Age of onset of disruptive behavior of residentially treated adolescents

Boer, S.B.B. de

Chapter 7

Summary and general discussion

References

Nederlandse samenvatting (summary in Dutch)

List of publications

Dankwoord (acknowledgements in Dutch)

Curriculum Vitae

Summary and general discussion

This dissertation aimed at identifying subgroups, within an inpatient cohort of youths characterized by psychiatric disorders combined with severe disruptive behavior, based on the age of onset of their disruptive behavior. The question was, whether the distinction between life-course persistent (LCP) and adolescence-limited (AL) antisocial behavior (Moffitt, 1993; Moffitt et al., 1996), was relevant in clinical practice for predicting severity of problems and treatment outcome. After dividing the clinical sample into subgroups of early-onset (EO) disruptive behavior and adolescent-onset (AO) disruptive behavior, subgroups were compared on proximal (i.e., dropout, and psychosocial functioning at discharge) and distal outcomes (i.e., social functioning 18 months after discharge). It was hypothesized that the outcomes for individuals with EO disruptive behavior would be worse than for individuals with AO disruptive behavior. EO was expected to have a higher chance at dropout and when treated, their problems would have a higher likelihood of persistence. The incentive to differentiate within the patient population was asked for by clinicians of the orthopsychiatric facility, who felt encouraged by results from previous research conducted at their facility (Bruinsma & Boon, 2001). It was assumed that further differentiation based on age of onset of disruptive behavior, enables individualization of interventions and optimization of treatment results.

Summary of main findings

In chapter 2, the aim was to examine whether a subsample of our inpatient group could be discriminated from a non treatment control sample based on information recorded early in their lives. In most cases this information was recorded before these children came into contact with mental health care because of their behavioral problems. At two specific moments (i.e., April 2006 and March 2009), all adolescents who were then in treatment at the institution (n=49) were asked for permission to access their youth health care files. All youth health care files traced containing complete data, were examined (n=24). These files were kept from early infancy on to monitor the growth and development of children. Our analyses focused on written descriptions made by health professionals and teachers at the time that the

respondents were five years of age. Contrary to nowadays practice in The Netherlands, professionals at that time did not specifically report on disruptive behavior, although they had the opportunity to indicate any striking features of the child. The files of the subsample were compared to those of a control group matched on their date of birth and sex, who in adolescence had no reported history of behavioral or psychiatric problems. Results indicated that both teachers and professionals made significantly more remarks regarding disruptive behavior in the files of the future inpatients. The area's under the curve (AUC), indicating sensitivity (the probability that a child with disruptive behavior at the age of five will belong to the orthopsychiatric sample) and specificity (the probability that a child without disruptive behavior at the age of five will belong to the control group) were significant. For the teachers' remarks the AUC was .79, and for the YHC professionals' remarks the AUC was .73.

Next, chapter 3 aimed to examine whether participants admitted to the orthopsychiatric facility (n=203) with EO disruptive behavior (n=134) differed from individuals with AO disruptive behavior (n=69) on childhood characteristics. Results showed that the two groups differed on a number of childhood characteristics that previously have been associated with life-course persistent and adolescence-limited antisocial behavior. Individuals with grade retention in primary school, childhood impulsive behavior, and a history of physical abuse, had the highest probability of being in the EO group.

The aim of chapter 4 was to examine the outcome (i.e., reduction of symptoms between admission and discharge) of individuals with EO (n=85) versus AO disruptive behavior (n=60). This was prompted by the suggestion that individuals with LCP antisocial behavior would be less susceptible to treatment (Moffitt et al., 2008; Moffitt et al., 1996). Outcome of the sample was determined using change in mean scores between admission and discharge as well as the Reliable Change Index (Hageman & Arrindell, 1999, 1999a; Jacobson & Truax, 1991) on the Symptom Checklist (SCL-90-R)(Arrindell & Ettema, 2003). Dropout was included because it indicates likelihood of being treated. The results showed that the EO group more often dropped out than the AO group (44.4% versus 24.7%). As regards outcomes on the SCL-90-R, improvements in both onset groups were similar.

