenses and property offenses and do so with a high frequency, a subgroup that committed mainly property offenses with a high frequency and sex offenders. Each subgroup was found to have its own risk profile. The results coincide with the developmental trajectories as suggested by Loeber and Hay (1994): [property offenders](#) fit the covert pathway, [serious violent offenders](#) fit the overt pathway and [violent property offenders](#) fit a combination of these two. The fact that all three groups score high on truancy and school dropout as well as having authority problems suggests that they probably followed the authority conflict pathway as well. [Sex offenders](#) are quite different from the other three groups. They are characterized by social problems, psychopathology, low intelligence, low academic achievement and sexual problems. The findings further showed that the four subgroups also differ regarding recidivism rates: [serious violent offenders](#) and [sex offenders](#) commit the most serious offenses before treatment, but after treatment they show the largest reduction in severity of offending. [Violent property offenders](#) and [property offenders](#) are the most serious subgroups *after* treatment. Risk factors that predict severity of recidivism are different for each subgroup.

In the [sixth chapter](#) we found six clusters with cluster analysis, each cluster with its own risk profile. The first cluster consists of [antisocial](#) juvenile offenders: they are characterized by a lack of conscience and empathy and with problematic behavior during treatment. This cluster seems to be the most serious one of the six, with the highest rates for recidivism and severity of recidivism. The second cluster is composed of [frequent offenders](#) with substance abuse problems. We found one cluster that does not show a peak on either one of the risk domains. They have been labelled as the [flat profile](#) group. One cluster consists of juvenile offenders with [problems in the family](#) and during childhood, such being exposed to a lack of parenting skills, domestic violence and neglect. Finally, we found two clusters that are characterized by [sexual problems](#): one [with a lack of social and cognitive skills](#) and one with [sexual problems only](#). These two groups committed mainly sex offenses before treatment. However, they have the lowest recidivism rates of all six groups, although these two clusters are the most serious ones before treatment. Next, the results of regression analysis show that each cluster has its own unique set of risk factors that significantly predicts severity of recidivism. The strength of

the predictive value of the six models differs somewhat; severity of recidivism is harder to predict in the flat profile cluster and the cluster with family problems (the explained variance in these groups is under ten percent; $R^2 = .077 / .08$, $r = .27 / .28$). In the other four clusters, the models for prediction of severity of recidivism are stronger, up to 38% ($R^2 = .115 - .375$, $r = .35 - .62$).

In the final study, the two classifications described in the foregoing studies were combined into a classification in 24 subgroups, with the aim to develop a classification based on both the criminal career and the risk profile. Of these 24 theoretical subgroups, 18 subgroups do actually occur in clinical practice. The static and dynamic risk factors that predict general recidivism and severity of recidivism over all 18 subgroups are shown. The results show differences in rates of recidivism and serious recidivism (appendix 2). According to the *risk principle* intensity of intervention should depend on the level of risk of an offender. The results show which subgroups are the highest risk subgroups:

- violent property offenders with an antisocial identity;
- violent property offenders with sexual problems and a weak social identity;
- violent property offenders with a problematic family background, and
- property offenders with sexual problems and a weak social identity.

Subgroups with considerably lower rates of general and violent recidivism are:

- serious violent offenders with sexual problems only;
- serious violent offenders with sexual problems and a weak social identity;
- sex offenders with sexual problems only, and
- sex offenders with sexual problems and a weak social identity.

Considering the criminal careers of very serious juvenile offenders, the findings show that juveniles who combine violent offenses and property offenses are the highest risk offenders in the sample, no matter what their risk profile is. We have got to do with generalizing behavior, which is apparently hard to influence. Another thing that should be noticed is the fact that serious violent offenders and sex offenders, who committed the most serious offenses *before* treatment, have significantly lower rates of recidivism than the other subgroups *after* release.