In chapter 5**,** the aim was to examine differences between dropouts (n=77) and completers (n=147) on known risk factors. In addition, EO disruptive behavior, and specific types of disruptive behavior and their relation to dropout were considered. The dropout group was further sub classified into withdrawal (n=40) and pushout (expulsion, n=37). It was found that dropouts compared to completers more commonly were male, showed more frequent cannabis use prior to treatment, more often displayed disruptive behavior at school and belonged more often to the EO group. Also, individuals with EO disruptive behavior dropped out almost three times as often as AO counterparts. Further, adolescents who had used cannabis prior to treatment dropped out twice as often as those without previous cannabis use. Within the dropout group, no differences in risk factors or types of disruptive behavior were found between withdrawals and pushouts.

The aim of the study in chapter 6 was to examine the 18 month outcome of the dropouts (n=67) and completers (n=129) after leaving the orthopsychiatric facility. General daily functioning was the outcome assessed. It was found that compared to dropout, treatment completion was associated with more stable living conditions, having a daytime activity, and absence of delinquent behavior. To control for the possible effect of the covariates (of chapter 5) associated with dropout in our sample, EO disruptive behavior, cannabis usage prior to admission and male sex were also examined. The results indicated that treatment completion, compared to dropout, was the best predictor for good general daily functioning at follow-up explaining 10.1% of the variance. EO disruptive behavior, cannabis usage prior to admission and male sex, added to the explained variance over and above treatment completion.

General discussion

Overall, this thesis shows that differentiating between individuals with EO and AO disruptive behavior, within a specific orthopsychiatric sample carries some clinical relevance. Although our group is highly selective, which hampers generalizability, the results are informative at group level. The distinction between EO and AO, together with the other predictors (i.e., cannabis use prior to treatment, male sex), was mainly relevant in the relation to dropout. As the explained variances were low, it must be recognized that other unknown factors carry relevance as well. Nevertheless, at the

start of treatment, practitioners could take these predictors into account to assess whether there is an increased risk of dropout. The finding that individuals with EO disruptive behavior had higher chance at dropout, may indicate that for them the treatment was less effective. In reverse, individuals with EO disruptive behavior who completed treatment reported similar outcome as those with AO disruptive behavior. Although the EO and AO groups were not identical to the LCP and AL groups, this finding seems to contradict the idea (Moffitt et al., 2008; Moffitt et al., 1996) that individuals with LCP antisocial behavior would be less susceptible to treatment.

Usefulness of age of onset in clinical practice

The developmental taxonomy of Moffitt has influenced the DSM IV (and subsequently the DSM 5) classification of conduct disorder, by subdividing the conduct disorder classification into childhood onset versus adolescent onset (before or after age 10). By incorporating this sub classification in the DSM, it was assumed that the onset of behavioral problems carries clinical importance. In reverse, the usefulness for clinical practice has up till now not been demonstrated, and has even been questioned by some (e.g., Colins & Vermeiren, 2013; Jambroes et al., 2016).

In the current thesis, some evidence supporting the age of onset classification is presented. The fact that we found fewer differences between the EO and AO groups than we had expected, may partly be due to the severity of the AO group's pathology. After all, the sample examined in the present thesis is a very specific clinical group with complex and severe behavioral problems. Although we knew this beforehand, it nevertheless seemed relevant to examine whether the distinction between EO and AO was important in this complex group.

Although for youth with disruptive behavior specific treatment was shown effective overall (Bennett & Gibbons, 2000; Kazdin, 2016; Kazdin et al., 1994; McCart et al., 2006; Serketich & Dumas, 1996; M. Shaw et al., 2012; Van der Pol et al., 2017), individual differences are substantial. In accordance with the risk-need-responsivity model (see e.g., Andrews & Bonta, 2010), treatment should address the needs of the individuals to whom the treatment is targeted. In this light, it makes sense to differentiate in order to get a better view on individuals who may or may not benefit from a specific treatment. Our findings show that a distinction based on the onset of

behavioral problems in a sample with psychiatric disorders and severe disruptive behavior is only partially useful in clinical practice. Both onset groups changed to the same extent by the end of treatment (i.e., self reported symptom reduction between admission and discharge) (chapter 4). As we have no control group, we do not know whether the improvement is due to the intensive, highly specialized, tailored treatment that was provided. The distinction in onset only seemed relevant in relation to dropout (chapter 4 and chapter 5). As explained variances were low, there were several other factors involved beside the onset of the behavioral problems. As described later in this chapter, there are limitations regarding the retrospective determination of the age of onset and these undoubtedly affected the meaningfulness of the distinction. Also, age of onset has very likely less value in our high risk sample than in a normal population, since all subjects had severe problems.

In youth with severe disruptive behavior, other differentiating factors are likely to be helpful as well, for instance callous unemotional (CU) traits (Frick, Ray, Thornton, & Kahn, 2014; Hawes, Price, & Dadds, 2014) or the related DSM specifier limited prosocial emotions. The "with Limited Prosocial Emotions (LPE)" specifier was added to the conduct disorder (CD) diagnosis of the DSM 5. Individuals with LPE are most likely to show elevated rates of CU traits (Dandreaux & Frick, 2009) and thus considered to comprise a severe antisocial subgroup of CD. It has been argued that the LPE specifier is informative regarding the effectiveness of interventions (Frick et al., 2014). Indeed, CU traits were demonstrated to be related to poor treatment outcome for both children and adolescents (Hawes et al., 2014). Furthermore, the LPE subtyping does seem to be limited to the childhood onset CD group (Frick, 2016). In this regard, subdividing the EO group into an EO group with and without LPE is considered to go beyond the distinction solely based on age of onset. However, research on the added value of the LPE specifier for clinical practice is still sparse and there are studies that question the clinical relevance and predictive value of the LPE specifier (Colins & Vermeiren, 2013; Jambroes et al., 2016). Beside, the LPE specifier was shown to explain just a limited part of the variance (Jambroes et al., 2016), as was the case with the EO versus AO distinction. Therefore, a subdivision based on this specifier will probably again be of limited value for clinical samples. Also, the question is whether it

is useful at all to make a division into age or into LPE, because reality is obviously too complex to be captured in dichotomies.

Dropout

While Moffitt (2008) previously suggested a relation between EO disruptive behavior and dropout, this had thus far not been objectified. Recently however, Kazdin (2016) stated that the greater the impairment of children and their families, the greater the challenge to keep them in treatment. He also argued that some factors (e.g., current stressors in the home, socioeconomic disadvantage) tended to have more impact on dropping out than on treatment outcomes in terms of reduction of symptoms. In this light it makes sense that individuals with EO disruptive behavior, who are more likely to lack the necessary support from their social environment, feel less inclined to complete treatment. Maybe the higher chance at dropout of the EO group is above all associated with their long history of a diversity of often failing treatments. Presumably, their experiences thwarted their expectations of another mental health intervention. Such a history on itself probably increases the risk of dropout during treatment at De Fjord, regardless of the onset of the disruptive behavior. Additionally, this may also be related to levels of callous unemotional traits of the EO group. These traits have for instance been associated with higher levels of aggression (Jambroes et al., 2016), increasing the likelihood of expulsion. The latter was not confirmed in the present thesis (chapter 5), because the ratio between both types of dropout were the same for both onset groups.

Finding ways to motivate the youngsters for treatment is of utmost importance. Reducing dropout is a necessity, as it is a likely indicator of effectiveness. Perhaps some of the individuals need a different approach, other than restrictive intervention in an institution that is far away from their home. An intensive, outpatient intervention as Multi Systemic Therapy (MST)(Henggeler, Melton, & Smith, 1992) or Multidimensional Family Therapy (MDFT)(Liddle et al., 2001) may be an alternative for some, although thus far there is no evidence that these approaches are effective for this specific group. Therapists and policymakers do think that at least some of the target group may better off in outpatient care. In The Netherlands, the substitution of residential facilities with outpatient care is stimulated for many years now and is an

ongoing process. In itself this can be regarded as a favorable development, provided that intensive home care is offered. A great advantage may be that, when the personal situation allows, individuals can stay in their own environment. This may have a positive effect on clients as well as their families. Outpatient treatment necessitates that the facility is within easy traveling distance, which in a practical sense makes it easier to apply a systemic approach, compared to inpatient facilities that likely are at a greater travel distance. Also, it increases the likelihood, for those in an outpatient facility, of organizing a gradual transition back to the home environment. Overall, residential treatment should only be indicated if intensive outpatient intervention, such as MDFT (Liddle et al., 2001) and MST (Henggeler et al., 1992), has been considered first. Considering the severity of problems and in many cases the lack of a supportive parent system, there will remain cases where residential treatment cannot be avoided.