Considering the risk profiles of very serious juvenile offenders, the findings show that the two clusters of juveniles with sexual problems contain both subgroups with significantly *higher* rates of recidivism than average, as well as subgroups with significantly *lower* rates of recidivism. This result asks for careful assessment of serious juvenile offenders with sexual problems.

Discussion and implications

In [chapter 8](#) we recapitulated the main findings of this thesis. After a description of the strengths and limitations of the study, theoretical implications of this thesis are given. The classification in four criminal-career-subgroups and the characteristics of each subgroup are in line with the findings of Loeber and Hay (1994). This is remarkable because of the fact that the sample consists of the top 5% most serious juvenile offenders in the Netherlands. Theoretically, these juveniles should have reached the end of the line, that is, have walked multiple pathways and having generalized their criminal behavior. In reality however, we are capable of distinguishing different developmental trajectories *even* in very serious offenders. The specific developmental trajectories of the juveniles are the basis for a fitting approach of serious criminal behavior in juveniles.

Further, the results in this thesis are important for theory on sex offenders. The results show that sex offenders have the lowest rates of recidivism and severity of recidivism of all subgroups of serious juvenile offenders. This finding supports the evidence found in previous research, which suggests that sexual offending may be -at least for a part of juvenile sex offenders- limited to adolescence, and indicative of immature experimentation (Bullens et al, 2006). We found this to be the case even in the very serious offender group in this study. In this respect, our findings support the notion that sex offenses in juveniles are a different phenomenon from sex offenses in adults (Långström & Grann, 2000; Miner, 2002; Nisbet et al, 2004; Letourneau & Miner, 2005). Another implication that follows from the results is that within sex offenders specialists distinguish themselves from so-called generalists. That is, juvenile offenders with sexual problems who 'specialize' in sex offenses are with a lower risk than juvenile offenders with sexual problems who 'generalize', and who also commit violent offenses and property offenses.

Besides the ability to distinguish different developmental trajectories in general and the subdivision of sex offenders specifically, the statistically significant classification of serious juvenile offenders in subgroups has another important implication for theory on the causes of persistent criminal behavior. The classification enables us not only to refine existing theories on serious violent offenders, property offenders and sex offenders, but also to integrate these theories.

Next, implications for clinical practice and public policy are discussed. Effective interventions should be developed according to the *What Works principles*: the *risk principle*, the *needs principle* and the *responsivity principle*. The *risk principle* implies, as stated before, that intensity of treatment should depend on the risk for recidivism. This principle can for instance be applied to juvenile sex offenders.

Within this heterogenic group we found subgroups with a considerably lower risk (specialists) and several high-risk subgroups (generalists). Careful assessment of juvenile

sex offenders is therefore needed to decide what the intensity of treatment should be. Although the base rate of juvenile sex offending is low, the presence of several high-risk subgroups asks for interventions, which aim at these groups.

The *needs principle* states that interventions should meet the needs of juvenile offenders. This means that the risk factors that predict recidivism and severity of recidivism are the first ones that should be targeted during treatment. These risk factors are different for each subgroup. We therefore plea for modular treatment, which can be adapted to fit the needs of the subgroup a juvenile offender belongs to. With risk assessment juvenile offenders can be classified into subgroups. Next, depending on the needs of that specific subgroup, an intervention aimed at the individual can for example be combined with an intervention which targets the parents and which provides aftercare. Combining these interventions can lead to an effective approach of serious juvenile offending.

The results further show that psychopathology occurs in a significant number of subgroups as a risk factor for severity of recidivism, which indicates that there is a need to address psychopathology during treatment. In the Netherlands however, there is a chronic shortage of specialized psychiatrists for offender therapy (Raad voor Strafrechtstoepassing en Jeugdbescherming, 2007). This asks for investments in training and recruiting psychiatrists and psychologists for treatment in juvenile justice institutions.