One may wonder if it is really that harmful if someone drops out of treatment. Among children and adolescents who completed interventions aimed at reducing disruptive behavior, the effectiveness (i.e., reduction of symptoms) has clearly been demonstrated (Bennett & Gibbons, 2000; Kazdin, 2016; Kazdin et al., 1994; McCart et al., 2006; Serketich & Dumas, 1996; M. Shaw et al., 2012; Van der Pol et al., 2017). When disruptive behavior and psychiatric problems are not treated however, these problems are likely to persist or even get worse later in life (De Haan et al., 2013; Moffitt et al., 2002). With this in mind, we hypothesized that an individual completing treatment is better off than someone who prematurely drops out. To the best of our knowledge this had never been demonstrated, and thus far little to nothing was known about the course of symptoms after termination of treatment of individuals who dropped out prematurely. The present thesis (chapter 6) showed that dropout was related to poorer functioning at follow up, and therefore we concluded that it is of clinical relevance to prevent it. Thus, we do know that 18 months after (premature) discharge, a considerable part of the dropout group functioned worse than the completer group. This could be because this specific group had more problems initially. Also, we do not know whether these dropouts would have been helped with treatment. Further research is warranted to investigate whether alternative interventions are useful for this group. It could be that more outreaching interventions

like MDFT or MST work better for young people who have high risk of dropout. Moreover, it is important to realize that there will probably always be an unreachable group. It is important to bring this group to a minimum.

Cannabis usage

Research indicated that in The Netherlands about half of all youngsters age 17 or 18 have used cannabis (Verdurmen et al., 2011), and among groups of troubled youth the prevalence is even higher (Van Laar et al., 2014). As there is a strong relation between substance use and disruptive behavior (Disney et al., 1999; Grant et al., 2015; Kendler et al., 2003), it was not surprising that many youngsters admitted to De Fjord used cannabis. The use of cannabis in itself was not a reason for expulsion, on the contrary, relapse prevention was an important part of the treatment. Not surprisingly, we found that cannabis use prior to treatment was related to dropout. It was already known that individuals using cannabis after discharge had almost 6 times higher likelihood at worsening of symptoms (SCL-90-R) at one-year follow-up (Boon & De Boer, 2007). Also, individuals who had not used cannabis after discharge were over 11 times more likely to improve their (SCL-90-R) symptoms at one-year follow-up (Boon & De Boer, 2007). Cannabis use is thus a crucial determinant that has an influence on the outcome. Therefore, reduction or prevention of cannabis use is of clinical relevance. Treatment and relapse prevention of cannabis use should be an important focus during treatment of youth with severe disruptive behavior and psychiatric disorders, as well as for other groups of vulnerable youth. Ideally, such interventions are not only effective in reducing cannabis use, but also in terms of symptom reduction. For youth with a combination of psychiatric problems, disruptive behavior and substance use, community care and multidimensional interventions such as MDFT (Liddle et al., 2001) and MST (Henggeler et al., 1992) can be very beneficial.

Strengths and Limitations

There are several limitations to this study. Most of them were related to the **observational design** of the study. It has been shown that treatment works for behavioral problems (in specific Conduct Disorder) (Bennett & Gibbons, 2000; Eyberg et al., 2008; Frick et al., 2014; McCart et al., 2006; Serketich & Dumas, 1996). As we did

not include a control group, we cannot conclude about the effectivity of our interventions. Further, adolescents received a diversity of interventions, therefore a possible effect cannot be related to specific components. Unlike in RCTs, in which the effect of a single intervention is studied, the treatment of De Fjord consists of a combination of practice-based and evidence-based interventions, which have often been adjusted on the basis of experience and insight to make them suitable for the specific target group of De Fjord and utmost, for an individual. Also, in clinical institutions like De Fjord, no uniform sample without comorbidities exists. Thus, although evidence-based interventions were used, we are not sure to what extent the specific combination of interventions actually work for our heterogeneous target group.

Because of the naturalistic design, we cannot conclude about the representativeness and replicability of the study. Nevertheless, we believe that the results of the present thesis are relevant for a specific subgroup of youths, since several of our findings were in line with literature.

Next, the **long period of research** has likely affected the representativeness and replicability. During seventeen years, we conducted program evaluation research in a naturalistic context, which provided a wealth of valuable information. At the same time, the clinical practice was undoubtedly subject to substantial change, due to changes in policy, management, therapeutic climate, therapists and adolescents. We do not know to what extent changes over time in the influx of youths in the clinic has influenced our results. Changes in therapists obviously must have affected the treatment and hence the treatment outcome as well as the attrition. Besides, due to experience and new insights, the approach to subjects that could potentially drop out may have evolved over time.

Other limitations concern the restrictions attached to **the way in which the classification in EO and AO was made**. In the present thesis the EO and AO division was based on specific information that was obtained from the youngsters, parents and professionals, as well as information available in files. Of course, this information is likely to differ in other studies and in other circumstances. Because the EO and AO constructs can be operationalized in different ways, the outcomes may vary (Colins & Vermeiren, 2013). It is not only unclear to what extent the results of the retrospective

EO and AO distinction can be generalized to the (prospective) onset groups, since studies also differ in the kind of information that is used to identify the disruptive behavior (e.g., self report, police records, criterion characteristic of conduct disorder). As with all studies, in the present thesis (elaborated in chapter 2), the identified age of onset depended on external factors and is therefore an approximation of the actual age of onset of the disruptive behavior. It is likely that some adolescents have been identified as AO while their actual disruptive behavior started much earlier. It may for instance be that a teacher at school was able to handle behavioral problems to a certain extent. In such a case, no special education may have been advised or just at a later time, than it would have been with another teacher. Also, in case of adequate or strict parental supervision, the age of onset of a first crime may have been postponed as it were. Also, one parent may indicate more problems than the other, depending on his or her own carrying load and subjective perspective. Such factors have not been taken into account in the present thesis. It should be noted that similar mechanisms would also have played a part in the population research.

There were also limitations with regard to the **number and nature of factors** that were associated with the EO and AO distinction. All individuals of the sample had encountered a vast amount of accumulating and interacting risk factors that, at most, were only partly covered by this study. Also, we only studied risk factors, neglecting the possible influence of protective factors (see e.g., De Vries Robbé, De Vogel, & Stam, 2012; Dubow, Huesmann, Boxer, & Smith, 2016; Lösel & Farrington, 2012; Monahan, Oesterle, Rhew, & Hawkins, 2014; Portnoy, Chen, & Raine, 2013) that are related to disruptive behavior. Risk factors as well as protective factors that were not included in the study (e.g., treatment factors, and patient characteristics, e.g., personality traits, psychotropic medication use, psychiatric disorders, family factors, pathology of parents) were probably also important in the relation between dropout, completion of treatment and general daily functioning after treatment. The explained variances of the factors found in the present thesis were relatively low, which suggests that many other factors played a role. This also indicates that the findings can only be used to a limited extent to predict behavior of the individual youths.

Clinical Implications

Detection of conduct problems at an early age

In the Netherlands, the GGD (Municipal Health Service) protects, monitors and promotes the health of all residents. It identifies and prevents health risks, provides assistance in the event of an incident, e.g., after an outbreak of food poisoning or infectious diseases, and also provides rapid assistance in case of disasters. In addition to tasks such as advising municipalities on health policy, the GGD also conducts health investigations, gives vaccinations and supports schools, among other things, with their care for a healthy learning environment for children. In the context of health research that takes place as standard among all children, children are seen at regular times by Youth Health Care (YHC) professionals of the GGD. At specific times, teachers are also asked information about how the children function at school. When youngsters are in high school, they are approached by the GGD for health screening with the aim of detecting problems early. Not only physical health is considered, but also lifestyle themes such as alcohol, smoking, nutrition and exercise. Besides, the emotional development, for example resilience, independence, mood swings and social problems such as bullying, are also considered. In the extension of this health research, results of the present thesis (chapter 2) indicated that YHC professionals and teachers already observed signs of disruptive behavior as early as the age of five in half of the children that would eventually be treated in the orthopsychiatric residential setting.