Finally, the *responsivity principle* implies that interventions should fit the characteristics of the juveniles it aims at. The results show that a large portion of serious juvenile offenders has an IQ lower than average and a lack of social skills. Further, treatment motivation is a problem for most juvenile offenders. We may conclude that, in order to meet the *responsivity principle*, every intervention should pay attention at treatment adherence (for instance, by Motivational Interviewing; Miller & Rollnick, 2002) and interventions should fit the limited cognitive capacities of the juveniles (for instance by using concrete language and material, a lot of repetition and 'learning by doing'). This is an important finding since most existing interventions have been developed for juveniles with average cognitive skills.

Finally, several recommendations are given for future research. First, further research is needed to validate the classification in subgroups that was found in this thesis. The next step after validation is to accommodate the classification in subgroups for clinical practice. Existing assessment tools, if needed completed with new assessment tools, can be used to develop a screening instrument for clinical practice to classify juvenile offenders in subgroups at the start of treatment. In this way both the diagnostic procedure and the decision which intervention should be applied can be improved. Further, in future research the effectiveness of interventions should be studied to evaluate whether recidivism can actually be reduced if the risk factors in the different subgroups are targeted during intervention. Another interesting topic for future research is to find

other risk factors, such as biological factors, that explain persistence and desistance of criminal behavior. When we are able to combine all these different parts of the puzzle, we can form a clearer image of the way to adequately cope with serious juvenile offending with the aim to reduce recidivism.

Nederlandse samenvatting

Introductie

In Nederland worden ernstige jeugdcriminelen in een Justitiële Jeugdinrichting geplaatst met een PIJ-maatregel (Plaatsing In een Jeugdinrichting). Na twee tot zes jaar behandeling moet de kans op recidive aanzienlijk zijn verminderd. De nieuwe delicten die plaatsvinden moeten minder ernstig zijn dan de delicten die werden gepleegd vóór behandeling. Tot nu toe is er echter weinig onderzoek gedaan naar de risicofactoren die recidive voorspellen in deze ernstige groep en waar men zich tijdens behandeling op zou moeten richten. In onderzoek naar de effectiviteit van interventies is het *What Works principe* leidend als het gaat om het bereiken van een zo groot mogelijk behandel-effect. Volgens dit principe zouden effectieve interventies moeten worden ontwikkeld volgens de volgende thema's: het *risk principe*, het *needs principe* en het *responsivity principe*. Volgens het *risk principe* moet de intensiteit van behandeling afhangen van de kans op recidive: hoe hoger het risico, des te hoger de intensiteit. Bij het *needs principe* moet de behandeling aansluiten bij de specifieke behoeften van de jongeren: de risicofactoren die samenhangen met recidive moeten worden aangepakt. Het *responsivity principe* tot slot schrijft voor dat behandeling moet passen bij de kenmerken van de jongeren: motivatie, intelligentie, individuele mogelijkheden en onmogelijkheden. In dit proefschrift wordt meer inzicht gegeven in de kenmerken van ernstige jeugdcriminelen, de verschillen in recidiverisico en de risicofactoren die recidive voorspellen.

Onderzoeksvragen

1. Wat zijn de kenmerken van ernstige jeugdige criminelen?
2. Welke risicofactoren of risicogebieden voorspellen algemene recidive en ernst van recidive bij ernstige jeugdige criminelen?
3. Kunnen ernstige jeugdige criminelen worden ingedeeld in subgroepen op basis van hun criminele carrières?
4. Kunnen ernstige jeugdige criminelen worden ingedeeld in subgroepen op basis van hun risicoprofiel?
5. Welke risicofactoren voorspellen algemene recidive en ernst van recidive in mogelijke subgroepen ernstige jeugdige criminelen?

Methode

De 1179 proefpersonen in dit proefschrift behoren tot de top 5% meest ernstige jeugdige criminelen van Nederland: jongeren met een PIJ-maatregel. Dit is de zwaarste maatregel in het Nederlands Jeugdstrafrecht en de steekproef bestaat uit de jongeren die zijn veroordeeld tussen 1996 en 2005. Tussen 2002 en 2005 is de Forensisch Profielen

en Jeugd-lijst (FPJ-lijst) ontwikkeld om risicofactoren te meten in de dossiers van jongeren met een PIJ-maatregel. De psychometrische kwaliteiten van de lijst zijn onderzocht en voldoen aan de gestelde eisen (hoofdstuk 2). Om ervoor te zorgen dat de *time at risk* minimaal twee jaar was, zijn alleen die jongeren in de analyses betrokken die ten minste twee jaar buiten de jeugdinrichting verbleven op het moment dat recidive werd geregistreerd. Voor recidive zijn officiële veroordelinggegevens gebruikt. Ernst van recidive werd gemeten op een 12-puntsschaal (hoofdstuk 3).

Resultaten

De resultaten van het eerste onderzoek laten zien dat ernstige jeugdcriminelen een groep zijn met een grote hoeveelheid problemen: het probleemgedrag begint op jonge leeftijd en er zijn allerlei problemen in het gezin. Ernstige jeugdcriminelen hebben vaak antisociale vrienden, autoriteitsproblemen, ze spijbelen veel of stoppen voortijdig met school. Middelenmisbruik komt veel voor, net als psychologische problemen, zoals een gebrekkige gewetensontwikkeling en een lage impulscontrole. Een gedragsstoornis komt vaak voor en veel ernstige jeugdcriminelen hebben ADHD. De sociale en cognitieve kwaliteiten van deze jongeren zijn vaak beperkt. Tijdens behandeling vormen motivatie, therapietrouw en de band met de therapeut een probleem. De afgelopen tien jaar zijn er enkele verbeteringen zichtbaar in de groep jongeren met een PIJ-maatregel, maar hoewel de scores op individuele risicofactoren soms iets verbeterden, bleef het niveau van problemen onveranderd hoog. De risicofactor 'intelligentie' verergerde in de loop der jaren: jongeren met een PIJ-maatregel zijn nu gemiddeld minder intelligent dan tien jaar geleden.

In hoofdstuk 3 wordt onderzoek beschreven naar de risicofactoren die recidive voorspellen bij ernstige jeugdcriminelen. Algemene recidive in deze groep is bijna 80%. Logistische regressieanalyse en multiële lineaire regressieanalyse tonen aan dat de statische risicofactoren 'aantal delicten in het verleden' en 'het hebben van een onbekend slachtoffer' ernst van recidive voorspellen. Risicofactoren die te maken hebben met de opvoeding en probleemgedrag tijdens behandeling voorspellen ook recidive en ernst van recidive.

In het vierde hoofdstuk vonden we met behulp van factoranalyse dat 70 risicofactoren kunnen worden samengevat in 9 risicogebieden. Deze risicogebieden zijn: *antisociaal gedrag tijdens behandeling, seksuele problemen, gezinsproblemen, As1 psychopathologie, delictkenmerken, geweten en empathie, cognitieve en sociale capaciteiten, sociaal netwerk en middelengebruik*. Recidivisten scoren hoger dan niet-recidivisten op de gebieden *delictkenmerken* en *geweten en empathie*, en lager op de gebieden *seksuele problemen* en *As1 psychopathologie*. De gebieden *antisociaal gedrag tijdens behandeling, gezinsproble-*

men en *As1 psychopathologie* voorspellen ernst van recidive. De verklaarde variantie van het regressiemodel is echter laag (4-6%) en we vonden aanwijzingen voor het bestaan van subgroepen met verschillen in recidive. De resultaten leidden tot de conclusie dat een combinatie van losse risicofactoren waarschijnlijk leidt tot een betere voorspelling van de kans op recidive. Desalniettemin zijn de resultaten nuttig voor interventie, omdat zij een indicatie geven van de risicogebieden waar behandeling zich op zou moeten richten.