Since 2015, in The Netherlands, district teams (i.e., wijkteams) have been set up. These teams are organized by the municipality and, among other things, have the task of timely identifying and guiding vulnerable families. District teams aim to activate and support residents in their social functioning. Often these teams have a broad preventive task, and there is common ground with activity of the GGD and district teams. This task could be better utilized in practice, by stimulating collaboration between GGD and the district teams. YHC professionals for instance could involve the district teams when they receive signals of psychosocial problems. District teams on the other had could benefit from regular screening of children by the YHC, which offers a picture of the children from birth up to 18 years. District teams could improve insights about individual children by using that knowledge. Children showing signs of disruptive behavior at an early age can be identified by the YHC and be referred to

interventions initiated by the district teams. This is recommended, because research increasingly indicates that early detection of behavioral problems and subsequent early intervention is important for preventing future aggressive behavior and antisocial behavior (Beauchaine et al., 2005; Houghton et al., 2017; Kazdin, 2016; Kolko et al., 2009; Lochman & Salekin, 2003; Odgers et al., 2008). It has been found that the group of children with conduct problems that is most aggressive and that is most likely to continue their antisocial behavior into adulthood, often begin with mild conduct problems very early in childhood (Eyberg et al., 2008; Frick, 2016). The results of current thesis are in line with this finding (chapter 2). Also, children with untreated behavioral problems are more likely to drop out from school, engage in delinquent activities, drug and alcohol abuse and unemployment later in life (Lochman & Salekin, 2003; Odgers et al., 2008).

Interventions initiated by the district teams should address the needs of children and their parents in terms of content and intensity (Andrews & Bonta, 2010; Frick, 2016). Several interventions, aimed at the parents of these young children, have been proven effective in treating early emerging conduct problems (see e.g., Eyberg et al., 2008; Kazdin, 2016). Although it is certainly not the solution for all young children displaying disruptive behavior, it is important to intervene when children are young. It has for instance been found that the effectiveness of parenting programs is substantially reduced as the child grows older. Of course, there will always be children that do not respond to interventions.

Prevention of Dropout

The youngsters admitted to De Fjord often had a long history of previous (often unsuccessful) care. Admission to De Fjord is often considered as the last option for help within youth mental healthcare and also a last opportunity to finish school. For adolescents, their parents as well as for the therapists involved, the importance of staying aboard was considerable. Treatment certainly does not catch on with all adolescents with disruptive behavior (chapter 4), however, it is important to limit dropout to a minimum. When these youngsters are left untreated, they tend to cause much social turmoil. Our findings indicated that dropouts functioned worse in the period after discharge and had higher chance at poor general daily functioning at

follow-up. Therefore, in the treatment of conduct disordered youths, preventing dropout should be a main focus. This will be a challenging task, because these individuals are characterized by many risk factors associated with dropout, that likely interact with problems in multiple areas of life, negative experiences with previous youth care and overall lack of motivation. It is hypothesized that by preventing dropout, daily functioning will be improved in more individuals, additionally resulting in lower costs of care in the future. Therefore, preventing dropout will likely result in more (cost) effective care, especially since treatment that fails costs money while it probably yields nothing.

As concerns dropout prevention, the distinction in age of onset of disruptive behavior can aid to pinpoint youngsters at risk of dropout. Our study shows that both EO disruptive behavior and a history of cannabis use predicts treatment dropout. For these youngsters with high risk at dropout, practitioners should develop an intensive motivation trajectory, for instance consisting of components that appeal to the desire to change, the readiness to change, and the perceived ability to change (Nock & Kazdin, 2005).

Prevention and relapse prevention of substance use

A focus of treatment in conduct disordered youth should be prevention and treatment of substance use. In the present thesis we found that cannabis usage prior to treatment not only predicted dropout, it also affected general daily functioning at follow-up. In previous research, substance use in the year after discharge predicted aggravation of symptoms (Boon & De Boer, 2007). In this light, treatment of substance use and relapse prevention may help to reduce dropout and may also prevent worsening of symptoms. Evidence based treatment modalities that simultaneously address substance use, antisocial and aggressive behavior, and delinquency, such as Multidimensional Family Therapy (MDFT)(Henggeler et al., 1992; Van der Pol et al., 2017) and Multisystemic Therapy (MST)(Asscher et al., 2013; Liddle et al., 2001), are recommendable.