In hoofdstuk 5 vonden we vier subgroepen met latente klassenanalyse op basis van de criminele carrières van de jongeren: ernstige geweldsdelinquenten, jongeren die gewelds- en vermogensdelicten combineren, een groep die vooral vermogensdelicten pleegt en jeugdige zedendelinquenten. Elke subgroep bleek haar eigen set risicofactoren te hebben, die ernst van recidive voorspelt. De resultaten komen overeen met de ontwikkelingspaden van Loeber en Hay (1994) die worden beschreven in hoofdstuk 1: vermogensdelinquenten volgen het ontwikkelingspad van heimelijk probleemgedrag, ernstige geweldsdelinquenten volgen het ontwikkelingspad van openlijk probleemgedrag en jongeren die gewelds- en vermogensdelicten combineren volgen beide paden. Het feit dat alle drie de groepen spijbelen en autoriteitsproblemen vertonen, wijst erop dat ze ook het ontwikkelingspad van autoriteitsconflicten volgen. Zedendelinquenten wijken af van de andere drie groepen. Zij worden gekenmerkt door sociale problemen, psychopathologie, een lage intelligentie en seksuele problemen. De resultaten laten verder zien dat recidive verschilt tussen de vier subgroepen: ernstige geweldsdelinquenten en zedendelinquenten plegen de meest ernstige delicten vóór behandeling, maar na behandeling laten zij de grootste afname in ernst zien. Gewelds- en vermogensdelinquenten en vermogensdelinquenten zijn de subgroepen die het meest ernstig recidiveren na behandeling. Risicofactoren die ernst van recidive voorspellen verschillen per subgroep.

In het zesde hoofdstuk vonden we met behulp van clusteranalyse zes clusters, elk met zijn eigen risicoprofiel. Het eerste cluster bestaat uit antisociale jeugdige criminelen: deze jongeren hebben een gebrekkig geweten, weinig empathie en vertonen probleemgedrag tijdens behandeling. De jongeren in dit cluster recidiveren het meest en het meest ernstig. Het tweede cluster bestaat uit veelplegers met problemen met middelengebruik. We hebben één cluster gevonden met een gemiddelde score op alle risicodomeinen: de groep met een vlak profiel. Eén cluster bestaat uit jongeren met problemen in het gezin en tijdens hun jeugd, zoals gebrekkige opvoedingsvaardigheden van hun ouders, huiselijk geweld en verwaarlozing. Tot slot vonden we twee clusters die worden gekenmerkt door seksuele problemen: één met enkel seksuele problemen en één met daarbij zwakke sociale en cognitieve vaardigheden. Deze twee groepen pleegden vooral zedendelicten vóór behandeling. Hoewel deze twee groepen zeer ernstige delicten pleegden vóór behandeling, hebben ze verreweg de laagste recidive-

cijfers van alle clusters. De resultaten van regressieanalyse tonen aan dat elk cluster zijn eigen unieke combinatie van risicofactoren heeft, die ernst van recidive voorspelt. De voorspellende waarde van de zes modellen verschilt: ernst van recidive is moeilijker te voorspellen in het cluster met een vlak profiel en in het cluster met gezinsproblemen (de verklaarde variantie in deze groepen is minder dan 10%). De modellen in de andere vier clusters zijn sterker (de verklaarde variantie in deze groepen varieert van 12% tot 38%).

In het zevende hoofdstuk worden de twee manieren van classificeren die hierboven zijn beschreven gecombineerd tot een indeling in 24 subgroepen. Het doel hiervan was om een groepsindeling te vinden die gebaseerd is op zowel de criminele carrière als het risicoprofiel. Van de 24 subgroepen blijken er 18 voor te komen in de klinische praktijk. In een overzicht worden de statische en dynamische risicofactoren die ernst van recidive voorspellen beschreven in alle 18 subgroepen. De subgroepen verschillen van elkaar wat betreft recidive en ernst van recidive (zie appendix 2). Volgens het *risk principe* moet de intensiteit van interventie afhangen van het recidiverisico van de behandelde criminele jongere. De subgroepen met het hoogste recidiverisico zijn:

- jongeren die gewelds- en vermogensdelicten combineren *en* antisociaal zijn;
- jongeren die gewelds- en vermogensdelicten combineren *en* gezinsproblemen hebben;
- jongeren die gewelds- en vermogensdelicten combineren *en* seksuele problemen hebben met zwakke sociale en cognitieve vaardigheden, en
- jongeren die vooral vermogensdelicten plegen *en* seksuele problemen hebben met zwakke sociale en cognitieve vaardigheden.

Subgroepen met een aanzienlijk lager risico op recidive zijn:

- jongeren die ernstige geweldsdelicten plegen *en* seksuele problemen hebben;
- jongeren die ernstige geweldsdelicten plegen *en* seksuele problemen hebben met zwakke sociale en cognitieve vaardigheden;
- jongeren die voornamelijk zedendelicten plegen *en* seksuele problemen hebben, en
- jongeren die voornamelijk zedendelicten plegen *en* seksuele problemen hebben met zwakke sociale en cognitieve vaardigheden.

Kijkend naar het delictverleden is te zien dat ernstige jeugdige criminelen die gewelds- en vermogensdelicten combineren de meest risicovolle jongeren zijn in de onderzoeksgroep, *ongeacht* hun risicoprofiel. We hebben te maken met generaliserend gedrag, dat kennelijk moeilijk te beïnvloeden is. Voorts blijkt dat jongeren die vóór behandeling de meest ernstige delicten pleegden (ernstige geweldsdelicten respectievelijk zedendelicten), ná behandeling aanzienlijk minder recidiveren dan de andere subgroepen.

Kijkend vanuit het risicoprofiel zien we binnen de twee clusters met seksuele problemen een gedifferentieerd beeld wat betreft het recidiverisico: de clusters bevatten zowel subgroepen met een significant hoger, als met een significant lager recidiverisico. Dit vraagt om zorgvuldige diagnostiek bij jongeren met dit profiel.

Discussie en aanbevelingen

In hoofdstuk 8 worden de belangrijkste uitkomsten van dit proefschrift gerecapituleerd. Na beschrijving van de sterke en zwakke kanten van dit onderzoek, worden de theoretische implicaties die voortvloeien uit de gevonden resultaten besproken. De classificatie in vier subgroepen op basis van crimineel verleden en de kenmerken van elke subgroep sluiten aan bij de bevindingen van Loeber en Hay (1994). Dit is opmerkelijk gezien het feit dat de onderzoeksgroep bestaat uit de 5% meest ernstige jeugdige criminelen in Nederland. In theorie zouden deze jongeren het eind van hun criminele ontwikkeling moeten hebben bereikt, waarbij ze meerdere paden hebben doorlopen en aldus criminele generalisten zijn geworden. In de praktijk blijkt echter dat we zelfs bij deze zeer ernstige jeugdcriminelen de verschillende ontwikkelingspaden nog kunnen onderscheiden; hun specifieke criminele ontwikkeling blijft zichtbaar. Deze verschillende ontwikkelingspaden vormen het uitgangspunt voor een adequate aanpak van ernstig crimineel gedrag bij jongeren.

De gevonden resultaten zijn eveneens van belang voor de theorie over jeugdige zedendelinquenten. Uit de resultaten blijkt dat de jeugdige zedendelinquenten het minst recidiveren van alle subgroepen van ernstige jeugdcriminelen. Dit sluit aan bij resultaten van eerder onderzoek, die suggereren dat zedendelicten bij een deel van de jeugdige criminelen beperkt blijven tot de adolescentie en daarmee een extreme vorm van experimenteelgedrag zijn. Ook voor deze zeer ernstig criminele groep blijkt dit te gelden. In dit opzicht zijn zedendelicten gepleegd door jeugdigen een wezenlijk ander fenomeen dan zedendelicten gepleegd door volwassenen. Verder blijkt uit dit onderzoek dat jeugdige zedendelinquenten kunnen worden onderverdeeld in specialisten en generalisten. Jongeren met seksuele problemen die zich 'specialiseren' in zedendelicten, recidiveren aanzienlijk minder dan jongeren die generaliseren en naast zedendelicten ook gewelds- en vermogensdelicten plegen.