Directions for Future Research

The present thesis aimed at identifying subgroups within a clinical inpatient cohort of youths characterized by both psychiatric disorders and severe disruptive behavior based on the age of onset of their disruptive behavior. This was prompted by the idea that differentiation in subgroups may benefit intervention and may eventually result in more individualized and appropriate intervention and as a consequence better treatment results (Vermeiren, 2003). Results of the present thesis indicated that in clinical practice, the EO and AO sub classification has limited value for such differentiation. Beside the finding that EO disruptive behavior was predictive of dropout, the EO and AO sub classification did not seem to yield much in terms of outcome. However, we cannot generalize our findings to other clinical samples. For that purpose, research should focus on other clinical samples, for instance those with predominantly disruptive behavior and specific psychiatric disorders or minor psychiatric problems. Given previous research questioning the clinical usefulness of the age of onset distinction (Colins & Vermeiren, 2013; Jambroes et al., 2016), it is unlikely that such research will give positive results. For this reason, it is of interest to focus on other factors as well, such as the recently promoted LPE specifier (DSM 5).

Although one may wonder whether making any subdivision is useful at all, dividing into subgroups should help clinicians to develop and offer more tailor made, comprehensive and individualized interventions. Hence the question is how we can sub-classify a very complex clinical sample with severe disruptive behavior and co-occurring psychiatric disorders in such a way that treatment can be applied more effectively. Instead of examining dichotomous subdivisions, dimensional approaches are probably more useful. Brazil and colleagues for instance, advocate an approach that describes each individual as a combination of multidimensional traits (Brazil, Van Dongen, Maes, Mars, & Baskin-Sommers, 2018). In this, a combination of interacting biological (e.g., genetic, brain, and physiological) and cognitive (e.g., executive functioning, social cognition) dimensions should be considered (Brazil et al., 2018), which is in line with the vision of the Research Domain Criteria (RDoC)(Insel et al., 2010). This RDoC project was launched by the National Institute of Mental Health (NIMH) to create a new classification framework for research on mental disorders. In

order to investigate an interplay of a large number of variables, large samples are needed, which ask for collaborative efforts of multiple institutes and research groups.

One of the factors that could be considered is the aforementioned LPE subtyping or degree of CU traits (Caldwell, Skeem, Salekin, & Van Rybroek, 2006; Hawes & Dadds, 2005; Houghton et al., 2017), which relates to a dimension of psychopathy (Frick, Bodin, & Barry, 2000). This factor should be considered dimensional, and in combination with other dimensional factors, such as impulsivity. Impulsivity (accompanied by irresponsibility) is another dimension of psychopathy (Frick et al., 2000), and is characteristic for individuals with ADHD. A significant part of the sample we examined was diagnosed with ADHD. By abandoning the dichotomous idea that there is or is not an attention deficit disorder, a dimensional approach could be applied and the degree of impulsivity could be determined and used for sub classification. This fits well with the transformative effort as proposed by the RDoC to implement a neuroscience-based psychiatric classification (Insel et al., 2010). Indeed, research among offender populations already suggested that it is important to differentiate between antisocial individuals with and without high levels of psychopathy, especially since their disruptive behavior may look the same on the outside, while the underlying mechanisms leading to their disruptive behavior may be different (Brazil et al., 2018). This certainly also applies to our target group. Furthermore, it is relevant for clinicians, because findings also suggest that individuals with high levels of psychopathy are unresponsive to certain types of interventions and individuals with disruptive behavior can diverge greatly in the treatment interventions to which they respond best (Brazil et al., 2018).

In the present thesis, a considerable part of the sample dropped out of treatment. Of course, dropout can never be completely prevented, nevertheless it is recommended to make efforts to reduce it. To enable reduction, more knowledge is needed about mechanisms causing dropout. Although we did not find differences between pushouts and withdrawals in the factors we examined, both types of dropout probably differ in underlying mechanisms. In order to prevent the different types of dropout, these mechanisms should be further investigated. Research can provide support in this, as well as in the evaluation of deployed motivational trajectories.