Naast het herkennen van de ontwikkelingspaden in het algemeen en de onderverdeling van de groep zedendelinquenten in het bijzonder, heeft deze statistisch onderbouwde indeling van deze heterogene groep ernstige jeugdcriminelen in subgroepen nog een belangrijke implicatie voor de theorie over de oorzaken van persistent crimineel gedrag. Deze indeling maakt het namelijk mogelijk om niet alleen de bestaande theorieën over gewelds-, vermogens- en zedendelinquenten te verfijnen, maar deze theorieën ook te integreren.

Na de theoretische implicaties worden aanbevelingen voor behandeling en beleid besproken. Effectieve interventies zouden moeten worden ontwikkeld volgens de *What Works principles*: het *risk principe*, het *needs principe* en het *responsivity principe*. Volgens het *risk principe* moet de intensiteit van behandeling zoals gezegd afhangen van de kans

op recidive. Dit principe kan bijvoorbeeld worden toegepast bij jeugdige zedendelinquenten. Binnen deze heterogene groep vonden we immers subgroepen met een laag risico (specialisten) en subgroepen met een hoog risico op recidive (generalisten). Een zorgvuldige diagnostiek van jongeren die zedendelicten plegen is derhalve noodzakelijk om de intensiteit van behandeling te bepalen. De *base rate* van jeugdige zedendelinquenten is weliswaar laag, maar de aanwezigheid van enkele subgroepen met een zeer hoog risico vraagt om interventies gericht op deze ernstige criminele jongeren. Het *needs principe* stelt vervolgens dat interventies moeten aansluiten bij de behoeften van de jongeren. Dit betekent dat de behandeling zich in eerste instantie moet richten op *die* risicofactoren die recidive en ernst van recidive voorspellen. Die risicofactoren verschillen per gevonden subgroep. Om aan te sluiten bij de specifieke behoeften per subgroep is het dan ook wenselijk dat de behandeling modulair kan worden samengesteld. Als na diagnostiek is vastgesteld tot welke subgroep een jongere behoort, kan al naar gelang de behoefte bijvoorbeeld een interventie gericht op de individuele jongere met een interventie gericht op de ouders en nazorg worden gecombineerd tot een effectieve totaalbehandeling.

Een andere in het oog springende uitkomst van het onderzoek is dat psychopathologie in een groot aantal subgroepen voorkomt als risicofactor voor ernst van recidive, wat betekent dat er een duidelijke vraag is naar psychiatrische behandeling bij deze ernstige criminele jongeren. In Nederland is echter een chronisch tekort aan kinder- en jeugdpsychiaters die gespecialiseerd zijn in daderbehandeling. Investerings in het rekruteren en opleiden van psychiaters en psychologen voor behandeling in Justitiële Jeugdinrichtingen zijn nodig om aan deze vraag tegemoet te komen.

Het *responsivity principe* ten slotte vraagt dat interventies aansluiten bij de kenmerken van de jongeren waarvoor ze bedoeld zijn. Dit onderzoek toont aan dat een groot deel van de ernstige jeugdige criminelen een beneden gemiddeld IQ heeft en gebrekkige sociale vaardigheden. Daarnaast is motivatie om mee te werken aan behandeling voor de meeste jongeren een probleem. Geconcludeerd kan worden dat om aan het *responsivity principe* te voldoen, elke interventie aandacht moet besteden aan het motiveren voor behandeling en aan moet sluiten bij de beperkte cognitieve capaciteiten van de jongeren (bijvoorbeeld door het gebruik van concreet taalgebruik en beeldmateriaal, veel herhaling en 'leren door doen'). Dit is een belangrijk aandachtspunt, gezien het feit dat veel erkende interventies ontwikkeld zijn voor normaal begaafde jongeren.

Tot slot enkele aanbevelingen voor vervolgonderzoek. Allereerst dient de classificatie in subgroepen te worden gevalideerd. Na validatie moet de indeling worden aangepast voor gebruik in de klinische praktijk. Bestaande instrumenten voor risicotaxatie, zo nodig aangevuld met nieuwe instrumenten, kunnen worden gebruikt om een checklist te ontwikkelen voor de klinische praktijk om jongeren bij aanvang van behandeling in

subgroepen in te kunnen delen. Op deze manier kunnen zowel de diagnostiek als de beslissing welke interventie(s) moet(en) worden toegepast worden verbeterd. Verder is onderzoek wenselijk naar de effectiviteit van de interventies om te evalueren of recidive daadwerkelijk daalt als de risicofactoren per subgroep worden aangepakt. Ten slotte is onderzoek nodig naar andere risicofactoren, zoals biologische, die ernstig crimineel gedrag en recidive nader verklaren. Als we er in slagen om al deze puzzelstukjes te combineren, ontstaat een completer beeld hoe ernstige jeugdcriminaliteit effectief kan worden gereduceerd.

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Lieve Marcel, vanaf april 2008 reizen we samen. Het delen met jou heeft de reis zo ontzettend veel mooier gemaakt. Ik waardeer het heel erg je er bent, dankjewel voor je interesse, voor je vragen, je betrokkenheid. En bedankt voor de samenwerking. Het is heerlijk om klussen over te kunnen laten aan iemand en te weten dat het goed zit. Het bijhouden van de literatuurlijst werd voor jou bijna een hobby. Je hield steeds bij wat er nog moest gebeuren en hield me scherp waar nodig. Vol overgave stortte je je op het ontwerpen van de kaft. Jij was zo mogelijk nog blijer als er een artikel werd geaccepteerd dan ik en zo mogelijk nog meer teleurgesteld na een afwijzing. Met jou heb ik echt genoten. Waar je zo vaak hoort dat de laatste loodjes het zwaarst wegen, was voor mij het laatste halfjaar van het onderzoek het beste. Ik ben er echt dankbaar voor dat ik dat met jou heb mogen delen. Op naar het volgende avontuur!

Curriculum Vitae

Evangeline Aleida Mulder werd op 26 juni 1980 geboren in Amsterdam. In 1998 behaalde ze het gymnasium diploma cum laude aan het St. Ignatiusgymnasium in Amsterdam. Ze begon in datzelfde jaar met de studie psychologie aan de Universiteit Leiden. Eva studeerde met genoegen af in de richting ontwikkelings- en onderwijspsychologie, maar specialiseerde zich in een extra jaar studie in de forensische psychologie door diverse keuzevakken te volgen aan zowel de Universiteit Leiden als de Vrije Universiteit in Amsterdam. In 2002 werkte ze als student-assistent mee aan het scholenproject van het Nederlands Studiecentrum Criminaliteit en Rechtshandhaving. Haar stage vervulde ze bij Stichting FORA, waar ze zich bezig hield met forensische diagnostiek in de vorm van rapportage pro justitia. Na haar afstuderen in 2003 bleef Eva drie dagen in de week werkzaam bij Stichting FORA en begon daarnaast met het opzetten van haar promotieonderzoek. In augustus 2005 kreeg ze een aanstelling van twee dagen in de week bij het ErasmusMC, afdeling forensische psychiatrie, waar ze haar promotieonderzoek uiteindelijk kon gaan uitvoeren in samenwerking met de Dienst Justitiële Inrichtingen van het Ministerie van Justitie. In 2007 verruilde ze haar baan bij Stichting FORA voor een baan bij De Waag, centrum voor ambulante forensische psychiatrie, waar ze nog steeds drie dagen in de week werkzaam is als behandelaar. Daarnaast is ze betrokken bij het vervolg van het promotieonderzoek.

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